



OLD DOMINION
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Announcements contained in this publication are subject to change without notice and may not be regarded in the nature of binding obligations to the University. The University reserves the right to change any provisions or requirements. Only the Provost or designee can approve changes to the Catalog except where otherwise stated within.

When students matriculate with Old Dominion University, they come under the academic requirements of the edition of the Catalog at that time. Students may graduate under these academic requirements within a period of eight years even though subsequent Catalogs may change. Academic requirements include competency requirements, grade point average requirements, and degree program requirements. Grading practices, tuition, fees and other matters are not considered to be “academic requirements” and are subject to change at the discretion of the University.

Should new changes be to their advantage, graduate students must have permission of the graduate program and dean to select a newer catalog. However, because academic programs are subject to requirements imposed by outside accrediting or certifying agencies, the Commonwealth of Virginia, and the United States of America, such outside requirements take precedence.

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Student Responsibility for Catalog Information

Students are held individually responsible for the information contained in the Undergraduate and Graduate Catalogs. Failure to read and comply with University regulations will not exempt students from whatever penalties they may incur.

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Old Dominion University

The Mission of the University

Mission

Old Dominion University (ODU) is a preeminent public research university located in Coastal Virginia. Our world-class faculty fosters dynamic on-campus and global online learning for undergraduate and graduate students that enriches their lives, promotes insightful and perceptive leadership, and motivates the pursuit of excellence in dedicated fields and professions. We collaborate with strategic partners to address challenges and propose solutions that impact the economy, environment, health and wellness, and social justice. In pursuit of equity and inclusion, ODU provides opportunities for educational, artistic, and professional growth to our diverse Monarch community.

Background

Old Dominion University is located in Hampton Roads, one of the world's major seaports. Since the early seventeenth century, Hampton Roads has been the state's gateway to the rest of the world and the world's gateway to Virginia in commerce and industry, in recreation and culture, and in national security. Now a complex of seven major cities, it is a microcosm of the opportunities and challenges of contemporary urban America. It is also a major center for research and development and a home for extensive scientific and technological activities in marine science, aerospace, ship design and construction, advanced electronics, and nuclear physics.

The University takes its unique character from Hampton Roads as it provides leadership to the state and nation in teaching, research, and service. Thus the University has a special mission for the Commonwealth in commerce, and in international affairs and cultures. It has a significant commitment in science, engineering and technology, particularly in fields of major importance to the region. As a metropolitan institution, the University places particular emphasis upon urban issues, including education and health care, and upon fine and performing arts.

As one of America's major ports, Hampton Roads is the locus of national and international military commands, and the home of a culturally diverse population. The University therefore has natural strengths in activities having international outreach. Faculty members in such fields as business, economics, international studies, geography and the sciences strive to design curricula, teach courses, and encourage foreign exchanges that enhance the University's role as Virginia's international institution.

The Hampton Roads scientific environment provides special opportunities for science and engineering faculty to emphasize research and graduate programs in such fields as marine science, aerospace, and advanced electronics. Global ocean studies and cooperative research at NASA receive particular attention, as University researchers collaborate with U.S. and foreign engineers and scientists.

Urban issues are addressed by programs in public administration, education, the social sciences, and the health professions. The richness of Hampton Roads' artistic life gives great vitality to the University's programs in the visual arts, music, theater, and dance.

Mission Support

Old Dominion University serves the needs of several internal and external constituents with its resources. These include: current and prospective students seeking undergraduate, graduate, and continuing education programs; business and industry; government agencies at all levels; the military; research organizations; and the community at large regionally statewide, nationally, and internationally. These constituencies are discussed in greater detail in the following paragraphs.

Old Dominion University offers a wide array of undergraduate programs, all of which meet national standards of excellence. Every Old Dominion undergraduate student follows a general education program that is designed to develop the intellectual skills of critical thinking and problem solving and to encompass the breadth of understanding needed for personal growth and achievement and for responsible citizenship. This general education

program places special emphasis upon appreciation of the arts and upon understanding the perspectives of women, minorities, and non-Western cultures. Each undergraduate chooses a major program in the liberal arts or sciences or in a technological or professional field.

Old Dominion University's graduate offerings are focused on society's need for advanced professional education and on specialized programs at the master's and doctoral levels for which the institution is prepared through unusual strength of faculty or special geographic advantages. All graduate programs meet national standards of excellence.

As a national leader in the field of technology-delivered distance learning, the University strives to enhance the quality of the educational experience, wherever education is delivered, by applying emerging technologies. It also supports research to explore the impact of these technologies on the teaching-learning process. By utilizing these technologies and by partnering with institutions of higher education, corporations, and governmental entities, the University is able to provide undergraduate and graduate degree programs to students across time and geographic boundaries.

Because of its commitment to Hampton Roads and its emphasis on creative innovation, Old Dominion University offers life-long learning opportunities through credit and noncredit courses and brings educational services and programs to the people of Hampton Roads at several off-campus centers. The University has a responsibility to serve the many members of the military services and their families. The military forms a unique combination of national and international constituents because they are from other locales in the United States and are looking to become, among other things, internationally capable in an international environment.

As a center of learning, Old Dominion University is committed to the principle of free inquiry. The University faculty of distinguished teacher-scholars seek to pass on the best in academic tradition while establishing themselves at the forefront of discovery and creativity. As partners in the development of the University's future, the faculty enjoy full academic freedom and have a recognized role in the decision-making process of the University. Mindful of present and future needs for a multicultural academic climate, the University deems recruitment and retention of minority and women faculty members and staff to be essential.

The University is committed to providing the highest quality instruction to all of its students. Teaching excellence is encouraged through faculty development programs and appropriate recognition of superior instruction.

The discovery of new knowledge through research and creative endeavor is a central function of Old Dominion University, which values and supports faculty participation in the discovery, synthesis, application and creation of new knowledge and art forms. The institution shall promote and preserve excellence in basic and applied research as a Carnegie Foundation Doctoral Research-Extensive University which is a key production and coordination force in technology development.

The University encourages the involvement of its faculty and staff in community service. The enrichment of the lives of students and residents of Hampton Roads is fostered through University sponsored cultural activities, fine and performing arts events, and intercollegiate athletics. In addition, through applied research, consulting, and other activities, the University plays a prominent role in the development of local business and industry and serves as a resource of government agencies and both public and private educational institutions.

The University seeks in its student body a diversity of age, gender, ethnic, religious, social, and national backgrounds. It actively recruits American minority students along with students from other countries worldwide in such numbers as to have their presence make a discernible impact upon the University's educational processes. Old Dominion recognizes its mandate to serve both the academically gifted and those who have the potential for academic success despite educational, social, or economic disadvantages.

Extracurricular activities and experiences are offered that challenge students to develop a personal system of values, to think and act autonomously, to achieve physical competence, and to establish a sense of their own identity. Other services help students meet educational, personal, and health needs.

Old Dominion University depends on its alumni for advice, leadership, and support. In close collaboration with the University, the Alumni Association provides to former students opportunities to continue their participation in various aspects of university life, to advance their personal and professional development, and to sustain communication and strengthen bonds with their alma mater and fellow alumni.

To evaluate its accomplishments against its goals, a continuing process of systematic assessment is given high priority by the University. Information gained from such efforts is utilized to ensure the highest possible quality for all University programs. The Board of Visitors will conduct a periodic review of the University's mission and major goals in conjunction with representatives of the major University constituencies. The review will ensure that the mission clearly identifies the University's unique role in Virginia's public higher education system and assures that the University is focusing its resources to be the best that it can be in that role to achieve its mission and accomplish the major goals.

Adopted by the Board of Visitors
June 10, 1971
Revised January 17, 1989
Revised April 15, 1999
Revised June 14, 2002
Revised April 8, 2010
Reaffirmed December 10, 2020

Major Goals of the University

1. Students

Old Dominion University is a selective admission institution. The University strives to serve those students in the immediate geographical area as well as attract students from the national and international communities. Additionally, the University seeks to attract and serve a culturally and ethnically diverse student body. The University pays particular attention to identifying and admitting students who are academically gifted. As a major metropolitan university, Old Dominion University has a special commitment to serve those students who have been academically, socially, or economically disadvantaged, but who have the potential for academic success.

2. Faculty

Old Dominion University seeks to attract and retain a distinguished faculty of teacher-scholars. Its faculty enjoy academic freedom and have a recognized role in the decision-making process of the University. The University is committed to strengthening its faculty through the recruitment and retention of minorities and women.

3. Academic Programs

Undergraduate Programs

As a comprehensive university, Old Dominion University offers and develops quality liberal arts, science, technology and professional programs. Old Dominion University undergraduate students follow a general education program that emphasizes intellectual skills and the breadth of intercultural understanding necessary for personal growth and achievement and responsible citizenship. All Old Dominion University degree programs meet national standards of excellence.

Graduate Programs

Old Dominion University's graduate offerings are focused on society's need for advanced professional education and on specialized programs at the master's and doctoral levels for which the institution is prepared through unusual strength of faculty or special geographic advantages. In selected graduate programs, the University aspires to international leadership.

Special Emphasis Areas

Because Hampton Roads is a major international maritime and commerce center that is Virginia's window to the nation and world, the University has a special mission for the Commonwealth in commerce, and in international affairs and cultures. With the principal marine and aerospace activities of the Commonwealth concentrated in Hampton Roads, the University has a

significant commitment to science, engineering and technology, specifically in marine science, aerospace and other fields of major importance to the region. Due to its location in a large metropolitan area, Old Dominion University places particular emphasis on urban issues, including education and health care, and on fine and performing arts.

4. Teaching

Old Dominion University is committed to providing the highest quality instruction to all of its students. Teaching excellence is encouraged through faculty development programs and appropriate recognition of superior instruction.

5. Research, Scholarship, and Creativity

Old Dominion University is a center of learning committed to the principle of free inquiry. The University seeks to participate in the acquisition, discovery, synthesis, application, and creation of new knowledge and art forms through research, scholarly endeavor and creative undertakings by faculty and students. In selected areas of research, scholarship and creativity, the University strives for international recognition.

6. Digital Learning

As a national leader in the field of technology-delivered distance learning, Old Dominion University is committed to providing academic programs to a diverse national and international population. The University seeks partnerships and alliances that will facilitate delivering those programs to place-bound students.

7. Life-long Learning

Old Dominion University is committed to the concept of life-long learning, and offers credit and noncredit courses throughout the region. The University seeks to develop off-campus centers to bring educational services and programs to the citizens of the region. Because of the major Armed Forces presence in Hampton Roads, the University is particularly cognizant of its responsibility to serve members of the military services and their families.

8. Community Service

Community service is an important part of the University's mission. Particular importance is attached to the enrichment of the lives of students and residents of Hampton Roads through University cultural activities, fine and performing arts events, and recreational, intramural and intercollegiate athletics. The University acts as a resource to business, industrial, health care and educational organizations, as well as to the agencies of local, state and federal government. The University is committed through applied research, consulting and other activities to playing a major role in advancing the overall development of Hampton Roads.

9. Student Life

The University provides opportunities for student development outside of the classroom. Programs are offered to enhance personal and social growth of individual students, to provide an exciting and stimulating collegiate environment and to enable students to cope with educational, career, and health needs. Students choosing to live in on-campus housing benefit from programs especially designed to promote student educational and personal development.

10. Alumni

Alumni are an important part of the University community. Through outreach programs, participation on advisory committees, and a variety of professional and social activities, the University maintains a close relationship with its alumni and seeks alumni involvement and support for planning and development purposes.

11. Quality

Improvement of the University is a continual process. The foregoing goals provide criteria for the rigorous and regular evaluation of the quality, pertinence and effectiveness of academic and other University programs.

These goals also provide criteria for the assessment of student achievement and the performance of members of the faculty, administration, and staff.

Adopted by the Board of Visitors
January 17, 1989
Revised April 15, 1999
Reaffirmed December 10, 2020

General Statement of Policy

Within the limits of the University's facilities as to numbers that can be accommodated, admission to Old Dominion University is open to all qualified students regardless of race (or traits historically associated with race including hair texture, hair type, and protective styles such as braids, locks, and twists), color, national origin, age, marital status, sex (including pregnancy, childbirth, or related medical conditions), political affiliation, marital status, sexual orientation, gender identity, genetic information, disability, religion, or veteran status; the facilities and services of the University are open to all enrolled students on those same bases, and all policies and standards of the University, including those governing employment, are applied accordingly. Students having concerns of this nature should contact the Office of Institutional Equity and Culture.

Old Dominion University Notice of Non-Discrimination

Old Dominion University does not discriminate in admissions, treatment, employment or access to its programs or activities on the basis of race (or traits historically associated with race including hair texture, hair type, and protective styles such as braids, locks, and twists), color, religion, national or ethnic origin, age, sex (including pregnancy, childbirth, or related medical conditions), political affiliation, marital status, veteran status, family medical and genetic information, sexual orientation, gender identity, gender expression, or disability, as required by The Civil Rights Act of 1964; The Americans with Disabilities Act of 1990, as amended; The Age Discrimination Act of 1975; Title IX of the Education Amendments of 1972; Section 504 of the Rehabilitation Act of 1973; the Virginia Human Rights Act; the Governor's Executive Order Number One (20184); and other state or federal laws and University policies <https://www.odu.edu/about/policiesandprocedures/university/1000/1005> (<https://www.odu.edu/about/policiesandprocedures/university/1000/1005/>) and <https://www.odu.edu/about/policiesandprocedures/university/1000/1008> (<https://www.odu.edu/about/policiesandprocedures/university/1000/1008/>). ODU prohibits sexual and sex-/gender-based misconduct, discrimination, harassment and interpersonal violence, including sexual assault. ODU also prohibits discrimination against employees or applicants because they have inquired about, discussed or disclosed their own pay or the pay of another employee or applicant.

As an affirmative action and equal opportunity employer, ODU promotes the full realization of employment opportunity for all persons, including minorities, women, individuals with disabilities and veterans. ODU bases all employment decisions only on job requirements. These efforts apply to all employment actions, including but not limited to recruitment, selection, hiring, promotion and compensation.

Any member of the ODU community has the right to raise concerns or file a complaint regarding discrimination without fear of retaliation. Any and all inquiries regarding the application of this statement and related policies may be referred to: Kimberly Cain, Director of Equity and EO/AA, Institutional Equity and Culture, Innovation Research Park I, 4111 Monarch Way, Suite 106, Old Dominion University, Norfolk, VA 23529, (757) 683-3141, kcain@odu.edu.

The University's designated **Title IX Coordinator** is Kate Couch, Institutional Equity and Culture, Innovation Research Park I, 4111 Monarch Way, Suite 106, Old Dominion University, Norfolk, VA 23529, (757) 683-3141, titleixcoordinator@odu.edu.

Title IX Coordinator

Kate Couch
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Norfolk, VA 23529
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Deputy Title IX Coordinators

Student Enrollment, Engagement & Services, Vicki Williams
Dean of Students and Associate Vice President
2008 Webb Center
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Athletics, Carolyn Crutchfield
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Senior Woman Administrator
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Equity and Culture, Kimberly Cain
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4111 Monarch Way Ste. 103
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Title IX Liaisons

Academic Affairs, Dr. Shanda Jenkins
Director of Faculty Recruitment and Retention
2102-B Dragas Hall
757-683-4327
sjenkins@odu.edu

Talent Management and Culture
Spong Hall, 5255 Hampton Blvd
757-683-3042

Complaints of discrimination, harassment, and retaliation may be directed to Institutional Equity and Culture (<https://www.odu.edu/equity/>) at <http://www.odu.edu/equity> (<http://www.odu.edu/equity/>). Complaint procedures may be found at <https://www.odu.edu/about/policiesandprocedures/university/1000/1005> (<https://www.odu.edu/about/policiesandprocedures/university/1000/1005/>). Complaints may also be filed with the Department of Education Office for Civil Rights (<http://www2.ed.gov/about/offices/list/ocr/docs/howto.html>), Equal Employment Opportunity Commission (<https://www.eeoc.gov/field/norfolk/charge.cfm>), Commonwealth of Virginia Division of Human Rights (<http://www.dhrm.virginia.gov/equal-employment-opportunity/>), and the Department of Human Resources Management (<http://www.dhrm.virginia.gov/>).

Title IX Nondiscrimination Statement

As part of its commitment to providing an educational environment free from discrimination, Old Dominion University complies with Title IX of the Education Amendments, which prohibits discrimination and harassment based upon sex in an institution's education programs and activities. Title IX prohibits sexual harassment, including sexual violence, of students at Old Dominion University-sponsored activities and programs whether occurring on-campus or off-campus. Title IX also protects employees from sexual harassment and discrimination. Prohibited harassment includes acts of verbal, nonverbal or physical aggression, intimidation or hostility based on sex, even if those acts do not involve conduct of a sexual nature; sex-based harassment by those of the same sex; and discriminatory sex stereotyping. Old Dominion University will take prompt action to investigate and resolve reports of sexual harassment or sexual violence in accordance with Title IX. Old Dominion University's Title IX Coordinator is Kate Couch, Innovation Research Park I, 4111 Monarch Way, Suite 106, Norfolk, VA 23529, akgriffi@odu.edu. Retaliation against any person who initiates an inquiry

or complaint or participates in the investigation of a complaint is prohibited. Such conduct will be further cause for disciplinary action.

Accreditations

Old Dominion University is accredited by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) to award baccalaureate, masters, education specialist, and doctoral degrees. Old Dominion University also may offer credentials such as certificates and diplomas at approved degree levels. Questions about the accreditation of Old Dominion University may be directed in writing to the Southern Association of Colleges and Schools Commission on Colleges at 1866 Southern Lane, Decatur, Georgia 30033-4097, by calling (404) 679-4500, or by using information available on SACSCOC's website (<https://www.sacscoc.org> (<https://www.sacscoc.org/>)).

Numerous programs of study at the University are accredited by specialized accrediting agencies that are recognized by the Council on Higher Education Accreditation (CHEA), the U.S. Department of Education, and other agencies.

College of Arts and Letters

The F. Ludwig Diehn School of Music is a full member of the National Association of Schools of Music (NASM):

11250 Roger Bacon Drive, Suite 21
Reston, VA 20190-5248
(703) 437-0700 Phone

Strome College of Business

- The undergraduate and graduate business programs of the Strome College of Business are accredited by The Association to Advance Collegiate Schools of Business (AACSB)-International.
- The undergraduate and master's degrees in accounting are also accredited by the AACSB-International.
- The master's degree in public administration is accredited by the National Association of Schools of Public Affairs and Administration (NASPAA).

Darden College of Education and Professional Studies

- The undergraduate human services program is accredited by the Council for Standards in Human Service Education.
- The mental health, school, and college counseling master's and counselor education doctoral degree programs are accredited by the Council on Accreditation of Counseling and Related Educational Programs (CACREP).
- The Children's Learning and Research Center is accredited by the Southern Association of Colleges and Schools Commission on Colleges and Council on Accreditation and School Improvement (SACS/CASI).
- The graduate program in library and information studies has been awarded candidacy by the American Library Association Committee on Accreditation (ALA).

Education Programs

- The education programs in the Colleges of Arts and Letters, Education and Professional Studies, and Sciences are accredited by the Council for the Accreditation of Teacher Education (CAEP). These include: art education, biochemistry (licensure in chemistry), biology, chemistry, computer science, early childhood education, earth science, educational leadership, elementary education, English, world languages, library science, marketing education, mathematics, math specialist, vocal and instrumental music, middle school science education, health and physical education, physics, reading specialist, school counseling, social studies, special education, Teaching English as a Second Language, technology education, and theatre and dance.
- The graduate program in music education is accredited by the National Association of Schools of Music (NASM).

Batten College of Engineering and Technology

- The baccalaureate degrees in civil engineering, computer engineering, electrical engineering, and mechanical engineering are accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org/>.
- The engineering technology programs in civil engineering technology, electrical engineering technology, and mechanical engineering technology are accredited by the Engineering Technology Accreditation Commission of ABET, <http://www.abet.org/>. (<http://www.abet.org/>)

School of Health Professions

- The Master of Health Sciences, Pathologists' Assistant program is accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS), 5600 N River Road, Suite 720, Rosemont, IL 60018, 773-714-8880.
- The Master of Physician Assistant program is accredited by the Accreditation Review Commission on Education for the Physician Assistant (ARC-PA).
- The Master of Science in Counseling and Art Therapy is accredited by the Accreditation Council for Art Therapy Education (ACATE).
- The Master of Surgical Assisting program is accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP).

College of Health Sciences

- The program in dental hygiene is accredited by the American Dental Association Commission on Dental Accreditation (ADA).
- The medical laboratory science program is accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS), 5600 N River Road, Suite 720, Rosemont, IL 60018, 773-714-8880.
- The physical therapy program is accredited by the American Physical Therapy Association, Commission on Accreditation in Physical Therapy Education (CAPTE).
- The graduate program in athletic training is accredited by the Commission on Accreditation of Athletic Training Education (CAATE).
- The nuclear medicine technology program is accredited by the Joint Review Committee on Educational Programs in Nuclear Medicine Technology (JRCNMT).
- The cytology program is accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP).
- The undergraduate program in exercise science is accredited by the Commission on Accreditation of Allied-Health Education Programs (CAAHEP).
- The Doctor of Occupational Therapy program is a candidate for accreditation by the Accreditation Council for Occupational Therapy Education (ACOTE).
- The graduate program in speech-language pathology is accredited by the Council on Academic Accreditation in Speech-Language Pathology of the American Speech-Language-Hearing Association (CAA/ASHA).

Joint School of Public Health

- The environmental health program is accredited by the National Environmental Health Science and Protection Accreditation Council (EHAC).
- The health services administration major in the Bachelor of Science in Public Health program is certified by the Association of University Programs in Health Administration (AUPHA).
- The Master of Public Health program is accredited by the Council on Education for Public Health (CEPH).

College of Sciences

- The doctoral program in clinical psychology is accredited by the American Psychological Association (APA).
- The doctoral program in psychology (human factors) is accredited by the Human Factors and Ergonomics Society.

School of Nursing

- The baccalaureate nursing program is accredited by the Commission on Collegiate Nursing Education (CCNE) and approved by the Virginia Board of Nursing (VBN).
- Graduate nursing programs (MSN and DNP) are accredited by the Commission on Collegiate Nursing Education (CCNE).
- Specialty tracks in graduate nursing programs are approved by the Pediatric Nursing Certification Board, the National Nurses Certification Corporation, American Nurses Certification Corporation, and the American College of Nurse Practitioners.
- The certified registered nurse anesthetist specialty track is accredited by the Council on Accreditation of Nurse Anesthesia Educational Programs (CoA-NA).

Affiliations

The University is a member of the Southern Association of Colleges and Schools, the American Council on Education, the Council of Graduate Schools in the United States, the American Association of State Colleges and Universities, the American Association for Higher Education, the Association of American Colleges and Universities, the Association of Governing Boards of Universities and Colleges, the Council for the Advancement and Support of Education, the Southeastern University Research Association, the American Association of University Women, the University Extension Association, the Universities Space Research Association, the American Association of Collegiate Schools of Business, the National Council for Accreditation of Teacher Education, the Association for Continuing Higher Education, the North American Association for Summer Sessions, the Association of Virginia Colleges, the Association of Schools of Allied Health Professions, the American Society for Engineering Education, the Consortium for Oceanographic Research and Education, the Conference of Southern Graduate Schools, the Council for Standards in Human Service Education, and the National Council for State Authorization Reciprocity Agreements (NC-SARA), and a partner of the Southern Regional Education Board's Electronic Campus (SREB Electronic Campus). The University is also a Division I member of the National Collegiate Athletic Association (NCAA) and the Sun Belt Athletic Conference.

The Master of Engineering Management program is certified by the American Society for Engineering Management (ASEM). The undergraduate program in chemistry is American Chemical Society certified.

Old Dominion University is authorized by the Washington Student Achievement Council and meets the requirements and minimum educational standards established for degree-granting institutions under the Degree-Granting Institutions Act. This authorization is subject to periodic review and authorizes Old Dominion University to offer specific degree programs. The Council may be contacted for a list of currently authorized programs. Authorization by the Council does not carry with it an endorsement by the Council of the institution or its programs. Any person desiring information about the requirements of the act or the applicability of those requirements to the institution may contact the Council at P.O. Box 43430, Olympia, WA 98504-3430.

University Addresses

Physical Address:

Old Dominion University
5115 Hampton Boulevard
Norfolk, VA 23529

Mailing Address:

1 Old Dominion University
Norfolk, VA 23529

Academic Calendar

Fall Semester 2025-26

Date	Day	Event
August 23	Saturday	Classes begin
September 1	Monday	Labor Day Holiday - no classes held
October 11-14	Sat-Tues	Fall Holiday - no classes held
November 4	Tuesday	Election Day - no classes held
November 14	Friday	Last day to withdraw from classes
Nov 26-30	Wed-Sun	Thanksgiving Holiday - no classes held
December 5	Friday	Classes end
December 6	Saturday	Exams begin
December 12	Friday	Exams end
December 13	Saturday	Commencement
December 13	Saturday	Degree Conferral date*

* Degrees may be conferred on additional dates during the semester pending completion of all degree requirements.

Winter Session 2025-26

Date	Day	Event
December 15	Monday	Classes begin
December 25	Thursday	Christmas Day Holiday - no classes held
January 1	Thursday	New Year's Day Holiday - no classes held
January 2	Friday	Classes end

Spring Semester 2025-26

Date	Day	Event
January 17-19	Sat-Mon	Martin Luther King, Jr. Holiday - no classes held
January 20	Tuesday	Classes begin
March 16-21	Mon-Sat	Spring Holiday - no classes held
April 17	Friday	Last day to withdraw from classes
May 04	Monday	Classes end
May 05	Tuesday	Reading Day
May 06	Wednesday	Exams begin
May 13	Wednesday	Exams end
May 15, 16	Friday, Saturday	Commencement
May 16	Saturday	Degree Conferral Date*

* Degrees may be conferred on additional dates during the semester pending completion of all degree requirements.

Summer Term 2026

Date	Day	Event
May 18	Monday	Maymester begins
May 18	Monday	Session 1 and 3 classes begin
May 25	Monday	Memorial Day Holiday - no classes held
June 05	Friday	Maymester ends (including exams)
June 19	Friday	Juneteenth Holiday observed - no classes held
June 27	Saturday	Session 1 classes end (including exams)
June 29	Monday	Session 2 classes begin
July 3	Friday	Independence Day Holiday observed - no classes held
August 7	Friday	Session 3 classes end (including exams)
August 8	Saturday	Session 2 classes end (including exams)
August 21	Friday	Degree Conferral date*

* Degrees may be conferred on additional dates during the semester pending completion of all degree requirements.

Fall Semester 2026-27

Date	Day	Event
August 22	Saturday	Classes begin
September 7	Monday	Labor Day Holiday - no classes held
October 10-13	Sat-Tues	Fall Holiday - no classes held
November 3	Tuesday	Election Day - no classes held
November 13	Friday	Last day to withdraw from classes
Nov 25-29	Wed-Sun	Thanksgiving Holiday - no classes held
December 4	Friday	Classes end
December 5	Saturday	Exams begin
December 11	Friday	Exams end
December 12	Saturday	Commencement
December 12	Saturday	Degree Conferral date*

* Degrees may be conferred on additional dates during the semester pending completion of all degree requirements.

Winter Session 2026-27

Date	Day	Event
December 14	Monday	Classes begin
December 25	Friday	Christmas Day Holiday - no classes held
December 31	Thursday	Classes end
January 1	Friday	New Year's Day Holiday - no classes held

Spring Semester 2026-27

Date	Day	Event
January 16-18	Sat-Mon	Martin Luther King, Jr. Holiday - no classes held
January 19	Tuesday	Classes begin
March 15-20	Mon-Sat	Spring Holiday - no classes held
April 16	Friday	Last day to withdraw from classes
May 03	Monday	Classes end
May 04	Tuesday	Reading Day
May 05	Wednesday	Exams begin
May 12	Wednesday	Exams end
May 14, 15	Friday, Saturday	Commencement
May 15	Saturday	Degree Conferral Date*

* Degrees may be conferred on additional dates during the semester pending completion of all degree requirements.

Summer Term 2027

Date	Day	Event
May 17	Monday	Maymester begins
May 17	Monday	Session 1 and 3 classes begin
May 31	Monday	Memorial Day Holiday - no classes held
June 04	Friday	Maymester ends (including exams)
June 18	Friday	Juneteenth Holiday observed - no classes held
June 26	Saturday	Session 1 classes end (including exams)
June 28	Monday	Session 2 classes begin
July 05	Monday	Independence Day Holiday observed - no classes held
August 06	Friday	Session 3 classes end (including exams)
August 07	Saturday	Session 2 classes end (including exams)
August 20	Friday	Degree Conferral date*

* Degrees may be conferred on additional dates during the semester pending completion of all degree requirements.

Fall Semester 2027-28

Date	Day	Event
August 21	Saturday	Classes begin
September 06	Monday	Labor Day Holiday - no classes held
October 09-12	Sat-Tues	Fall Holiday - no classes held
November 02	Tuesday	Election Day - no classes held
November 12	Friday	Last day to withdraw from classes
Nov 24-28	Wed-Sun	Thanksgiving Holiday - no classes held
December 03	Friday	Classes end
December 04	Saturday	Exams begin
December 10	Friday	Exams end
December 11	Saturday	Commencement
December 11	Saturday	Degree Conferral date*

* Degrees may be conferred on additional dates during the semester pending completion of all degree requirements.

Winter Session 2027-28

Date	Day	Event
December 13	Monday	Classes begin
December 25	Saturday	Christmas Day Holiday - no classes held
December 31	Friday	Classes end
January 1	Saturday	New Year's Day Holiday - no classes held

Spring Semester 2027-28

Date	Day	Event
January 15-17	Sat-Mon	Martin Luther King, Jr. Holiday - no classes held
January 18	Tuesday	Classes begin
March 13-18	Mon-Sat	Spring Holiday - no classes held
April 14	Friday	Last day to withdraw from classes
May 01	Monday	Classes end
May 02	Tuesday	Reading Day
May 03	Wednesday	Exams begin
May 10	Wednesday	Exams end
May 12, 13	Friday, Saturday	Commencement
May 13	Saturday	Degree Conferral Date*

* Degrees may be conferred on additional dates during the semester pending completion of all degree requirements.

Summer Term 2028

Date	Day	Event
May 15	Monday	Maymester begins
May 15	Monday	Session 1 and 3 classes begin
May 29	Monday	Memorial Day Holiday - no classes held
June 02	Friday	Maymester ends (including exams)
June 19	Monday	Juneteenth Holiday - no classes held
June 24	Saturday	Session 1 classes end (including exams)
June 26	Monday	Session 2 classes begin
July 04	Tuesday	Independence Day Holiday - no classes held
August 04	Friday	Session 3 classes end (including exams)
August 05	Saturday	Session 2 classes end (including exams)
August 18	Friday	Degree Conferral date*

* Degrees may be conferred on additional dates during the semester pending completion of all degree requirements.

Graduate Admission

Office of Admissions

The mission of the Office of Admissions is to recruit, admit, and enroll students from throughout the United States and abroad who will contribute to the overall collegiate experience. Old Dominion University is open to all qualified students regardless of race, color, religion, gender (including pregnancy), age, national origin, veteran status, disability, political affiliation, sexual orientation, or genetic information.

General Requirements for Admission

An earned baccalaureate degree from institutions of higher education accredited by accrediting agencies recognized by the U.S. Department of Education for Title IV purposes (https://www2.ed.gov/admins/finaid/accred/accreditation_pg9.html) or international equivalent. An applicant must have earned at least a 2.80 cumulative grade point average (4.00 scale) for admission to a master's program and at least a 3.00 cumulative grade point average for admission to a doctoral program. Additional requirements are imposed by individual graduate programs. For specific program requirements, prospective students should consult the appropriate section of this catalog and contact the appropriate graduate program directors.

Students who apply before completion of undergraduate work may be admitted on the condition that the bachelor's degree is received before the beginning of actual graduate studies.

Students whose backgrounds are judged to be deficient in any specific area of study or whose undergraduate grades or test scores are below the required average may be admitted provisionally and asked to make up the deficiency by taking one or more courses at the undergraduate level. Graduate credit will not be awarded for these courses.

Standardized Tests

The Graduate Record Exam (GRE) or the Graduate Management Admission Test (GMAT) may be required for admission. Test scores are considered valid for five years. Students with test scores older than five years should contact the program director for guidance.

Required by some programs, the Miller Analogies Test (MAT) is administered by appointment through the University Testing Center. Applicants should contact that office to make arrangements for taking the MAT.

Some programs require that students take the Exit Examination of Writing Proficiency, administered by the University's Writing Center, prior to completion of nine graduate hours of study. Graduate students in additional programs must take the Graduate Writing Proficiency Examination administered and evaluated by the College of Education.

Academic Testing

The University Testing Center is part of University College and is located in the Student Success Center. Personnel from the Testing Center administer University placement tests, College-Level Examination Program (CLEP) exams, DANTES, the Miller Analogies Test (MAT), and correspondence tests, and coordinate entrance and certification test administrations. For information on testing, please see the web site at <http://www.odu.edu/testing-center> (<http://www.odu.edu/testing-center/>).

Submission of Transcripts

All transcripts and academic records uploaded to the online application system are considered unofficial.

If admitted, official transcripts from all colleges or universities from which a bachelor's degree has been earned and official transcripts of all subsequent coursework must be submitted to the Office of Graduate Admissions. Official transcripts must be sent directly to the Office of Graduate Admissions from the institution at which the student took classes. Some programs may require additional official transcripts.

Old Dominion University reserves the right to require the submission of all official transcripts or credentials any time during the admission review process.

Application Procedures

Individuals interested in graduate work at Old Dominion University should apply online at <http://www.odu.edu/admission/graduate> (<http://www.odu.edu/admission/graduate/>) or contact the Office of Graduate Admissions to obtain the forms and information. The applicant must first complete the online Admissions application (including the application fee, when applicable), and submit all supporting documents required by the graduate program to which the student is applying. The completed application and supporting documents should be submitted to the Office of Graduate Admissions by the deadlines established by the programs to ensure complete processing of an application.

Several programs of a highly competitive nature have early deadlines. Failure to submit a complete application by the program's established deadline date will result in removal of the application from consideration for admission. Applications that remain incomplete for 6 months after the initial deadline will be purged unless the student requests deferment to a subsequent semester.

Applicants should refer to <https://www.odu.edu/academics/programs> (<https://www.odu.edu/academics/programs/>) for program application deadlines.

Old Dominion University reserves the right to require the submission of all official transcripts or credentials any time during the admission review process.

The Admission Decision

A written notice from the Office of Admissions or International Admissions, not letters from departments or faculty members, is certification of admission. Admission to graduate study may be limited by the number of places available in the various programs, colleges, schools, and departments of the University. Applicants are encouraged to apply early. The application process may span six to eight weeks depending on timely receipt of documents. After supporting credentials have been received and reviewed, applicants for admission are usually notified within 30 days of the action taken on their application.

International Student Admission

International students should apply only through the Office of International Admissions. U.S. Permanent Residents and Green Card holders should apply only through the Office of Admissions. The primary method of application is web-based; however, a paper application is available upon request. Along with the application and fee, officially issued academic records (transcripts) and evidence of English language proficiency are required. As a service to applicants, the Office of International Admissions evaluates all foreign academic credentials.

Application Process and Dates

Applicants must strictly adhere to international admission and specific program deadlines to allow for the evaluation of academic and financial credentials. Additional timeline considerations include the student visa application process and required attendance at various orientation programs conducted during the week prior to the beginning of classes. Admission deferments are granted for up to one calendar year (two semesters); beyond this allotted time, a new application, fee and academic credentials are required. Along with the application, fee and program specific requirements, all academic transcripts, translations and standardized tests must be official, sealed, stamped by the institution or testing agency and sent directly to the Office of International Admissions at Old Dominion University (CEEB code 005126). Officiating authorities include an institution's Registrar or Principle/Controller of Exams. When English is not the language of instruction, academic transcripts and course descriptions are required in one's native language and officially translated into English. Photocopies, notarized copies, or faxed copies of required official documents will not be accepted. Certified translations by a licensed or professional translator must accompany academic documents not written in English. Translations

of official documents completed by the student will not be accepted. Credentials submitted during the application process become the property of Old Dominion University and cannot be returned.

F-1 & J-1 Student Visas

Students seeking an F-1 or J-1 non-immigrant student visa must demonstrate to both Old Dominion University and the U.S. consulate the financial ability to cover all expenses related to study and living in the U.S. Funding requirements include tuition, health insurance, living and personal expenses for the first year of study, in addition to a reasonable expectation of funding for the remaining years of study. Old Dominion University issues forms I-20 (F-1) or DS-2019 (J-1) for the nine-month academic year with the submission of Old Dominion University's Financial Affidavit of Support, along with any corresponding original, bank issued financial statements or financial sponsorship guarantees.

English Proficiency Requirements for Non-Native Speakers of English

Admission to the University is contingent upon successful completion of English language proficiency requirements. Non-native speakers of English can provide evidence of English language proficiency through a variety of options. Admission to the English Language Center (ELC) and subsequent enrollment in non-credit English language courses at the ELC does not imply admission to the University. Further information for non-native speakers of English is available from the Office of Admissions (permanent residents and naturalized citizens) and from the Office of International Admissions (all non-immigrants).

Graduate applicants who are non-native speakers of English must provide evidence of English language proficiency through fulfillment of one of the following:

1. Submission of one of the following English proficiency test scores: TOEFL iBT of 79 (550 paper based); IELTS overall band of 6.5; PTE score of 53; GRE Verbal Reasoning of 152, a GCSE or GCE score of "O" level pass in English; CPE grade of A, B, C.
2. Possession of a Bachelor's or Master's degree equivalent from an accredited institution located in a country where English is the native language.
3. Successful completion of two university- or college-level English courses at a regionally accredited U.S. institution. Successful completion is defined as obtaining a minimum grade of C (2.00) in each of these courses. These courses must be equivalent to the University's English composition course(s) (see General Education Requirements, Lower-Division Written Communication section) and any other advanced composition or technical writing course. In addition, matriculated Old Dominion University / English Language Center students must receive prior approval from the Office of International Admissions to take English composition courses at another institution for the purpose of satisfying the English Proficiency Requirement.
4. Successful completion of the Old Dominion University's English Language Center (ELC) Monarch English Transition Program (formerly the ELC Bridge Program). Successful completion is defined as satisfying the following two criteria: a.) Securing a minimum grade of B and demonstrating 85% attendance in each English Language Center class; and b.) Securing a minimum grade point average of 3.00 in academic courses taken during the Monarch English Transition Program.

Graduate students who choose to satisfy English language proficiency requirements through the on-campus English Language Center will be placed according to the following criteria:

1. Students with a TOEFL iBT score below 61 (below 500 paper-based) are automatically eligible to enroll in the ELC's Intensive English Program (IEP). Conditional admission to most graduate programs is available.
2. Students with a TOEFL iBT score between 61 - 78 (500 - 550 paper-based) will be placed in the graduate level Monarch English Transition Program (formerly the ELC Bridge Program), which includes one

graduate academic course and semi-intensive English Language Center course work.

English Language Center - IEP students may enter the Monarch English Transition Program directly without TOEFL test scores after satisfying the following requirements: a.) Successful completion of level 5 in the IEP program with a 'B' grade or higher; and b.) Receive passing scores on level exit assessments. This option is only available to students that have progressively enrolled in the Intensive English Program.

Non-native speakers of English who anticipate holding a teaching assistantship position must provide evidence of oral English proficiency. They may take the Test of Spoken English (TSE), given by the Educational Testing Service (ETS) at sites around the world, or the ETS SPEAK Test, administered by the English Language Center at Old Dominion University. Graduate teaching assistants who fail to pass either of these tests will not be eligible to assume an instructional position.

Digital Learning

The mission of the Office of Admissions is to recruit, admit, and enroll students from throughout the United States and abroad who will contribute to the overall collegiate experience. Old Dominion University is open to all qualified students regardless of race, color, religion, sex (including pregnancy), age, national origin, veteran status, disability, political affiliation, sexual orientation, or genetic information.

Admission

Students who are applying for a online program are encouraged to apply online and include their essay and resume. Students may request letters of recommendation within the on-line application and the recommendation letters can either be mailed or sent electronically to the Office of Admissions. Additional requirements are imposed by individual graduate programs. For specific program requirements, prospective students should consult the appropriate section of this catalog and contact the appropriate graduate program directors. All graduate applications are processed according to the University policies and procedures contained in this catalog.

Types of Admission Status

Degree Seeking Applicants

Regular

Students who have fully met the requirements for admission to a program.

Provisional

An applicant who does not fully meet the requirements for admission as a regular graduate student may, at the discretion of the graduate program director, be allowed to enroll in a graduate program as a provisional graduate student.

The Graduate Continuance Policy applies to all students, including provisionally admitted students.

Deferred Enrollment

With approval of the graduate program director, enrollment into a graduate program can be deferred for no more than one calendar year beyond the start of the original semester for which admission was offered. For example, students offered admission for fall may request to defer their enrollment to the next fall semester. The records of students who have not enrolled after 1 calendar year will be purged and students will have to reapply for admission.

Nondegree Seeking Applicants

Nondegree Entry

Nondegree entry is available to students who do not choose to apply for admission to a degree program at the time but wish to enroll in course work at the institution. Some reasons to enter as a nondegree student are:

Visiting student – A student who takes course work at Old Dominion University and then transfers the course credit to the home (degree-granting) institution.

Applying for a certificate program.

Expanding academic background or teacher certification.

Taking courses for personal and/or academic growth.

Missed the application deadline, but intends to apply as a degree-seeking student for a successive term.

Taking prerequisites (undergraduate, second degree, or graduate) for a degree-seeking program.

Nondegree Entry Procedures

Applicants for nondegree status are required to complete the online application form on the Admissions Office web page. For the student's convenience, official credentials may not be required at the time of registration; however, unofficial records or a personal interview may be requested for admission purposes. It is understood that all student information stated on the application is truthful. Deliberate falsification of application information will result in immediate withdrawal and a potential forfeiture of credits. Students should be familiar with policies and procedures for nondegree enrollment listed on the application form.

Directions for Certificate Program Registration

Please contact the department offering the certificate program for specific registration information and procedures.

Additional Information

All students should seek the approval of the academic department before registering for course work as a nondegree student.

Financial aid is not available for nondegree students, except those in approved teacher certification programs.

Students under suspension from another college or university are not eligible to attend as nondegree.

Academic advising is not available to nondegree students, but students are strongly encouraged to contact their academic department before registering for courses.

All students, degree and nondegree alike, must meet the continuance requirements as stated in the current Graduate Catalog. Failure to meet these requirements will subject students to probation or suspension.

Continuing Student Admission

Continuing applicants are students who have previously attended Old Dominion University on a degree-seeking basis and left the University, but would like to return. A student who has left the University in good academic standing is required to complete a reactivation/readmission form. If the separation from the University was longer than five years, the applicant will be required to reapply and resubmit all official transcripts and necessary credentials. The graduate program directory must approve reactivation/readmission requests.

Tuition, Fees, and Financial Information

Tuition

As used by the University, the term tuition refers to a comprehensive fee that includes payment of instructional programs, academic services, student services and activities, recreational sports, and intercollegiate athletics. All fees are subject to approval and/or change by the Board of Visitors.

Information related to the comprehensive tuition can be found on the website for the Office of Finance (<https://www.odu.edu/tuition/rates> (<https://www.odu.edu/tuition/rates/>)).

Students who are eligible to enroll in a combination of undergraduate and graduate courses in any given semester must pay tuition for the courses at the appropriate levels as prescribed. Graduate hours are available at graduate tuition rates, and undergraduate rates apply for undergraduate hours.

Room and Board Charges—2025-26 Academic Year

See <https://www.odu.edu/housing> (<https://www.odu.edu/housing/>) for room and board rates.

Eligibility for In-State Tuition for Certain Individuals Using G.I. Bill Benefits

<https://www.odu.edu/tuition-aid/tuition/military> (<https://www.odu.edu/tuition-aid/tuition/military/>)

G.I. Bill is a registered trademark of the U.S. Department of Veterans Affairs. More information about education benefits offered by the VA is available at the official U.S. government website at <http://www.benefits.va.gov/gibill> (<http://www.benefits.va.gov/gibill/>).

In-State Tuition Status (Residency)

Current information about eligibility for in-state tuition rates can be found at: <https://odu.edu/tuition-aid/costs-tuition/tuition/in-state> (<https://odu.edu/tuition-aid/costs-tuition/tuition/in-state/>).

Billing Cycle/Tuition Deadlines

Through the act of registration, either by registering online or by registration form, students accept responsibility for charges incurred. All University charges are due and payable by the established deadlines. The total amount due must be received by 5:00 p.m. on the deadline date shown on the statement to avoid financial penalties. Students unable to pay the total due by the tuition deadline may opt for participation in the University payment plan (fall and spring only). If charges remain unpaid 30 days after the due date, a 5% late payment penalty is assessed. Once the account is 120 days past due, it is forwarded to a collection agency and assessed an additional 25%. Tuition deadlines are published for each term: <https://ww1.odu.edu/tuition-aid/tuition/billing> (<https://ww1.odu.edu/tuition-aid/tuition/billing/>).

Billing Statements

All itemized Student Account billing statements are only available online at www.LeoOnline.odu.edu (<http://www.leonline.odu.edu/>). Billing activity, notifications, and alerts are sent to the student's ODU.EDU provided email address. For more information, please visit the website (<https://ww1.odu.edu/tuition-aid/tuition/billing/>).

Failure to Pay Tuition

Students' registrations will not be canceled for failure to pay tuition. Nonpayment will not release students from the financial obligation for tuition charges. Students are strongly encouraged to follow University procedures and meet published deadlines to officially drop classes and be released from charges. Stopping payment on a tuition draft does not constitute a cancellation of the student's registration.

Payment/Student Accounts (Cashiers' Windows)

Students may pay for tuition and fees with personal checks, money orders, cash, or credit card (VISA, MasterCard, Discover, and American Express). The Office of Finance no longer accepts credit card payments at the cashiers' windows. Cash payments should be made at the Office of Finance cashiers' windows ONLY. Check/money order payments may be mailed to Office of Finance, Student Accounts, Old Dominion University, Alfred B. Rollins, Jr. Hall, Norfolk, VA 23529-0045. Personal checks will be accepted for the exact amount of fees and/or other amounts owed the University. Students may make credit card payments via Leo Online only. Students who pay using a credit card will be charged a convenience fee. Third party payments are accepted upon submission of authorization documents. Payments on all financial obligations to the University will be applied on the basis of age of the debt. The oldest debt will be paid first. Postdated checks are not scrutinized and will be deposited upon receipt. The cashiers do not cash checks or make cash refunds. Checks must be provided in U.S. dollars. Over-payments on students' accounts of \$5 or less that are not created by a financial aid disbursement will not be refunded unless students request the refund from the Student Accounts Office.

Cash Payments over \$10,000

In accordance with the Internal Revenue Service (IRS) requirements and the University Policy, any cash payment received by ODU exceeding \$10,000 will require completion of a Cash Intake Form (<https://www.odu.edu/sites/default/files/documents/cash-intake-form.pdf>). For more information, visit the Departmental Deposits (<https://ww1.odu.edu/finance/accounts-receivable/departamental-deposits/>) page.

Third-Party Payment Authorizations

A "Third Party" is an employer, a military unit, a service organization, embassies, or a federal, state or local governmental agency agreeing to pay tuition and fees on the student's behalf, and requests that ODU bill them for these debts. These payments require a written authorization (<https://ww1.odu.edu/tuition-aid/tuition/billing/payments/third-party/>) for processing.

Student Account Inquiry

The University reserves the right to request information on the student identification number and/or a photo identification when releasing information or conducting other financial transactions. Specific account information will be released only to the student. Each student account can be viewed using any Internet browser. Students are strongly encouraged to access records directly through their secure access site on www.leonline.odu.edu (<http://www.leonline.odu.edu/>). Students are expected and required to assume responsibility for their own financial matters and to abide by the laws of the Commonwealth and the rules and regulations of the University. Failure to read and comply with University regulations will not exempt students from whatever penalties they may incur.

Delinquent Accounts

The University will not issue a degree, diploma, grade report, or permit registration for future terms to any student who has not paid all debts in full. Students with account holds are permitted to drop classes to reduce debt or withdraw to prevent academic penalty.

Collections

Virginia State law requires that the University make every attempt to collect past due amounts owed to state agencies. If, after 120 days, full payment of a debt has not been received, the account will be placed with a collection agency. Account holders are responsible for any collection costs incurred at a rate of 25% of the total due. Several other actions may be taken including the following: the account can be listed by the Credit Bureau as a bad debt; a delinquent account can be collected in full from income tax refunds, lottery winnings or other refunds due from the state (for Virginia residents); and the account may be turned over to the Virginia Attorney General's Office for

litigation. Timely payment is strongly encouraged so that collection efforts can be avoided.

Set-off Debt Collection Act

Under the provisions of this act, an individual's Virginia income tax refund or lottery winnings will be subject to the University's claim for any unpaid balance of tuition and fees to the University. For more information, please visit <https://ww1.odu.edu/tuition-aid/tuition/penalties/collections/> (<https://ww1.odu.edu/tuition-aid/tuition/penalties/collections/>).

Dishonored Checks and Charge Cards

A \$50.00 fee will be charged for each returned check or charge on a student's account, with a maximum allowable of three returned checks after which check payments will no longer be accepted. For more information, please visit <https://ww1.odu.edu/tuition-aid/tuition/penalties/> (<https://ww1.odu.edu/tuition-aid/tuition/penalties/>).

University Payment Plan (Fall & Spring Semesters)

Students may setup a payment plan (<https://www.odu.edu/tuition/billing/payments/payment-plan-agreement/#::~text=Fall%2FSpring%20Semester%20Plans&text=Old%20Dominion%20University%20offers%20a,%2Drefundable%20set%2Dup%20fee>) in Leo Online, where charges for each semester are divided into four equal payments with a \$40 nonrefundable setup fee, to be paid at the time the payment plan is established. **Payment plans may not be available on past due balances.**

Tuition Refund Policy

The total tuition is considered fully earned by the University once scheduled classes have begun. Students desiring to withdraw from the University must formally notify the University of their intention by executing an official withdrawal with the Office of the University Registrar (<https://www.odu.edu/registrar/>). If completed by the posted deadlines each semester, students will be refunded (<https://ww1.odu.edu/tuition-aid/tuition/refunds/>) the costs and fees associated with dropped courses.

Tuition Differentials (Add/Drop Policy)

In accordance with the refund periods, a full or partial refund of the difference between tuition paid and the new tuition charges will be granted if the per credit rates differ. In those instances where the revised tuition charges are greater, the additional tuition charges will be assessed.

Special Situations

For classes of less than one semester/session in length, refunds will be granted only before the first meeting of the class. Administrative withdrawals, as in the case of classes canceled by the University or the case of academically suspended students, entitle the student to a full refund of tuition. For refund purposes, the beginning of a semester is defined as the opening day of classes as shown in the course schedule and Undergraduate and Graduate Catalogs. For additional information, visit <https://ww1.odu.edu/tuition-aid/tuition/refunds/> (<https://ww1.odu.edu/tuition-aid/tuition/refunds/>).

Return of Title IV Funds

According to federal regulations, financial aid funds are returned to the government when charges were paid by financial aid and a refund is given to a student who fully withdraws from the University. For more information or further assistance, please visit the Refunds (<https://ww1.odu.edu/tuition-aid/tuition/refunds/>) page or contact the Office of Financial Aid (<https://www.odu.edu/finaidoffice/>).

Tuition Appeal Policy

Students may request tuition financial charges be dropped if a student meets the approved requirements by completing an official Tuition Appeal (<https://ww1.odu.edu/tuition-aid/tuition/refunds/appeals/>) and providing necessary paperwork.

Senior Citizen Tuition Waiver

In accordance with the Senior Citizen's Higher Education Act of 1974 (Code of Virginia, § 23.1-639, et seq.), a senior citizen* may take courses without paying tuition or required fees, except for course materials, under certain conditions. If the senior citizen has taxable individual income of not more than \$23,850 in the preceding year, the individual may take a course for academic credit free of tuition and fees, except for fees established for the purpose of paying for course materials, such as laboratory fees, books, etc. Proof of income in the form of a Virginia Resident Form 760 or an IRS Verification of Non-Filing must be provided at the time of registration, along with the Senior Citizen Tuition Waiver Application & Registration Form. This form can be downloaded at <https://odu.edu/registrar/forms/> (<https://odu.edu/registrar/forms/>).

A senior citizen, regardless of income level, may audit a course that is given for academic credit or take a noncredit course free of tuition and fees, except for fees established for the purpose of paying for course materials, such as laboratory fees or books.

No limit is placed on the number of terms or semesters in which a senior citizen who is not enrolled for academic credit may register for courses, but the individual can take no more than three noncredit courses in any one term, quarter, or semester. There will be no restriction on the number of courses that may be taken for credit in any term, semester or quarter, or on the number of terms, semesters or quarters in which an eligible senior citizen may take courses for credit.

The two additional conditions listed below shall be met before an individual may take a course under the provisions of this program:

1. Senior citizens wishing to use this benefit must be admitted as degree-seeking or non-degree students before registering, and
2. The senior citizen may be admitted to a course only on a space-available basis after all tuition-paying students have been accommodated on or after the first day of classes for the session in which the class is scheduled. Exceptions to this procedure may be made when the senior citizen has completed 75% of the requirements for a degree.

* "Senior citizen" means any person who, before the beginning of any term, semester or quarter in which such person claims entitlement to the benefits of this chapter, (i) has reached 60 years of age, and (ii) has had his legal domicile in this Commonwealth for one year. (Code of Virginia, § 23.1-639)

Deferment for Veterans

Old Dominion University offers a deferment for veterans, which extends the payment deadline for students whose veterans' benefits are not available by the tuition deadline. More information may be found here: <https://ww1.odu.edu/tuition-aid/tuition/military/> (<https://ww1.odu.edu/tuition-aid/tuition/military/>).

Federal Student Aid Refunds

Students who have a credit balance on their account may be eligible to receive a refund. The type of credit on a student's account will determine the method of initiating the refund and the length of time for a student to receive their refund. If there is a credit balance, then funds will be returned to the student in the form of a check or e-Refund. Additional information may be found here: <https://ww1.odu.edu/tuition-aid/tuition/refunds/> (<https://ww1.odu.edu/tuition-aid/tuition/refunds/>).

Replacement Checks

Checks that are lost, mutilated, or destroyed can be replaced by issuing a Stop Payment Request Form (<https://www.odu.edu/sites/default/files/documents/stop-payment-request.pdf>). For more information, please visit <https://ww1.odu.edu/tuition-aid/tuition/refunds/> (<https://ww1.odu.edu/tuition-aid/tuition/refunds/>).

Education Tax Credits

The IRS regulations require ODU to provide a statement of tuition and charges billed each calendar year via a 1098T Tax Form, issued no later than January 31 of each calendar year to all eligible students. For more

information, please visit <https://ww1.odu.edu/tuition-aid/tuition/education-tax-credits> (<https://ww1.odu.edu/tuition-aid/tuition/education-tax-credits/>).

Contact Information

Information related to tuition and fees, billing, refunds, payment options and related forms may be directed to Customer Relations located in the downstairs lobby of Alfred B. Rollins, Jr. Hall:

Local (757) 683-3030

Toll-free (800) 224-1450

FAX (757) 683-4100

e-mail tuition@odu.edu

Payment address:

Office of Finance

Old Dominion University

Alfred B. Rollins, Jr. Hall

Norfolk, VA 23529

Graduate Financial Aid

Office of Student Financial Aid

The Office of Student Financial Aid supports the mission of the University by seeking to assist qualifying students and their families in reducing financial barriers that might prohibit their participation in the education programs offered by Old Dominion University. Provide exemplary customer service; deliver funds in a timely and equitable manner; support enrollment and retention by identifying and obtaining resources and ensure federal, state and institutional policies and regulations are adhered. We also strive to educate students, their parents, the community and our colleagues to ensure informed financial decisions are reached. The office administers need-based financial aid programs funded by Federal, State, University, and private sources in the form of grants, Federal Direct Subsidized loans, Federal work-study programs, and both merit-based and need-based scholarships. In addition, the office administers the William D. Ford Federal Direct Unsubsidized Loan program and the Federal Direct PLUS loan program, both of which are non-need-based federally supported sources of funding. Alternative loan options are also available.

Financial resources are available to assist Old Dominion University graduate students with their educational costs. Most stipends awarded to graduate students are insufficient for meeting all living expenses; therefore, other sources of income are necessary. Financial sources for graduate students typically include teaching, administrative and research assistantships, fellowships, tuition grants (all administered through the academic colleges), as well as Federal Direct Stafford Loan Programs, and part-time student employment (administered through the Center for Career and Leadership Development). Additional information about need-based financial assistance is available from the Office of Financial Aid.

Prospective graduate students should also consider applying for national fellowships, such as those awarded by the National Science Foundation, the Woodrow Wilson National Fellowship Foundation, the Ford Foundation (minority fellowship program), and the Danforth Foundation. Applicants should check program deadlines, some of which are as early as December 1. Information on fellowships in specific fields is available from the chair or program director of each department/school.

Regulations governing the administration of student financial aid are subject to unanticipated changes. Information provided herein is as accurate as possible on the date of printing. For additional and updated information, students and interested parties are invited to visit the office's web site at <https://www.odu.edu/finaidoffice> (<https://www.odu.edu/finaidoffice/>) or Old Dominion University's home page <http://www.odu.edu>.

Scholarships, Grants, Loans, and Student Employment

The University offers a variety of awards each year to qualified students who have been accepted for admission into degree programs. Some of these awards are available only to Virginia residents, while others are awarded without regard to state residency. Student assistance is offered on the basis of scholastic achievement and/or established financial need. Financial need is defined as the difference between the cost of education/attendance at Old Dominion University and the amount of money an applicant and his or her family are expected to make available from their income and assets to meet the expenses of that education. The eligibility for non-need Federal Direct Unsubsidized loans and Federal Direct PLUS loans is determined by a combination of factors, including cost of attendance, and aggregate amount borrowed to date, to name a few.

To be eligible for assistance from the major student aid programs, a student must:

- be a citizen or an eligible non-citizen;
- be admitted and enrolled as degree seeking in an eligible program;
- be registered with the Selective Service (if required);
- not be in default or owe a repayment or refund on a federally guaranteed loan or grant;

- be in good academic standing (making satisfactory academic progress) to be eligible for financial assistance. Certain aid programs require a student to maintain a full-time status.

There is one exception to the requirement that students be admitted on a degree-seeking basis: students who are admitted only for purposes of teacher certification may qualify for a William D. Ford Federal Direct Loan by submitting a memo verifying their admission into an approved licensure program by the Director of Teacher Education Services in the Darden College of Education. Students must be enrolled in six (6) credits minimum to be eligible for aid.

Financial aid eligibility is determined on an annual basis for one academic year (fall, spring), and is determined for succeeding years upon re-application and continued eligibility. Student must submit the summer aid request form to request summer aid review. Not all students will be eligible for summer aid. Applications for Old Dominion University-administered financial aid should be submitted as early as possible starting in October for consideration in the following academic year.

To be considered for the Annual and Endowed Scholarships administered by the University, an Admissions application or the Scholarship Application for Continuing Students must be received by the University by March 1st preceding the academic year of interest. All admitted students will automatically be considered.

An entering student must be accepted for admission into a degree-seeking program before receiving a financial aid eligibility notification letter, however, a student who has not yet been accepted for admission may apply for financial assistance. Once admitted into an eligible degree program, the student will automatically receive a notice of tentative financial aid eligibility. Announcements of financial aid eligibility for early applicants are generally made before May 1. The applicant will be notified by the Office of Student Financial Aid. In addition, the admitted student is encouraged to monitor the status of his/her application for aid and its subsequent processing by accessing his/her records on the University's secure online site, LEO Online at www.leonline.odu.edu. Alerts, reminders, and student-specific information are mailed through the University's secure e-mail system throughout the year, and students are responsible for reading and responding to these communications.

The information regarding financial aid contained in this catalog is subject to changes or deletions without notification. Additional information concerning financial aid is available through the Office of Student Financial Aid. The Guide to Federal Student Aid, which describes the federal student aid programs and how to apply for them, is also available free of charge from the Federal Student Aid Information Center (1-800-433-3243). The U.S. Department of Education provides efficient and secure access to information and government services and benefits for students via the web site (<https://studentaid.gov/>).

Application Requirements

To be considered for financial aid, a student must complete the FAFSA as soon as it becomes available preceding the academic year for which application is made. For example, a student planning to attend during the Fall semester, 2025 would submit a financial aid application on or after October 1, 2024. The documents and deadlines are described below. The FAFSA for the 2026-27 year is expected to be available on October 1, 2025.

Note: The Free Application for Federal Student Aid (FAFSA) is required of all applicants who wish to be considered for financial aid.

Document 1: The Free Application for Federal Student Aid (FAFSA)

Submitting a completed and signed FAFSA initiates the process of applying for financial aid. The information provided by the student (and his/her contributors) is used by the University and other awarding agencies to determine financial need and general financial aid eligibility. When filing the 2025-26 FAFSA, tax information for 2023 will be submitted. When completing the FAFSA, use Old Dominion University's Title IV Institution Code (003728). Old Dominion University encourages students to take advantage of the electronic FAFSA option on the web at <https://>

studentaid.gov/, which is a secure and convenient method for completing the application process. All applicants and contributors of dependent applicants should apply for a FAFSA ID with the Department of Education at <https://studentaid.gov/> in order to be able to sign the FAFSA application electronically. The FAFSA must be filed each year for which the student is requesting aid. FAFSAs received by the federal processor before university established priority deadlines receive priority consideration. The FAFSA priority date is March 1 for all students (priority consideration as funds are available).

Document 2: FAFSA Submission Summary

Once the FAFSA is received and processed, you will receive your results by e-mail within a few days. The e-mail will contain a secure link so you can access your FAFSA Submission Summary online. If you have a “blocked” folder in your e-mail files, check it. Students are strongly encouraged to keep their FAFSA Submission Summary and all other financial-aid-related documents for future reference. The FAFSA Submission Summary contains valuable information as well as a unique data release code.

Document 3: Employment Eligibility Verification

All U.S. employers are responsible for completion and retention of Form I-9 for each individual they hire for employment in the United States. This includes citizens and non-citizens. On the form, the employer must verify the employment eligibility and identity documents presented by the employee and record the document information on the Form I-9. Additional information can be obtained from the Office of Finance.

Document 4: Consortium Agreement and Dual Enrollment Forms

Students attending classes at the community college may be required to submit these forms. These students should consult with their success advisor and their financial aid counselor to determine if these forms are required.

Standards of Satisfactory Academic Progress to Maintain Financial Aid Eligibility

Old Dominion University Requirements

Fulfillment of Federal Satisfactory Academic Progress is reviewed and evaluated by the Financial Aid Office in compliance with federal regulations. In order to qualify for assistance through the Office of Student Financial Aid, students must be accepted by the University as degree-seeking students. Students must be enrolled at least half-time (50%) to qualify for most financial aid programs.

Graduate students must be enrolled for a minimum of nine (9) credit hours during either the fall or spring semester to be considered full-time or 6 or more credit hours during the summer. Three-quarter time enrollment is 6-8 credit hours during the fall or spring semesters or 4-5 credit hours in the summer semester. Half-time enrollment for graduate students is 4-5 credit hours during either the fall or spring semesters or three credit hours during the summer semester.

Eligibility and award amounts are based on the number of semester hours in which the student is enrolled. For purpose of financial aid, courses taken for audit do not count toward enrolled hours.

The following quantitative and qualitative requirements apply to financial aid programs administered by Old Dominion University for satisfactory academic progress.

Policy

Maintaining Satisfactory Academic Progress is one of many federally mandated criteria viewed in determining a student’s eligibility for continued receipt of financial aid. Progress is measured by PACE (the number of credits earned in relation to those attempted), Qualitative (GPA) standard and Allowable time (the maximum time frame allowed to complete the academic program). Students must also demonstrate a progression toward completion of their degree program within an established time-frame.

Failure to maintain Satisfactory Academic Progress will result in loss of financial aid eligibility. Progress is reviewed annually, at the end of the academic year.

A. PACE

Graduate

To maintain Satisfactory Academic Progress, a graduate student is required to complete 80% of the total credit hours attempted.

How to calculate PACE

$.80 \times \text{Attempted Hours (including transfer credits)} = \text{Minimum hours a graduate student must earn}$

B. QUALITATIVE

Qualitative Satisfactory Academic Progress for students is evaluated in accordance with the following table.

Hours Earned	Minimum G.P.A
1+	3.0

C. Maximum Time Frame

No student may exceed 150% of the published length of their educational program. Students will be notified and will need to appeal for financial aid when they are approaching 150%. Students must complete their degree within a specified amount of time. This standard will depend on the student’s enrollment status and degree. Old Dominion University requires an appeal at 125% of degree hours. When a student exceeds 125%, they will be required to submit an appeal for the following semester to determine if they will continue to receive financial aid.

*Note: Transfer credit hours are included in the calculation.

Satisfactory Academic Progress Review

The Office of Student Financial Aid will conduct a review of Satisfactory Academic Progress at the end of each academic year. Email notifications of SAP standard(s) not met will be sent to the student’s ODU email account or mailed to the student’s permanent address.

Please note that students who have not received financial aid in previous years but are applying for financial assistance for the first time will also be held to the requirement of maintaining Satisfactory Academic Progress. Satisfactory Academic Progress is reviewed for all semesters of a student’s enrollment regardless of whether the student was eligible for financial assistance during a term. **If students exceed the maximum allowable time, they are not meeting satisfactory academic progress, thus, all aid will be suspended.**

Financial Aid suspension does not prohibit you from continuing your education at Old Dominion University. It does prohibit you from receiving financial aid until you again meet the standards for Satisfactory Academic Progress.

Financial Aid Suspension

Students who fail to meet satisfactory academic progress are placed on financial aid suspension. You have the option to appeal this suspension. An appeal must be based on significant mitigating circumstances that seriously affected academic performance. The decision of the appeal will be sent via email to the students ODU email account. ***Note: Please make sure your email account is activated.**

Financial Aid Probation

For students who are successful in their appeal, aid will be reinstated on a probationary basis for one payment period/term. Emails will be sent to students on financial aid probation advising them of the conditions needed. The financial aid office will review the student’s record at the end of the semester to determine their outcome for future semesters. At the conclusion of the probation term, the student must be meeting the school’s SAP standard in order to qualify for further Title IV Funding. If it is determined that a

student will need more than one probationary term, the student must be placed on an academic plan.

The Appeal Process

Appeals must be submitted 10 days after notification of appeal or by the deadline on the appeal form. These dates vary from year to year; however, the deadline will be the Friday before classes begin.

The deadlines are listed on the SAP appeal form.

Deadlines for appeal submission for summer 2025 and 2025-26 academic years

2024-25

Summer 2025 term

2025-26

Fall term - August 22, 2025

Spring term - January 17, 2026

Summer - June 26, 2026

Students awaiting a response from the SAP Appeal Review Committee are responsible for paying their tuition and other fees by the payment deadline to avoid late and collection fees.

The decision of the Financial Aid Office is FINAL and cannot be appealed.

The complete packet including the advisor's portion and all documentation needed must be submitted or appeal will be denied.

The University will consider appeals for uncontrollable events, students having trouble adjusting to college, special circumstances that happen in a student's life such as death of a family member, student illness, transition to college issues, being called to the military, etc. The student must describe what impact the circumstance had on academics, what the student has done to address the impact and how the student plans to be successful. If the student is not yet prepared to vigorously focus on academics with assistance, if necessary, the student should not submit an appeal.

Some examples include but are not limited to:

- Death in the family. State how this person was related to you (i.e. parent, spouse, sibling, etc.). You must provide a copy of the death certificate or related documentation.
- Disabling illness or injury to the student. Please provide supporting documentation from your medical provider.
- Disabling illness or injury of immediate family member that required your care. Please provide supporting documentation from your medical provider.
- Emotional or mental health issue (for student) that required professional care. Please provide supporting documentation from your medical provider, social worker or other professional.
- Other special circumstance beyond your control (transition that may lead to depression, anxiety, and other problems that can be documented, divorce/separation, natural disaster, extreme change in financial or legal circumstances, etc.)

Documentation or evidence that supports the reason(s) must be included with your appeal. This might include a letter from a doctor, court documents, death certificates or copies of university documents, layoff notices, foreclosure notices, etc. Upload supporting documentation.

Use the SATISFACTORY ACADEMIC PROGRESS APPEAL FORM to submit your appeal.

- State clearly why you failed to meet the condition(s) cited. Upload documentation if necessary.
- State what has changed that will allow you to demonstrate SAP progress at the end of the next evaluation period.

- To confirm your extenuating circumstance(s), you must upload documentation from an objective third party (e.g. physician, counselor, lawyer, social worker, teacher, religious leader, academic advisor).

Meet with your academic advisor or department chair to complete the REQUEST FOR WRITTEN EVALUATION OF ACADEMIC PERFORMANCE form.

NOTE: If you submit your appeal without the advisor or department chair's evaluation, your appeal will not be considered.

Submit your complete appeal and upload all supporting documents by the deadline. Failure to submit the complete appeal will result in cancellation of aid.

ALLOW TWO WEEKS for the review of this appeal and receipt of the decision notification. If your appeal is approved, the decision notification will outline the conditions of your contract for reinstatement of aid eligibility. The contract is binding, and your academic progress will be reviewed at the end of the enrollment period specified. If your appeal is denied, the decision notification will specify the conditions for future consideration for financial aid eligibility.

Students awaiting a response from the SAP Appeal Review Committee are responsible for paying their tuition and other fees by the payment deadline to avoid late and collection fees.

The decision of the financial aid review committee is FINAL and cannot be appealed.

If the appeal is unsuccessful, an email notification will be sent notifying you of the decision and information on how to re-establish eligibility if applicable.

If you would like to file an appeal for reinstatement of your eligibility for financial aid, please follow these directions:

1. **Use the SATISFACTORY ACADEMIC PROGRESS APPEAL FORM to write your appeal.**

State clearly why you failed to meet the condition(s) cited.

Attach documentation if necessary.

State what has changed that will allow you to demonstrate SAP progress at the end of the next evaluation period.

To confirm your extenuating circumstance(s), you must attach documentation from an objective third party (e.g. physician, counselor, lawyer, social worker, teacher, religious leader, academic advisor).

We realize that sharing personal information can be difficult. Be assured that your statement will remain confidential. Only financial aid personnel will review your appeal.

2. **Meet with your academic advisor or the dean of your college to complete the REQUEST FOR WRITTEN EVALUATION OF ACADEMIC PERFORMANCE form.**

NOTE: If you submit your appeal without the advisor or dean's evaluation, your appeal will not be considered.

3. **Submit your complete appeal packet and all supporting documents within 14 days of receipt of the notification or prior to the deadline.** Appeals must be submitted 10 days after notification of appeal or by the deadline on the appeal form. These dates vary from year to year; however, the deadline will be the Friday before classes begin. The deadlines are listed on the SAP appeal form. Failure to submit the complete packet will result in cancellation of aid.

ALLOW TWO WEEKS for the review of this appeal and receipt of the decision notification. If your appeal is approved, the decision notification will outline the conditions of your contract for reinstatement of aid eligibility. The contract is binding, and your academic progress will be reviewed at the end of the enrollment period specified. If your appeal is denied, the decision notification will specify the conditions for future consideration for financial aid eligibility.

Students awaiting a response from the SAP Appeal Review Committee are responsible for paying their tuition and other fees by the payment deadline to avoid late and collection fees.

The decision of the financial aid review committee is FINAL and cannot be appealed.

If the appeal is unsuccessful, an email notification will be sent notifying you of the decision and also information on how to re-establish eligibility if applicable.

Re-Establishing Eligibility

Students may re-establish their eligibility for financial assistance by achieving the satisfactory progress standards. Keep in mind this will be at the student's own expense as they are ineligible for financial aid. Sitting out a semester at Old Dominion University will not assist in re-establishing eligibility. Once the student has earned the required grade point average or completed the required credit hours, they must contact financial aid to request the reinstatement of their financial aid eligibility.

Students not making SAP at the end of the second year, but at the end of the subsequent grading period come into compliance with the school's graduation requirements; will be considered making SAP beginning with the next grading period.

Withdrawing from Courses

Withdrawing from courses may impact your financial aid awards. Before withdrawing from class, you should contact the Financial Aid Office to determine the consequences.

Withdrawing from the University

Students who totally withdraw from the University and receive aid may owe the University money. Before withdrawing from the University, you should contact the Financial Aid Office to determine the consequences.

Withdrawing from all courses for two consecutive semesters may result in loss of financial aid eligibility.

Students who withdraw from all courses are subject to regulations regarding the Return to Title IV Funds requirement. If the date of complete withdrawal precedes the date on which 60% of the academic semester has been completed, a prorated portion of all Title IV student financial assistance will be due back to the federal programs. The University policy regarding tuition refunds following withdrawals is stated in the catalog and is independent of the Return to Title IV funds regulations. Students who withdraw from the University before 60% of the semester has elapsed should anticipate repaying a significant portion of the Title IV financial assistance. Additionally, students who failed to earn a passing grade during the term are subject to the same federal guidelines.

Transfer and Repeat Coursework

Accepted transfer credits must count as both attempted and completed hours.

Federal regulations limit the number of times a student may repeat a course and receive financial aid for that course. Ineligible repeated courses will be excluded from counting in the student's enrollment for financial aid purposes.

A student may receive aid when repeating a course that was previously failed (received a failing or unsatisfactory grade), regardless of the number of times the course was attempted and failed providing you meet the Satisfactory Academic Progress standards.

A student may receive aid to repeat a previously passed course (grade of 'D' or higher) one additional time. Once a student has completed any course twice with a passing grade (grade of 'D' or higher), he/she is no longer eligible to receive aid for that course.

This rule applies whether or not the student received aid for earlier enrollments in the course.

Important Note: The Financial Aid Office does not determine if a student may repeat a class, only whether a student may be eligible for financial aid

for a repeat class. For more information on your academic program's policy regarding repeat coursework, contact your academic advisor. In addition, every repeated course affects Satisfactory Academic Progress calculations; all repeated courses are counted as attempted credit hours.

Remedial courses are counted; however, enrichment and ESL courses ARE NOT taken into consideration.

Federal Programs

Students must submit the Free Application for Federal Student Aid (FAFSA) to determine eligibility for all of the following federal financial aid programs.

Federal Direct Student Loan Programs

Old Dominion University participates in the William D. Ford Federal Direct Loan Program and thus receives loan funds directly from the U.S. Department of Education upon disbursement (payment) to eligible students. There are two kinds of loans:

William D. Ford Federal Direct Unsubsidized Loans

Available to eligible students regardless of financial need, but students will be required to pay all interest charges, including the interest that accumulates during deferments.

PLUS Loans for Graduate or Professional Students

Graduate or professional students are eligible to borrow under the PLUS Loan Program up to their cost of attendance minus estimated financial assistance in the Direct Loan programs. This requirement includes a determination that the applicant does not have an adverse credit history, repayment beginning on the date of the last disbursement of the loan. Applicants for these loans are required to complete the Free Application for Federal Student Aid (FAFSA) and must have applied for their annual loan maximum eligibility under the Federal Unsubsidized Stafford Loan Program before applying for a Graduate/Professional PLUS loan.

Conditions for Disbursement of Financial Aid

The Office of Student Financial Aid publishes a "Statement of Student Responsibility & Conditions for Release of Financial Aid" document each academic year. This statement is included with the initial award notification and is also accessible on the Financial Aid Office page of the University web site <https://www.odu.edu/finaidoffice> (<https://www.odu.edu/finaidoffice/>). When students accept financial aid, they also acknowledge that they have read and agree to comply with the Statement. A limited sample of conditions is as follows:

Initial financial aid notices are based on the assumption that the student will enroll full time.

Students are required to communicate immediately with their counselors any changes in the enrollment level or student type during the period leading up to the beginning of each semester as they may impact the student's aid eligibility. Financial aid is based upon full-time (9 credits or more), three-quarter (6-8 credits), or half-time enrollment (4-5 credits). If a student's aid has been calculated based on an enrollment level different from the actual enrollment for that semester, the aid will not be released until the student has notified the counselor and the counselor has reviewed and recalculated aid eligibility. Financial aid eligibility changes when enrollment level changes. Students who drop courses are responsible for notifying the financial aid counselor immediately. It is the student's responsibility to notify the financial aid office if the student type changes (example: degree seeking to non-degree/certificate program). Aid will be reduced accordingly, and financial aid already received will be due back to the University. This also applies to "balance-of-aid" payments made to students prior to dropping.

The student is responsible for repayment of any and all financial aid received if adjustments resulting from unreported or misreported information discovered through verification, third-party notices, account reviews, that lead to reductions in aid. Documents such as Federal Income Tax transcript, W-2 forms, Leave and Earning

Statements, notices of SSI benefits, and Verification Worksheets may be required. Other documents may be requested to confirm marital status or other information provide on the FAFSA during the verification process.

The student is responsible for reporting additional educational assistance received through sources other than the Financial Aid Office. Financial aid may be adjusted according to federal regulations as a result of additional educational assistance received and not reflected initially. **The student bears responsibility for reporting any additional aid in the form of scholarships from outside sources, Vocational Rehabilitation Benefits, Graduate Tuition Scholarships, Veterans Benefits, Senior Citizen Tuition Waivers, Employer Assisted Tuition Payments, Third Party Payment Agreements involving any outside group or company, and all other forms of assistance. The student must report these external sources of financial assistance immediately to his/her financial aid counselor.**

Federal Direct Student Loans and Federal Perkins Loans require Promissory Notes. Federal Direct Student Loan promissory notes may be signed online. Federal Perkins Loan Promissory Notes are produced by the Office of Student Financial Aid after all eligibility conditions have been met. Students must complete and sign the promissory notes and return them to the Financial Aid Office before the loan process can be completed. Entrance loan counseling is required of all first-time borrowers prior to release of loan proceeds.

A tentative or conditional financial aid package assumes a level of government appropriations which are frequently under-determined at the time of preparation. If legislative bodies fail to provide the anticipated funding level, it may be necessary to reduce or cancel certain types of aid, particularly grants. Students will be notified immediately if such changes become necessary.

The Office of Student Financial Aid reserves the right to review, modify or cancel financial aid at any time on the basis of new information affecting student eligibility, including but not limited to changes in financial resources, residence, academic status, or changes in the availability of funds.

Awards Based on Admission to the University

Annual and Endowed University Scholarships

Scholarships at Old Dominion University have been established through the generosity of individuals, organizations, and corporations to recognize outstanding academic performance and to assist students in pursuing their educational goals. Scholarship awards are based on a variety of criteria. For some awards, eligibility is entirely determined by academic merit or potential. Other requirements might include demonstrated financial need, field of study, state or city residency, graduation from a particular high school or participation in a specific program, organization or activity. Generally, recipients have earned at least a 3.4 grade point average (on a 4.00 scale) and are full-time, degree-seeking students.

The Scholarship Form for Continuing and Graduate Students is available for students who are:

Students who have a change in scholarship eligibility according to the Criteria Checklist (included in the Scholarship Form)

Continuing students who meet the above circumstances must complete and submit the form to:

Office of Student Financial Aid
2002 Rollins Hall
Norfolk, VA 23529-0052

The form must be received by March 1st each year to be considered for scholarships for the following academic year. The information provided on the Form for Continuing and Graduate Students will be maintained and used for scholarship selection for the duration of the student's attendance at Old Dominion University. It is not necessary to complete the form more than once during attendance at Old Dominion University, UNLESS the

required information has changed. **To determine eligibility for need-based scholarships, designated by an asterisk (*), students must also file the Free Application for Federal Student Aid (FAFSA) PRIOR to March 1st of the appropriate academic year for Continuing and Transfer students.**

Selection procedures vary for these awards. All scholarships require admission to and enrollment in a degree program at Old Dominion University. For some scholarships, a portfolio, an audition or participation in a specific program may be required. The additional steps, if required, are summarized following each scholarship description.

Students will receive written notification of any scholarship for which they have been selected. Most scholarships will be awarded starting in April through August of each year.

College Scholarships

The College of Arts and Letters

The H. Lee Addison, III Scholarship in History was established by H. Lee Addison, III to assist a full time undergraduate or graduate student majoring in history that has a minimum GPA of 3.0.

The Eliot S. Breneiser Memorial Scholarship was established to assist a full-time music major in either the piano performance program or the music education program with a concentration in piano. Information concerning audition requirements is available from the Music Department. (AUDITION, PARTICIPATION) (757) 683-4061.

***The Dr. James V. D. Card Scholarship Fund** was established by James V. D. Card to assist an undergraduate or graduate student who is majoring in English. The recipient must demonstrate financial need. (FAFSA.)

The Anita Clair Fellman Endowed Service Learning Scholarship was established to assist one or more full time or part-time graduates, or undergraduate students who participate in a service-learning project through the Department of Women's Studies. The recipient will be selected by the chair of the Women's Studies Department and another Faculty member in the department.

The Lorraine '78 '83 and Dr. H. William Fink '34 Art Scholarship in Honor of Ken Daley was established to assist an incoming full-time graduate student in the MFA program. If there is no eligible graduate candidate who is qualified, the scholarship will be awarded to a rising senior in the BFA program who has a declared concentration in Print and Photo Media. The scholarship is based on merit and review of student's portfolio.

***The Harriet W. '69 and Burl Fisher Endowed Scholarship in History** is funded by an endowment that was established by Harriet and Burl Fisher given in memory of her aunt, Mabel Gresham Cones, and his grandmother, Renie Wright Fisher. Preference will be given to one or more full-time graduate students in history who maintain GPA of 3.5 and demonstrate financial need. (FAFSA)

***The Daniel E. Frank Memorial Scholarship Endowment for Blacksmithing and Metalwork** was established to assist a full-time student enrolled in the College of Arts and Letters and classified as a sophomore, junior or senior. Graduate students are also eligible for consideration. The recipient must be enrolled in studio art, blacksmithing, metalwork, jewelry-making or equivalent courses. The scholarship recipient must have a minimum grade point average of 3.0 or better and demonstrate financial need. (FAFSA)

The Friends of the ODU MFA Creative Writing Program Fellowship was established to assist a student enrolled in the MFA Creative Program in the College of Arts and Letters. The fellowship is based on merit and recipient must maintain a grade point average of 3.0.

***The Friends of Women's Studies Scholarship** is funded by an endowment in honor of Carolyn Rhodes for students majoring in women's studies. Two scholarships are awarded: one to a graduate student seeking an M.A. in humanities and one to an undergraduate student. Graduate students must have a minimum grade point average of 3.50. Recipients can be full- or part-time students. (FAFSA)

***The Linda Hyatt Wilson Graduate Scholarship in China Studies** was established by Linda Hyatt Wilson to assist a full-time graduate student who maintains a grade point average of 3.5, demonstrates financial need and is involved in the study of China's culture, history economy, politics, or foreign relations. (FAFSA)

***The Barbara M. Gorlinsky Memorial Fine Arts Scholarship** is made possible by an endowment the Gorlinsky family established in memory of their daughter. It is designed to assist students with financial need who are fine arts majors. Information concerning portfolio requirements is available from the Art Department. (PORTFOLIO, FAFSA) (757) 683-4047.

***The Amanda Kinzer Scholarship in Dance** was established to assist full-time undergraduate or graduate student(s) studying in the College of Arts & Letters. Preference will be given to a student(s) pursuing a degree in dance. The recipient must have a minimum grade point average of 2.75 for undergraduate students and 3.0 grade point average for graduate students.

***The Ralph Jackson and Clara Jackson Kingsbury Memorial Scholarship Endowment** was established to assist one or more undergraduate junior, senior and graduate student(s) majoring in English who has a cumulative GPA of 3.0 or better and demonstrates financial need. (FAFSA)

The Ashley Elizabeth Lawson Memorial Scholarship for Spanish Language Study Abroad was established to assist a student in the College of Arts and Letters enrolled in the Spanish Language Study Abroad Program at Old Dominion University. The recipient(s) must be full-time or part-time, Undergraduate or Graduate student.

The Marilyn Marloff and John Luker Dance Endowed Scholarship was established to assist a full-time undergraduate or graduate student(s) studying in the College of Arts and Letters who has a minimum grade point average of 2.75. Preference will be given to student(s) pursuing a degree in dance.

The Perry Morgan Fellowship in Creative Writing established in 2005 by Frank Batten and is awarded to two or more first year full-time graduate students enrolled in the creative writing program. Recipients must maintain a minimum 3.5 GPA.

***The Harvey Ronald Saunders Memorial Endowed Scholarship** was established by Mr. and Mrs. Louis M. Saunders to assist an undergraduate or graduate student majoring in the arts/fine arts with an emphasis in painting or drawing. The recipient must have a 3.00 minimum grade point average, demonstrate financial need and be a citizen of either the United States or Israel. Information concerning portfolio requirements is available from the Art Department. (PORTFOLIO, FAFSA) (757) 683-4047.

The Charles K. Sibley Art Scholarship is funded by an endowment made possible by contributions from the friends and patrons of the former Old Dominion University professor. Awards are to assist graduate or undergraduate students majoring in studio art or art history. Information concerning portfolio requirements is available from the Art Department. (PORTFOLIO) (757) 683-4047.

The David Scott Sutelan Memorial Scholarship is made possible by an endowment established by David, Charles, and May Scott Sutelan. The recipient will be seeking a master in fine arts in the creative writing program.

The Forrest P. and Edith R. White Endowed Scholarship Fund was established by Edith R. White to provide scholarships to students studying acting in the Old Dominion University Communication and Theatre Arts Department. (AUDITION)

The Joan Argyle Shambaugh Graduate Scholarship in English was established to assist students enrolled in the Master of Arts in English program within the Department of English in the College of Arts and Letters. The scholarship may be awarded to a full-time or part-time students who demonstrate financial need and maintains a grade point average of 3.0. The recipient(s) may be on enrolled as an on-campus student or online student.

***The Jerri Fuller Dickeski Endowed Master of Arts in English Scholarship** was established to promote graduate students pursuing a degree in the Master of Arts in English program with a concentration in Literature

in the College of Arts and Letters. The scholar may be full or part-time, must maintain a 3.0 grade point average, and demonstrate financial need. (FAFSA)

The Anne Tunyogi & Ildiko (Togi) Foldvary Endowed Scholarship was established to assist full-time rising sophomore students up through graduate student classification majoring in either of the Departments of History, Political Science, Sociology or in the Graduate Program in International Studies of the College of Arts & Letters. The recipient must maintain a minimum grade point average of 3.25, and complete an essay submission of no more than two pages outlining the student's interest in studies primarily relating to the historical, political, economic, ethnic, religious, cultural, linguistic and demographic forces in Central Europe, with particular focus on those of contemporary and historic Hungary in the Carpathian Basin, its neighbors and their indigenous ethnic Hungarian communities, especially, whenever possible, those living in Rumania's western province of Transylvania.

The Strome College of Business

***The Jeffrey W. Ainslie Endowed Scholarship in Real Estate** was established in 2006 by Jeffrey W. Ainslie to assist a full-time student in the Real Estate track in the Strome College of Business. The student must have a grade point average of 3.0 or higher and must demonstrate financial need. Preference will be given to the student with the highest GPA and demonstrating the greatest financial need. (FAFSA)

The Theodore F. and Constance C. Constant Fellowships are funded by an endowment that assists two full-time graduate students in the Strome College of Business.

***The Larry J. and Elizabeth J. Creef Endowed Scholarship** was established as an endowment by Larry J. and Elizabeth J. Creef to provide a scholarship to a student with an interest in pursuing a career with the Federal Bureau of Investigation (FBI), the CIA, the Department of Homeland Security, or other security agency of the U.S. government. The recipient must be a Virginia resident and a U.S. citizen, must demonstrate financial need, be a full-time student enrolled in the Strome College of Business, and must have declared a major in accounting. (FAFSA)

***The Kendra M. and Glen R. Croshaw Endowed Internship in Public Service** was established to assist a graduate student enrolled in the Strome College of Business that is currently working in or planning a career in Public Service. This scholarship will fund payment for internships in the public service sector, e.g., governmental, non-profit, or public service-related businesses. The scholar must be a full or part-time student maintaining a minimum grade point average of 3.5 and demonstrate financial need. (FAFSA)

***The Adam Gilmore Endowed Scholarship in Accounting** was established to assist a full-time entering graduate student in the M.S. Accounting Program. The recipient must hold an undergraduate degree from Old Dominion University and demonstrate financial need. (FAFSA)

***The Virginia Maritime Association/Carter T. Gunn Scholarship** was established to assist undergraduate students enrolled in the Strome College of Business majoring in Maritime and Supply Chain Management and/or an MBA student pursuing a concentration in Maritime & Port Management and demonstrating financial need. (FAFSA)

***The James A. Hixon Endowed Scholarship** was established by James A. Hixon to assist a full-time or part-time MBA student in the Strome College of Business. The student must have a cumulative GPA of 3.5 or better and demonstrate financial need. (FAFSA)

The Jesse and Sue Hughes International Accounting Scholarship was established by Dr. Jesse and Mrs. Sue Hughes to assist a full-time international student in the Strome College of Business who is a declared major in accounting with a focus on public sector financial management. Preference is given to a student at the graduate level, however, if there is not an eligible student at the graduate level, then an undergraduate student can be considered for the scholarship award.

The Jesse and Sue Hughes International Urban Studies and Public Administration Endowed Scholarship was established by Dr. Jesse and

Mrs. Roselyn S. Hughes to assist a full-time international graduate student in the Strome College of Business. The recipient must be enrolled in the Department of Urban Studies and Public Administration with a focus in public sector financial management and has successfully completed a graduate level accounting course. Secondary consideration will be given to an eligible undergraduate or graduate student in the Department of Urban Studies and Public Administration in the Department of Accounting with a focus in public financial management.

***The Max B. Jones Endowed Memorial Scholarship** was established by Katherine Jones Long and Susan K. Jones, in memory of their father, to assist a full-time or part-time graduate student enrolled in the Strome College of Business. The student must be a Virginia resident, must have a minimum cumulative GPA of 3.0, and demonstrate financial need. (FAFSA)

***The Pamela C. Kirk '88 and A. Russell Kirk Business Study Abroad Endowment** was established to assist full-time undergraduate and graduate students enrolled in the Strome College of Business to participate in Strome College of Business faculty-led study abroad experiences or an ODU affiliated study abroad program approved by a committee if an ODU faculty-led program is not offered. Preference will be given to full-time undergraduate or graduate students that demonstrate financial need. (FAFSA)

The Charles H. and Mary Kathryn Rotert Scholarship is funded by an endowment established by Mr. and Mrs. Charles H. Rotert Jr. This scholarship is awarded to a deserving student in the Strome College of Business.

***The Kilmer Accountancy Scholarship Endowment** was established to assist full-time undergraduate or graduate student(s) with a declared major in accounting. The recipient must demonstrate financial need. (FAFSA)

***The Scott and Lisa Thatcher Scholarship Endowment** was established to assist a full-time undergraduate or graduate student with a declared major in finance who demonstrates financial need. (FAFSA)

The Wolfgang Pindur Endowed Scholarship in Applied Research is funded by an endowment given by the School of Public Service to assist a full-time or part-time master's student (MPA or MUS) and/or a doctoral student (PhD in Public Administration and Urban Policy). An essay concerning the student's commitment to public service will need to be provided. (Essay) (683-6856)

***The Tevangudi P. Radhakrishnan Endowed Scholarship** was established by Rajesh Radhakrishnan to assist a full-time international student in the Strome College of Business.

The Susan (Merendino) Rowell Graduate Scholarship in Humanities was established in 2004 by Mrs. Susan S. Rowell to assist a graduate student majoring in humanities. The recipient must have a GPA of 3.4 or higher. This scholarship is renewable, and preference will be given to students with full-time enrollment status.

The Dr. Bruce L. Rubin Endowed MBA Scholarship was funded by former students of the Strome College of Business and friends. The scholarship recipient must be a newly-admitted and enrolled part-time student in the MBA program, have a minimum undergraduate grade point average of 3.2, and must have a minimum GMAT score of 600. Preference is given to a student who demonstrates volunteer service to the local business community.

The Marvin and Marilyn Simon Family Endowed Fellows Program in Business was established in 1994 to assist a master's or doctoral degree-seeking candidate attending the Strome College of Business. The recipient will be a talented student studying in business who has outstanding academic ability.

***The John R. Tabb Scholarship** was established by an endowment by the Tabb family in 2004. It is the desire of the family to assist a graduate student studying economic development with an international focus. The recipient must be a U.S. citizen with residency in North Carolina, Virginia, or Iowa. A minimum grade point average of 3.5 and demonstrated financial need is required. (FAFSA)

The Tidewater Association of Service Contractors (TASC) Scholarship was established to assist a full-time undergraduate or graduate student from the College of Engineering and Technology or Strome College of Business degree program. A full-time/part-time Masters Certification in Government Contracting program or any other certificate program supporting government contracting within the Continuing Education Departments may also be considered. The scholarship recipient must have a minimum grade point average of 3.0.

***The Shawn I. Tureman Scholarship Endowment** was established to assist full-time undergraduate or graduate students in the Strome College of Business who demonstrate financial need. (FAFSA)

***The School of Accountancy Graduate Scholarship Fund** was established to assist a graduate student(s) enrolled in the School of Accountancy or its successor program. The recipient may be selected based on merit and/or need. (FAFSA)

The Spore Scholars Endowed Scholarship was established to assist graduate student(s) enrolled in the Masters of Public Administration (MPA) program. The recipient(s) must maintain a grade point average of 3.25 or higher and must have professional experience in municipal government or the nonprofit sector.

The Strome College of Business General Scholarship was to assist a full-time student in the Strome College of Business.

The Karen and Jeff Tanner Scholarship Endowment for Doctoral Studies in Business was established to assist the top entering PhD student(s) as determined by the Graduate Program Director for Marketing and the Marketing Department Chair. Preference will be given to PhD student(s) with a concentration in marketing.

***The Joseph and Donna Vestal Endowed Scholarship** was established by Joseph Vestal to assist a full-time student in the Strome College of Business, who has a GPA of 2.5 or higher and demonstrates financial need. The recipient must also be involved in campus student activities in a leadership program. (FAFSA)

***The Rolf Williams Memorial Endowed Scholarship** was established by the Propeller Club of the United States, Port of Norfolk to assist a full-time undergraduate or full-time graduate student in the Strome College of Business. Student must be a rising senior with a declared major in Maritime and Supply Chain Management or a graduate student in the Master of Business Administration Program with a concentration in Maritime, Ports, and Logistics Management. Preference will be given to the student with greatest financial need and has at least a minimum of 3.0 cumulative GPA. (FAFSA)

The Darden College of Education & Professional Studies

The Anonymous Scholarship Endowment will assist a Ph.D. student in the Community College Leadership Program.

***The Coca-Cola Scholars Endowed Scholarship Fund** was established to assist a student enrolled in a financial aid-eligible program leading to teacher certification, licensure, and/or enhancement. Consideration will be given to all students studying via Digital Learning who have a minimum of 58 credit hours with a 3.00 cumulative grade point average. The recipient must also demonstrate financial need. (FAFSA)

The Sarah E. Armstrong Scholarship Endowment was established in 2002 in memory of the donor, Sarah E. Armstrong. The recipient must be a full-time student who has been accepted into the College of Education and must have an overall cumulative 3.2 grade point average.

The Linda Zydron Bamforth Scholarship in Early Childhood Education was established by Linda Z. Bamforth to assist a graduate student majoring in the Early Childhood Program (Pre-K -3) of the Darden College of Education. The recipient must be a full-time or part-time graduate student, has a minimum GPA of at least 3.5, and demonstrate love of children and dedication to early childhood education-evidenced by a copy of the applicant's last performance appraisal or student teaching evaluation.

The Dana Burnett Endowed Scholarship for Emerging Leaders in Higher Education was established to assist admitted students in the Darden College of Education enrolled in the Education Foundations and Leadership program interested in pursuing careers in higher education.

The Bennett's Creek Sertoma Club Scholarship was established by the Bennett's Creek Sertoma Club to assist a full-time graduate student seeking a degree in Speech Pathology. The recipient must have a grade point average of at least 3.0. Preference will be given to a student from Suffolk, Virginia.

***The Florence Pavlides Blankenship Memorial Scholarship** was established to assist students who are admitted to the Master in Library and Information Studies degree program, within the Darden College of Education and Professional Studies. Recipients must demonstrate financial need. (FAFSA)

The Darden College of Education and Professional Studies General Scholarship was established to assist a full-time student in the Darden College of Education and Professional Studies.

Mark A. Forget Endowed Scholarship in Content Area Reading Education was established to assist a graduate student enrolled in a Reading Program within the Department of Educational Curriculum and Instruction with coursework in Content Area Reading Instruction. Student must have a 3.5 grade point average or better.

***The Annabel & Hal Sacks Family Endowed Scholarship** was established to assist a full-time student in the Darden College of Education and Professional Studies who has met the requirements to enter into the teacher candidate internship at the graduate or undergraduate level. The student must demonstrate financial need and must be taking classes on campus. (FAFSA)

The J. Frank Sellow Memorial Scholarship in Education was established by the friends and family of Mr. Sellow. The recipient must have a GPA of 3.0 and major in a teacher education program. The recipient must also meet all teacher education admission standards established by their program of study and the Darden College of Education.

***The John Albert Gay Scholarship** is made possible by an endowment given by Dr. and Mrs. R. A. Gay (Florence Vaughan). This scholarship assists a graduate student majoring in special education. Preference is given to those specializing in the area of the emotionally disturbed child. Student must demonstrate financial need. (FAFSA)

The Jane M. Hager Literacy Scholarship was established to assist full-time or part-time graduate students in a Master's or Ph.D program with emphasis on literacy in the Darden College of Education. The recipient must maintain a minimum grade point average of 3.5. Selection will be based on recommendations of the Associate Dean of the Darden College of Education.

Sharon K. Mills Graduate Teaching Scholarship in Special Education was established to assist a student seeking a Master's Degree in Education, with Endorsement in Special Education: General Curriculum K-12 with an intent to teach students with disabilities or a Ph.D. with a major in Education and a concentration in Special Education student. The recipient must be an ODU alumna/alumnus that has taught in Virginia for at least a year. The recipient must live in Virginia with the exception of a military spouse that is enrolled in ODU via the online program.

***The Peggy Woofter Hull Scholarship** is made possible by an endowment given by Marie D. Woofter in memory of her daughter. It is awarded to a full-time doctoral student in education. Students are nominated by their graduate program director and are selected by the Office of the Dean of the Darden College of Education. Recipients must demonstrate financial need. (FAFSA)

***The Libbie and Albert Kaplan Scholarship in Special Education** was established to assist a full-time graduate student(s) seeking their Master's Degree in Special Education. Student(s) must demonstrate financial need and must have a 3.0 grade point average. (FAFSA)

***The Frank Hill Knecht Memorial Scholarship** is made possible by an endowment given by Lena Rosa K. Conley, an alumnus and retired staff member of Old Dominion University, in memory of her brother. This

scholarship assists a full-time graduate student in education. Preference is given to study in the area of special education. (FAFSA)

***The Ejner Emil "Karl" Karlsen Graduate Scholarship in Education** was established to assist a student(s) seeking a graduate degree from the Darden College of Education. The student must be a Virginia resident qualifying for in-state tuition, must demonstrate financial need, and may be enrolled at full or part-time status. (FAFSA)

The R.W. and Betty MacDonald Endowed Scholarship in Language Arts & Social Studies Education was established by Dr. Robert H. MacDonald and Ms. Betty Joan Matson in memory of and named for their parents. The recipient must be a graduate student enrolled in Language Arts or Social Studies Education and must have a minimum grade point average of 3.0.

***The Sertoma Club of Norfolk Scholarship for Speech Pathology** was established by the Sertoma Club of Norfolk to assist a Masters level first year full-time student enrolled in the Speech Pathology Program in the Darden College of Education. Student must have a minimum grade point average of 3.5 and demonstrate financial need. (FAFSA)

***The Strong Scholars Program Scholarship** was created to assist students in their final year of study in an approved teacher education program. This scholarship will be awarded to undergraduate students who have exhibited outstanding success and enthusiasm in field experiences prior to the final year of the program OR graduate students whose life experiences prior to enrollment reveal the same traits. Students must have achieved a minimum GPA of 3.0 in the two semesters prior to their final year and must demonstrate financial need. (FAFSA)

***The Louise M. White Memorial Scholarship** was established to assist a student pursuing a degree in the Darden College of Education and Professional Studies, first generation student that demonstrates financial need (FAFSA)

The Frank Batten College of Engineering and Technology

The Rao V. Arimilli and V. Lakshmi Arimilli Graduate Award in Mechanical and Aerospace Engineering was established to assist a PhD student in Mechanical and Aerospace Engineering, or its successor. The recipient must be making adequate academic progress in their PhD program in Mechanical and Aerospace Engineering. Preference is given to PhD students pursuing the thermal sciences.

The Batten College of Engineering and Technology General Scholarship was established to assist a full-time student in the Batten College of Engineering and Technology.

The Oktay Baysal Endowed Graduate Scholarship in Computational Engineering for Aerospace was established by Oktay Baysal to assist a graduate level Aerospace or Electrical and Computer Engineering student. The recipient must have a minimum grade point average of 3.0 and must have completed a minimum of 30 semester credit hours while attending ODU at either undergraduate and/or graduate level, or any combination thereof.

The BBG Incorporated Endowed Scholarship in Engineering was established by BBG Incorporated for a rising junior or senior majoring in Electrical Engineering, Electrical Engineering Technology, Computer Engineering, or Computer Engineering Technology who holds a minimum cumulative GPA of 2.5. The scholarship is also available to a graduate student majoring in Electrical Engineering or Computer Engineering with a minimum cumulative GPA of 3.0. The recipient will also be considered for an Engineering Cooperative Education/Intern position with BBG Incorporated.

The Civil and Environmental Engineering Visiting Council Graduate Scholarship in Engineering was established by The Civil and Environmental Engineering Visiting Council (CEEVC) in 2003. The recipient must be either full- or part-time civil or engineering graduate student who has a minimum graduate or undergraduate grade point average

of 3.25. Transfer students from other colleges or universities are also eligible for consideration.

***The Bruce and Carol Conway Scholarship Endowment** was established to assist a student that is pursuing a degree within the Batten College of Engineering & Technology. The recipient must demonstrate financial need. (FAFSA)

The Day-Helmick Family Endowed Scholarship in Engineering was established to assist a student in the Batten College of Engineering and Technology.

The Dewberry Endowed Scholarship was established to assist full-time students in the Batten College of Engineering and Technology in the civil engineering, electrical engineering, or mechanical engineering disciplines.

***The Dr. Robert A. and Ronnie Slocum Magoon Scholarship for Aerospace Engineering** was established by Robert A. Magoon to assist a graduate student majoring in Aerospace Engineering. Scholarship recipient must demonstrate financial need. (FAFSA)

The Newport News Shipbuilding and Huntington Ingalls Industries Scholars Program was established to assist rising junior, senior and/or graduate students who are declared in a STEM major related to engineering, analytics, information technology, and/or computer sciences. Student must maintain a minimum undergraduate grade point average of 2.0, and a minimum graduate grade point average of 3.0. The recipient must be a U.S. citizen or permanent resident. First preference will be given to military-affiliated student or student veterans. Second preference will go to students interested in working and living in Hampton Roads.

The Prabhu Endowed Graduate Scholarship in Mechanical Engineering was established to assist graduate level Mechanical Engineering student with a minimum grade point average of 3.0 at the undergraduate or graduate level. The scholar(s) must be a full-time student or equivalent if registered as a Graduate Assistant. Preference will be given to international students interested in research and other scholarly activities.

***The Christopher Kelly Rapp Memorial Scholarship in Civil & Environmental Engineering** was established to assist a student with a declared major in Civil and Environmental Engineering who has graduated from a Virginia High School and demonstrates financial need. (FAFSA)

***The Rollie Dubbe' Engineering Scholarship** is funded by an endowment to assist a full time graduate engineering student who holds a minimum cumulative GPA of 3.0. The scholarship recipient must be enrolled in the civil engineering program with a preference in geo-technical engineering. Must demonstrate financial need (FAFSA).

The Stuart H. Russell Memorial Scholarship is made possible by an endowment established by the estate of Olive L. Spicer. The scholarship is awarded to a deserving student in the Frank Batten College of Engineering and Technology with particular preference given to a student in the Electrical and Computer Engineering Department with an interest in electronics.

The Tiwari Endowed Graduate Scholarship in Mechanical Engineering was established by Surendra N. Tiwari. The recipient must be a graduate level Mechanical Engineering student and be enrolled full-time or equivalent if registered as a Graduate Assistant. Must have a minimum Undergraduate or Graduate GPA of 3.0 and preference is given to an international student interested in scholarly activities and research.

The Triton International Enterprises Scholarship Endowment was established to assist full-time undergraduate or graduate student(s), enrolled in the Frank Batten College of Engineering and Technology (BCET), born or a documented permanent resident from the country of Turkey with preference given to student(s) residing in a city OTHER THAN Istanbul, Ankara, Izmir, Bursa, Antalya or Adana.

***The Clarke and Susan Vetrone Endowed Scholarship** is funded by an endowment established by Clarke and Susan Vetrone to assist one undergraduate and one graduate student with an intending or declared major in the Batten College of Engineering and Technology. Both undergraduate and graduate student must be enrolled full-time and demonstrate financial

need. Undergraduate student must have a minimum GPA of 2.75 and preference will be given to a student with learning disabilities. Graduate student must have a minimum of 3.0 GPA. (FAFSA)

***The Edward L. White Endowed Scholarship** was established by Edward L. White, Jr. and Margaret W. Moore to assist a computer engineering student. The recipient must be a Norfolk resident, have a minimum 3.30 grade point average, and demonstrate financial need. (FAFSA)

The George C. Winslow Scholarship is made possible by an endowment to assist a graduate or undergraduate student who has demonstrated financial need and has obtained at least a 2.50 grade point average while pursuing a degree in mechanical engineering. (FAFSA)

The Anthony B. Woodell and Paul A. Woodell Aerospace Engineering Scholarship was established to assist a senior taking a senior concentration in aerospace engineering or pursuing an aerospace minor within The Batten College of Engineering and Technology. Preference will be given to the same student to continue their studies at ODU by pursuing a master's degree or Ph.D. in aerospace engineering. Preference will be given to full-time students, awarded on merit and/or financial need, and the student must maintain a grade point average of 3.0 at both undergraduate and graduate levels.

***The Captain Joseph F. Yurso Scholarship Endowment** was established to assist students in the Batten College of Engineering and Technology who demonstrate financial need and are in good academic standing. (FAFSA)

The College of Health Sciences

The Thomas Charles Auclair (*78) Scholarship is made possible through an endowment given by Mr. and Mrs. George E. Auclair in memory of their son. The scholarship supports a student pursuing studies in environmental health.

The Bennett's Creek Sertoma Fishcher-Grandy Endowed Scholarship was established to assist a full-time graduate student seeking a degree in Speech Pathology. The recipient must have a grade point average of at least 3.0. Preference will be given to a student from Suffolk, Virginia.

The College of Health Sciences General Scholarship was established to assist a full-time student in the College of Health Sciences.

***The DPS, Inc. Graduate Dental Hygiene Endowed Scholarship** was established by DPS, Inc. to assist a full time first or second year graduate dental hygiene student that has admitted into the Old Dominion University Dental Hygiene Program. The scholarship recipient must demonstrate financial need and hold a minimum GPA of 3.0. (FAFSA)

***The Echternach Scholarship** was established to assist a graduate student enrolled in the School of Physical Therapy. The recipient must have a minimum grade point average of 3.0 and must demonstrate financial need. An essay submission is required based on a topic chosen by the scholarship committee from the School of Physical Therapy. (FAFSA)

***The Friends of Dental Hygiene Endowed Scholarship** was established by Mrs. Linda Fox Rohrer in 2004. Recipients must be either full-time graduate or undergraduate students. The scholarship will be awarded to a deserving student in the School of Dental Hygiene. The recipient must also demonstrate financial need (FAFSA).

***The Gene W. Hirschfeld Scholarship** is supported by an endowment given by the former chair of the Department of Dental Hygiene and Dental Assisting. The scholarship is awarded to undergraduate or graduate students who demonstrate financial need and are enrolled in the Dental Hygiene Program. (FAFSA)

The Kate and George Maihafer Scholarship in Physical Therapy was established by George Maihafer to assist full-time graduate students majoring in Physical Therapy who have a minimum GPA of 3.25. Students eligible for the scholarship may apply for the scholarship starting in the spring semester of their first year of study. Students interested in the scholarship must submit an essay no longer than 500 words to the Physical Therapy Curriculum Committee describing their career goals within the

physical therapy profession after graduation. The scholarship is to be awarded in the fall semester.

***The George Maihafer Scholarship in Physical Therapy Endowed Scholarship** was established to assist full-time graduate students enrolled in the School of Physical Therapy. The recipient(s) must maintain a grade point average of 3.0 and demonstrate financial need. (FAFSA)

***Dr. Karen Royall Endowed Scholarship for Physical Therapy Students** was established to assist a full-time graduate student enrolled in the Physical Therapy Program (or its successor). Preference is given to a student with an interest in pediatrics from the Hampton Roads Region of Virginia with a minimum GPA of 3.0. Student must complete an essay (no longer than 500 words) describing their reasons for pursuing a career in pediatric physical therapy and the experiences that led to this decision to the Physical Therapy Scholarship Committee.

***Linda Fox Rohrer Endowed Scholarship for Dental Hygiene** was established to assist full-time graduate or undergraduate students. The scholarship will be awarded to a deserving student in the School of Dental Hygiene. The recipient must also demonstrate financial need (FAFSA).

***The Linda Fox Rohrer Graduate Dental Hygiene Endowed Scholarship** was established to assist a full time first or second year graduate dental hygiene student that has admitted into the Old Dominion University Dental Hygiene Program. The scholarship recipient must demonstrate financial need and hold a minimum GPA of 3.0. (FAFSA)

***Sentara Scholars College of Health Sciences Annual Scholarship** was established to assist an in-state undergraduate or graduate student enrolled in a healthcare or healthcare-related program. Student(s) must demonstrate financial need, be in compliance with the institution's Student Code of Conduct and must be in good academic standing. (FAFSA)

The Dr. Deanne Shuman Endowed Scholarship in Health Services was established to assist students with a regular admission status into the Ph.D in Health Services Research program on the basis of complete and fully evaluated credentials and recipient must be in good academic standing. The recipient must have a minimum grade point average of 3.25, be enrolled as a full-time student, and preference is given to dental hygienists interested in teaching and research. Students interested in this scholarship must submit an essay no longer than 500 words to the College of Health Science's Ph.D Advisory Committee describing his/her career goals in the health services research field after graduation.

The Sharon C. Stull Oral Health Community Impact Scholarship was established to assist all enrolled dental hygiene student(s) in the BSDH and MSDH programs. Interested student(s) must have a minimum grade point average of 3.0 and must submit an application packet to the Dental Hygiene Scholarship Committee. The packet should contain information that describes his/her leadership, volunteer and extra-curricular initiatives to increase oral health literacy in the community and include a letter of support from impacted volunteer/community organization(s).

The College of Sciences

The Dr. Hussein Abdel-Wahab Memorial Scholarship was established to assist a graduate student majoring in Computer Science.

The Sarah E. Armstrong Science Scholarship Endowment was established in 2002 in memory of Sarah E. Armstrong. The recipient must be a full-time student who has been accepted into the College of Sciences and must have an overall cumulative 3.2 grade point average.

The Virginia S. Bagley Endowed Scholarship is made possible by Mrs. Bagley's estate and is awarded to a graduate or undergraduate student in the Department of Biological Sciences.

The Richard T. and Nancy P. Cheng Award in Computer Science was established to assist one graduate student and one or more undergraduate student(s) enrolled in the Department of Computer Science in the College of Sciences. The graduate scholar must be in good academic standing and making good progress on his/her degree. The undergraduate scholar(s) may

be awarded up to the extent funds are available and must have a minimum grade point average of 3.5.

The Dr. Allen K. Clark Endowed Scholarship in Chemistry was established to assist a full-time undergraduate or graduate student majoring in chemistry or organic chemistry. Preference will be given to a student who is an affiliate of the American Chemical Society. The recipient must maintain a grade point average of at least 3.0.

Lee Entsminger Scholarship for Coastal Geology was established to assist a student emphasizing the Geosciences. If no such student is available, the department chair may recommend any student enrolled or about to enroll in graduate studies in the department of Ocean, Earth, and Atmospheric Sciences. Recipient(s) must be in good academic standing and maintain a 3.0 grade point average or higher.

***The Hampton Roads Maritime Scholarship** is funded by an endowment from the Hampton Roads Maritime Association and is given to a graduate student in the Department of Ocean, Earth, and Atmospheric Sciences with financial need. (FAFSA)

The Neil and Susan Kelley Endowed Scholarship Fund, established by Neil Kelley in 2001, provide financial support to a graduate student pursuing a Master of Science in Oceanography. The scholarship is awarded strictly on merit and may be renewed annually.

The Harold G. Marshall and Vivian J. Marshall Scholarship in Biology is funded by an endowment given by Harold G. Marshall and Vivian J. Marshall. This scholarship is provided to assist a full-time graduate student in the Department of Biological Sciences with a specific concentration in ecology.

The Brian Donald Diederich and Flavia Alexandra Osorhean Scholarship Endowment for Doctoral Research in Nuclear Physics was established to provide an award to an incoming experimental or theoretical nuclear physics Ph.D. student. Second priority is to provide an award to an existing experimental or theoretical nuclear physics Ph.D. student. Third priority is to provide an award to an incoming or existing Ph.D. student in another field within the Department of Physics.

The Nick Savage Scholarship was established by Anne Raymond Savage to assist a full-time undergraduate or graduate student majoring in an area of science that involves field work and the study of plant life. Preference will be given to a student who is entering or returning to the field of teaching science. Student must maintain a grade point average of 3.0.

The Travis Priest Family Endowment was established to assist an undergraduate or graduate student in good academic standing. The recipient must work with the Systems Group within the Department of Computer Science in the College of Sciences.

***The Jacques S. Zaneveld Endowed Scholarship** was established by Dr. Jacques S. Zaneveld to assist a graduate student in the Department of Ocean, Earth, and Atmospheric Sciences of the College of Sciences. The recipient must demonstrate a need for funding in the preparation of his/her dissertation in the field of biological oceanography. (FAFSA)

The School of Nursing

The Atlantic Anesthesia Endowed Scholarship for Nurse Anesthesia Students was established to assist full-time nurse anesthesia students in good standing. The scholarship will support tuition for any given semester of enrollment.

***The Bon Secours Hampton Roads Health System Endowed Scholarship for Graduate Nursing Students** was established to assist a full-time graduate student(s) enrolled in the Old Dominion University Nursing Program. The recipient(s) must demonstrate financial need and are encouraged to participate in a clinical experience with a minimum of 120- 250 clinical hours depending on program of study at a Bon Secours Hampton Roads Health System facility, or its successor. The student(s) will agree to placement in an ambulatory, acute, or long-term care depending on applicability to course of study. (FAFSA)

***The Chesapeake Regional Medical Center Nursing Endowed Scholarship** was established by the Chesapeake Regional Medical Center to assist a full time undergraduate or graduate student enrolled in Old Dominion University's Nursing Program. The student must demonstrate financial need and must agree to accept 120 clinical hours at Chesapeake Regional Medical Center, or its successor. (FAFSA)

***The Joseph Fleischmann Scholarship Endowment** was established to assist a full-time undergraduate sophomore, junior, senior or graduate student enrolled in pre-med or nursing major. Preference is given to a student pursuing medical research. The recipient must maintain a minimum GPA of 3.0 and must demonstrate financial need. (FAFSA)

***The Paul W. Imogene M. "Jean" Lowe Endowed Nursing Administrator/Executive Scholarship** was established to assist students enrolled in the School of Nursing graduate administrator or executive programs. The recipients must demonstrate financial need, must submit an essay about their desire for an advanced nursing degree, prior nursing practice experience, and aspirations for a nursing administrative/executive leadership position, and maintain a grade point average of 3.0. (FAFSA)

The Barbie Morgan Endowed Scholarship for Nurse Anesthesia Students was established to assist full-time senior nurse anesthesia student(s). Students interested in the scholarship must submit an application to the Graduate Nursing Awards Committee. The application packet should describe his/her volunteer activities, include a letter of support from the volunteer organization(s), and provide evidence of demonstrated clinical excellence as reported by preceptor feedback and evaluations.

The School of Nursing General Scholarship Fund was established to assist full-time student(s) in the School of Nursing.

The Graduate School

The Alumni Association Outstanding Scholar Fellowships were established in 1984. The fellowships are awarded to two graduate students in good academic standing who are attending Old Dominion University on a full-time or part-time basis. One fellowship must be awarded to an Old Dominion University alumnus/alumna who has been admitted as a full-time student to a graduate program at the University.

The Graduate School General Scholarship was established to assist a full-time student in the Graduate School. The recipient must demonstrate extraordinary academic merit and must maintain a grade point average of 3.5 or higher.

The Meredith Construction Company Scholarship is made possible by an endowment given by the Meredith Construction Co. Inc., Meredith Realty, et al., and members of the Meredith family. The award is given to a graduate student demonstrating academic merit in his/her chosen curriculum.

Military Awards

Army Reserve Officer Training Corps (AROTC) participants may qualify for scholarships. More information on application procedures and program requirements is available from the faculty of the Department of Military Science. (PARTICIPATION) (757) 683-3663.

Naval Reserve Officer Training Corps (NROTC) participants may qualify for full or partial scholarships. More information on application procedures and program requirements is available from the faculty of the Department of Naval Science. (PARTICIPATION) (757) 683-4744.

Other Awards (General)

The Bannon Foundation Quasi-Endowed Scholarship was established to assist four students of the Eastern Shore of Virginia with their commuter expenses.

The Nancy Topping Bazin Scholarship was established by the Friends of Women's Studies to assist a graduate student in women's studies.

***The John R. Burton Jr. Scholarship** is made possible by an endowment given by John R. Burton Jr. This scholarship assists students who demonstrate financial need. Preference is shown to high school graduates who have been reared in the Hope Haven Children's Home. (FAFSA)

***The Robert Claytor Memorial Scholarship** is funded by an endowment from the friends of Robert Claytor for a student who demonstrates financial need, according to federal needs analysis. (FAFSA)

The Charles H. Eure Memorial Scholarship is awarded to a marine science or engineering student who has a 3.00 grade point average and is of sound moral character. Preference will be given to a STASR (South Tidewater Association of Ship Repairers) company family member.

***The Wil & Michaelene James Endowed Scholarship** was established to assist student(s) pursuing a degree in the STEM-H field, must be a native to the Hampton Roads area in Virginia, demonstrate financial need and must have a minimum grade point average of 2.5. (FAFSA)

***The Pamela C. Kirk '88 and A. Russell Kirk Study Abroad Quasi-Endowment** was established to assist full-time undergraduate and graduate students enrolled in Old Dominion University to participate in faculty-led study abroad experiences or an ODU affiliated study abroad program approved by a committee if an ODU faculty-led program is not offered. Preference will be given to full-time undergraduate or graduate students demonstrating good academic standing, no violations of University's Honor Code, and demonstrating financial need. (FAFSA)

The Memorial and Recognition Scholarship Fund is an endowed scholarship that will be awarded to a student with a minimum grade point average of 3.00 and is able to demonstrate involvement in community service.

***The Sherwood/Portsmouth Scholarships** are funded annually by a trust established by the late Calder Sherwood III, a professor emeritus in the departments of Chemical Sciences and Physics/Geophysical Sciences. Professor Sherwood served on the Old Dominion University faculty for 38 years. The scholarships are awarded to graduates of public high schools in Portsmouth, Virginia who demonstrate financial need. (FAFSA)

***The Charles Redford "Red" Stone Scholarship** was established to assist a full-time student in good academic standing. The student must demonstrate financial need. (FAFSA)

The Town-N-Gown Scholarship has been established by Town-N-Gown, an association dedicated to promoting cooperation between the Hampton Roads community and the University in order to promote better understanding in fulfilling the aims and ideals of each. The scholarship recipient rotates annually from the following: (1) resident of the greater Hampton Roads area, (2) a member of or dependent of active duty military personnel, and (3) a dependent of an Old Dominion University faculty or staff member.

The Hugh L. Vaughan Scholarship has been established by an endowment made by Mr. Hugh L. Vaughan to assist handicapped students. Preference is given to blind students. Recipients must be native-born Virginians.

***The Jane L. and Robert H. Weiner International Affairs Scholarship** is made possible through an endowment established by Mr. and Mrs. Weiner to assist a student who will be studying abroad through the International Student Exchange Program (ISEP). Preference will be given to students who will study in a Third World or developing country for the purpose of fostering international understanding and peace and who demonstrate academic achievement and financial need. (FAFSA)

***The Calvert S. Whitehurst Scholarship** is funded by an endowment established by Mr. Robert B. Kendall and augmented by the Whitehurst Scholars Scholarship Foundation. The endowment recognizes the contribution of both Mr. Calvert S. Whitehurst and his son, Professor G. William Whitehurst, former member of the U.S. Congress. The scholarship is awarded to a student with financial need who demonstrates academic potential. (FAFSA)

The Linda Hyatt Wilson Graduate Scholarship in China Studies was established by Linda Hyatt Wilson to award one scholarship to a full-time graduate student who has a 3.5 grade point average, demonstrates financial need, and is involved in the study of China's culture, history, economy, politics, or foreign relations.

The Anita Clair Fellman Endowed Service Learning Scholarship is funded by an endowment established by Dr. Carolyn H. Rhodes to assist one or more full time or part-time graduates, or undergraduate students who participate in a service-learning project through the Department of Women's Studies. The recipient will be selected by the chair of the Women's Studies Department and another Faculty member in the department.

Other Financial Aid Resources

The Parker Lesley Endowed Fund has been established for students who demonstrate need for special circumstances. Special circumstances are defined as emergency travel, supplies, equipment, etc. (ESSAY) (757) 683-6856.

The James Stamos Scholarships in Voice and Piano are made possible by a bequest from Mr. Stamos to assist several students who are majoring in either voice or piano. Information concerning audition requirements is available from the Music Department. Contact Mr. Dennis Zeisler, chair of the department. (AUDITION) (757) 683-4061.

The Student Activities Scholarships in music are awarded to students who participate in one or more Music Department activities including concert choir, band, orchestra, Madrigal Singers and brass choir. Information concerning audition requirements is available from the Music Department. Contact Mr. Dennis Zeisler, chair of the department. (AUDITION, PARTICIPATION) (757) 683-4061.

The Viburnum Acting Endowed Scholarship Fund was established by the Viburnum Foundation to provide monetary awards to acting students. (AUDITION) (757) 683-3608.

The Institute for Learning in Retirement Scholarship is a two-year scholarship established by the Institute for Learning in Retirement for a student of any discipline who demonstrates financial need, has a baccalaureate degree, is a resident of Hampton Roads, and has a 3.00 grade point average. (757) 368-4160.

The Monarch Athletic Bands Endowed Scholarship was established by Old Dominion University Educational Foundation. The recipient(s) must be a full-time undergraduate or graduate student, successfully completes an audition, and must maintain a minimum GPA of 2.5 for an undergraduate student or minimum GPA of 3.0 for a graduate student.

State Programs

The Virginia Student Financial Assistance Program (VSFAP) was established to assist students with financial need. VSFAP Funds are used for need-based grants to Virginia resident undergraduates or for assistantships and fellowships to graduate students. As funds are limited, they are awarded on a first-come, first-served basis, with students meeting the priority FAFSA receipt deadlines established by the University given first consideration. Awards are limited to 125% of degree (cannot exceed 150 attempted credits). Specific Satisfactory Academic Progress requirements that are more rigorous than those for federal financial aid eligibility consideration apply. Interested students are encouraged to visit the State Council of Higher Education for Virginia web site at <http://www.schev.edu> (<http://www.schev.edu/>) for detailed information and program regulations and guidelines.

Veterans and Dependents Benefits

Virginia Military Survivors and Dependents Education Program (VMSDEP)

The Virginia Military Survivors and Dependents Education Program (VMSDEP) is a Commonwealth of Virginia program that provides education benefits to spouses and children of qualifying veterans who have been rated by the U.S. Department of Veteran Affairs (USDVA) (<https://www.va.gov/education/survivor-dependent-benefits/>) as totally and permanently disabled or at least 90 percent permanently disabled as a result of military service or qualifying military service members killed, missing in action, taken prisoner, or who have been rated by the USDVA as totally and permanently disabled or at least 90 percent permanently disabled as a direct result of involvement in covered military combat. Military service includes the United States

Armed Forces, United States Armed Forces Reserves, or the Virginia National Guard. VMSDEP assists survivors and dependents of qualified veterans or service members in attaining their educational goals.

The Virginia Department of Veterans Services (VDVS) (<https://www.dvs.virginia.gov/home/showpublisheddocument/148/638538872385700000/>) is responsible for certifying eligibility for benefits under the Virginia Military Survivors and Dependents Education Program.

The State Council of Higher Education for Virginia (SCHEV) (<https://www.virginia.gov/agencies/state-council-of-higher-education-for-virginia/>) and Virginia's public colleges and universities are responsible for applying the financial aid benefits (tuition/fee waiver, stipend) available under VMSDEP.

Benefits are available for up to eight semesters, the equivalent of four academic years.

Students who are certified by VMSDEP are eligible for educational benefits (a waiver of tuition and mandatory fees). **Housing and meals are not included.**

In addition, as funds are available, eligible students may receive a stipend to offset other educational expenses incurred by the student, such as room, board, books, and supplies. Please note that the stipend will **not be available** for the advance purchase of books.

Only students appearing on the verification rosters released by SCHEV to the institutions will be funded for the terms specified as authorized, regardless of certification/verification from any other source.

Stipends Priority Funding System for Fall and Spring

Because there may not be sufficient funding to make full VMSDEP stipends to all eligible students, a priority funding system will be used to determine the order and number of stipends. Students in a higher Priority category must receive their full projected annual stipend, as determined by SCHEV based on student enrollment level before subsequent categories are considered for funding. Only students appearing on the verification rosters released by SCHEV to the institutions will be funded for the terms specified as authorized, regardless of certification/verification from any other source.

To apply for VMSDEP, students must submit the application on the Virginia Military Survivors web site <https://www.dvs.virginia.gov/>.

Once approved, students are required to report enrollment plans via the VMSDEP portal for each term they wish to use benefits within the established open and close dates. Once the request is approved by VMSDEP, the student's name will be placed on the roster in the VMSDEP portal. The student's financial aid account will be noted with the enrollment and expected tuition amount. Please note VMSDEP only covers the tuition costs. Housing and meals are not included. Tuition payment may be adjusted for enrollment changes or tuition charge revisions.

The student's name must match the name listed in the ODU system to be processed. For example, if the name listed with VMSDEP is Bobby Smalls, the ODU name listed must also be Bobby Smalls. It cannot be Bob Smalls or Robert Smalls. VMSDEP funds cannot be processed if the student names do not match in both systems. It is strongly encouraged to have the student social security number on file to prevent processing delays. The student's domicile/residency must also be determined. Submit the request for instate tuition form or contact the Office of the Registrar for assistance. Students with a pending domicile status cannot be processed.

VMSDEP can only pay the authorized term tuition charge. Late fees may be assessed if the student is not listed in the portal timely and will be the responsibility of the student.

Approval for late submission of VMSDEP request for awarding of benefits will be at the discretion of the ODU Office of Financial Aid.

The student must report enrollment plans in the VMSDEP portal during the open and close established deadlines for tuition to be applied to the term requested. If you do not complete your enrollment update by the listed *Close (Due by)* date and time, you must request retroactive approval

from your attending Virginia public college or university; and **if approved**, the respective institution will notify the VMSDEP Office of such approval; upon which, the Office will authorize the qualifying semester. The financial aid office decision on retro request is final.

Note: Once the academic year is closed for processing (August 1), ODU can no longer approve VMSDEP tuition retro request.

Students should follow the VMSDEP application deadline guidelines to ensure they are approved for the semester they want to start the benefit.

VMSDEP Award Information

As a state veterans' benefit, the VMSDEP will be included as a financial resource in the financial aid package and may reduce state grants*, University grants or scholarships, federal loans, federal work-study, and private loans. Each financial aid offer type is different, so the benefit may affect each person's offer differently.

***A student cannot receive both VMSDEP and state grants (Commonwealth and VGAP). The state grant award will be cancelled once the student is authorized for VMSDEP.**

Tuition benefits (Tier 1 and Tier 2)

Eligible students, as confirmed by DVS, are guaranteed a waiver of all tuition and mandatory fees for eight semesters at a Virginia public college or university and Eastern Virginia Medical School. Please note tuition and mandatory fees are waived.

Housing, dining, books, and supplies are considered educational expenses; however, they are not considered mandatory fees and are not waived under this program.

Stipend benefits (Tier 2 only)

Eligible students may receive a stipend to offset educational expenses such as housing, dining, books, and supplies. The State Council of Higher Education for Virginia (SCHEV) works with DVS and the public colleges and universities in disbursing funds. The amount of the stipend is determined annually by SCHEV and is dependent on the student's enrollment status, the number of participating students, and available funding. Stipends are awarded later in the semester when funds are received from SCHEV.

Funds will be applied to the student's account 2-3 business days AFTER the last day to withdraw and receive 50% tuition refund or credit deadline of each term.

Students eligible for the stipend will receive those funds later in the semester once approved by SCHEV.

Students should not allow technical issues to prevent them from requesting their benefits. Contact VMSDEP directly for help with technical issues. Representatives are available to assist Monday-Friday, 8 a.m. - 4:30 p.m. Their contact information is as follows:

VMSDEP Contact Information

Phone - (804) 225-2083

Email: vmsdep@dvs.virginia.gov

Delays in submitting your VMSDEP request can lead to holds and late penalties. To avoid delays and possible late penalties, submit your request in a timely manner and by following up with VMSDEP should have questions or concerns.

VMSDEP is handled by the Office of Financial Aid Office. All other Veterans programs are handled by VASERVICES in the Military Connections Center.

Information about the administration of education assistance under the Veterans Administration may be obtained from the VA website: www.vba.va.gov (<http://www.vba.va.gov/>). Students wishing to use their VA benefits at Old Dominion University may find further information on the Military Connections Center <https://www.odu.edu/>

military-connection. (<http://www.odu.edu/military/students/veterans-services%20/>)

This institution is approved to offer GI Bill® educational benefits by the Virginia State Approving Agency. GI Bill® is a registered trademark of the U.S Department of Veterans Affairs (VA). More information about education benefits offered by VA is available at the official U.S. government website at <http://www.benefits.va.gov/gibill> (<http://www.benefits.va.gov/gibill/>).

Contact the Military Connection Center for further assistance:

1106 Monarch Hall
phone: 757 683-7153
email vaservices@odu.edu.

Termination of Aid

Failure to remain in good academic standing will result in automatic withdrawal of financial aid by the University. Failure to comply with the conditions of a financial award will cause its termination and the return of any unexpended funds as well as repayment, in some cases, of funds already utilized. Undergraduate specific endowed scholarships will be withdrawn immediately for the term in which an undergraduate student's classification advances to an admitted graduate student status.

Financial Awards for Graduate Students

Financial awards are determined by the graduate program and college dean following the policies and guidelines described below. For specific qualifications, conditions, amounts, length and types of awards, contact the appropriate graduate program director.

Graduate Assistantships

A. Nature of the Graduate Assistantship

A Graduate Assistant (GA) is expected to participate directly in either instructional, research, or administrative duties in support of the ongoing activities of the University's academic, research, and service units.

It is the University's intention to make the assistantship an integral and valuable part of the student's graduate education. It should be viewed as an apprenticeship in teaching, research, or administrative service.

B. Categories of Graduate Assistants

1. **Graduate Teaching Assistant (GTA)** - participates directly in teaching activities, such as the teaching of a course, holds responsibility for a laboratory section, or is assigned to specific instructional support or related activities. The University recognizes two levels of graduate teaching assistant responsibilities and activities: GTA-Instructors and GTA-Assistants.
 - GTA-Instructors directly communicate and interact with students in ways that lead to the conveyance of knowledge or skills required to successfully complete the course. Included in this category are graduate students who serve as instructors, laboratory supervisors, recitation leaders, and tutors.
 - GTA-Assistants do not directly instruct students; instead, they serve as graders and/or classroom or laboratory assistants.
2. **Graduate Research Assistant (GRA)** - participates directly in research or support activities conducted by faculty members or administrators. The University recognizes two categories of graduate research assistant responsibilities and activities: GRA-Faculty Assistants and GRA-Project Assistants
 - GRA-Faculty Assistants assist faculty on non-sponsored research activities.
 - GRA-Project Assistants assist faculty on sponsored research projects funded through external grants and contracts managed by the Old Dominion University Research Foundation, or through funds generated by the Educational Foundation or gift accounts.
3. **Graduate Administrative Assistant (GAA)** - participates directly in the support of the activities of a University administrative unit. Such positions must provide graduate students with an academically and/or programmatically appropriate level of intellectual and/or professional experience. The appointment of GAAs in non-academic units is to be made in consultation with the graduate program directors of the pertinent academic units.

C. Graduate Teaching Assistant Instructor Institute (GTAI Institute) Requirement

1. All GTA-Instructors will be required to pass the GTAI Institute prior to their semester of appointment. GTA-Assistants are not required to pass the GTAI Institute, but they must be approved and supervised by their appropriate faculty instructor.
2. The Institute is offered twice a year during the week before fall and spring classes begin. All graduate assistants, including those who have research and/or other non-instructional assignments, are encouraged to participate in the Institute in anticipation of future teaching assignments. The Institute is comprised of the University portion and the college portion. Students are required to attend both portions to pass the Institute. Departments are encouraged to develop their own on-going programs for training graduate teaching assistants. Such programs

should be tailored to the specific needs of the discipline and department policies.

3. International students must pass the SPEAK test prior to attending the GTAI Institute. This requirement may be waived if the student has a score of 26 or better on the Speaking portion of the iBT TOEFL exam or a score of 8.0 the speaking portion of the IELTS exam. Waivers are approved by the Graduate School.

D. Application

Application forms for graduate assistantship stipends paid by the University (GTAs, GRAs, and GAAs) are available from the Office of Admissions or from the University's web page. The completed form, together with a brief essay by the applicant discussing academic interests and career objectives, must be submitted to the appropriate graduate program director or office making the appointment, as soon as possible for fullest consideration. Applications for GRA positions funded through ODURF are made through the faculty member who is the principal investigator, the department chair, or graduate program director.

E. Eligibility

1. Only students admitted to graduate degree programs in regular or provisional status on the basis of complete and fully evaluated credentials and in good academic standing are eligible for appointment to a graduate assistantship. Students appointed as graduate assistants must be enrolled at least three-quarter time in fall and spring and at least half time in summer with the exception of those doctoral students who have advanced to candidacy or those master's students who are in their final semester of study (see the section in this policy on "Enrollment Requirements;" see also the related Graduate Catalog policy on "Enrollment Status"). Additional criteria apply for appointment as a graduate teaching assistant (GTA) (see the sections in this policy on "Categories of Graduate Assistants" and "Graduate Teaching Assistant Instructor Institute (GTAI Institute) Requirement").
2. All students appointed to a graduate assistantship are required to verify their identity and employment eligibility and complete an I-9 Form, according to University procedures, prior to commencing their duties. This requirement is established in order to comply with the Immigration Reform and Control Act of 1986. Students are also required to complete the Child Support Disclosure and Authorization Form, the Commonwealth of Virginia's Policy on Alcohol and Other Drugs Form, ODU Use of Electronic Communications and Social Media Form, the Commonwealth of Virginia Selective Service Form, and the Employee Payroll Direct Deposit Authorization Form.

Students who are not in good academic standing (i.e. a GPA below 3.0) may not be appointed to an assistantship. An existing assistantship appointment will be terminated for any student whose GPA falls below 3.0 and whose status subsequently moves to probationary at the end of a given semester. An exception may be granted for one semester by the Dean of the Graduate School or designee provided that 1) a remedial plan of study with set benchmarks is developed and confirmed in writing with the student, the student's advisor, and if pertinent, the student's supervisor, and 2) a justification is submitted by the graduate program director and approved by the dean of the college or dean's designee. An extension for a second semester may be granted only if the student has shown significant improvement toward the benchmarks and by using the same process.

F. Enrollment Requirements

Graduate students who are supported through graduate assistantships and appointed as Graduate Assistants are required to be enrolled during the semester of their appointment, but their registration requirements may differ based on their funding sources, duties, and/or residency status:

- **Graduate Teaching Assistants and Graduate Administrative Assistants**
 - Graduate Teaching Assistants, including both GTA-Instructors and GTA-Assistants, and Graduate Administrative Assistants who are paid from non-restrictive Commonwealth funds must register for and complete a minimum of **nine (9)** hours of graduate coursework per fall and spring semesters and **three (3)** hours of

graduate coursework per summer semester. Graduate Teaching Assistants and Graduate Administrative Assistants who are paid from restrictive Commonwealth (S5) funds must register for and complete a minimum of **nine (9)** hours of graduate coursework per fall and spring semesters and **six (6)** hours of graduate coursework per summer semester.

- **Graduate Research Assistants**

- Graduate Research Assistants, including GRA-Project Assistants and GRA-Faculty Assistants, have additional conditions that may affect their registration requirements. GRA-Project Assistants are paid only from external funds managed by the Old Dominion University Research Foundation or the Educational Foundation or from funds generated from gift accounts. They must register for and complete a minimum of **six (6)** hours of graduate coursework per fall and spring semesters and **three (3)** hours of graduate coursework per summer semester. GRA-Faculty Assistants are paid from Commonwealth funds. Those who are paid from non-restrictive Commonwealth funds must register for and complete a minimum of **nine (9)** hours of graduate coursework per fall and spring semesters and **three (3)** hours of graduate coursework per summer semester. Those who are paid from restrictive Commonwealth (S5) funds must register for and complete a minimum of **nine (9)** hours of graduate coursework per fall and spring semesters and **six (6)** hours of graduate coursework per summer semester.

For international students taking fewer than **nine (9)** hours of graduate coursework in either the fall or spring semester, a Reduced Course Load Request Form (RCL) must be filed with the Office of Visa and Immigration Service Advising (VISA). International students beginning a new academic program during the summer semester must register for and complete a minimum of **six (6)** credits, regardless of their funding source.

Students are required to complete all of the credit hours as listed in the individual program sections necessary for the degree. Undergraduate prerequisite courses and courses taken for audit are not normally counted toward the enrollment requirement, except upon the recommendation of the graduate program director, the department/school chair, and the dean of the appropriate academic college. International students must comply with any regulations or conditions associated with their visa status, in addition to the requirements of this enrollment policy.

Exceptions to enrollment requirements:

1. Doctoral students who have successfully advanced to candidacy must register for and complete at least **one (1)** hour of graduate credit every semester until graduation (see Continuous Enrollment Policy). Such students may be appointed as Graduate Assistants even while registered for a reduced course load. They are eligible for full tuition exemption and are considered to be full-time for financial aid purposes. The graduate form, Doctoral Candidates 1-Hour Full-Time Notification, must be completed and forwarded to the Office of the University Registrar, the Office of Financial Aid, and for F-1 and J-1 visa holders, the Office of Visa and Immigration Service Advising (VISA). Such students shall not be paid from restrictive Commonwealth (S5) funds.
2. Master's students appointed as Graduate Assistants in their final semester of study may register for a reduced course load, although they will not be considered full-time for financial aid purposes. The graduate form, Master's Student Full-Time Status Notification, must be completed and forwarded to the Office of the University Registrar and, for F-1 and J-1 visa holders, the Office of Visa and Immigration Service Advising (VISA). For F-1 and J-1 visa holders, the Reduced Course Load Request Form (RCL) must also be filed with VISA. Master's students appointed as Graduate Assistants may register for a reduced course load for no more than one semester. Such students shall not be paid from restrictive Commonwealth (S5) funds.
3. Except in certain professional programs, Graduate Assistants normally may not enroll for more than **nine (9)** credit hours per semester. Enrollment above **nine (9)** credit hours requires the approval of the appropriate graduate program director.

4. The Board of Visitors has authorized the president or his or her designee to consider waivers related to the minimum enrollment requirements specified above.

G. Appointment Process

1. Assistantships in Departments/Schools

The dean or other appropriate administrators notifies the individual departments/schools or units of their allocation of assistantships for the coming year.

- a. The department/school recommends candidates for the assistantships to the appropriate academic dean. Candidates should be interviewed before final recommendations are made for appointment. Particular care should be taken in the consideration of applicants to determine the adequacy of academic preparation and language skills. A completed E-1SG form or ODURF Form for all graduate assistant appointments will accompany the candidate's nomination to the dean or administrator. All completed E-1S forms with award letters, acceptance forms, and job descriptions are to be sent to the Office of E1S Processing for processing. ODURF forms are submitted electronically to the Old Dominion University Research Foundation. Prior to submission of a nomination, the department/school should determine whether the student has been nominated for or accepted another graduate assistantship.
- b. Nominations are reviewed and approved by the dean of the academic college or his/her designee to insure that applicants meet the eligibility criteria for appointment, such as admission to a degree program, English language proficiency requirements, good academic standing, and enrollment, and that the appointment is in compliance with applicable University and college policy.
- c. Applicants for GTA appointments must demonstrate written and oral fluency in the English language. For international students, a good command of written English will be evidenced by acceptable TOEFL scores and required entrance essays. Oral proficiency in English will be determined through the SPEAK test administered by Old Dominion University's English Language Center personnel. A passing score on the SPEAK test is 50. Students who marginally fail the SPEAK test with a score of 45 will be offered the opportunity to participate in a re-test as a part of the GTAI Institute to determine if face-to-face communication is sufficient for holding a teaching assistantship.

2. Assistantships in Non-Departmental Units

- a. Each non-departmental unit, e.g., the Center for Career and Leadership Development, Athletics, the Office of the University Registrar, submits to the Graduate School a position description for each Graduate Administrative Assistant (GAA) position available within their unit. Along with the position description the unit will provide a list of those graduate programs in which students have or are proposed to have the interest and skills required. The position must require and provide an academically and programmatically appropriate level of intellectual and professional activity. If the position description is approved, the department chair and graduate program director will coordinate with the non-departmental unit the selection of academically qualified and highly ranked students from their current or to-be recruited graduate students. The appointment of the GAA is made jointly by the academic and non-departmental administrative departments.
- b. Determination of the number and the availability of funds must be done as early as possible in order to facilitate offering these GAA positions to the top ranked applicants/students in the appropriate graduate programs. As part of the December - January budget submission process, non-departmental units must submit a justification for continued and increased support of GAAs, i.e., stipends and tuition waiver.
- c. Each semester, the GAA's immediate, non-departmental supervisor will evaluate the performance of the student and make recommendations for continuance or termination. This written evaluation will be reviewed by the graduate student and his/her

GPD or academic advisor and a final set of recommendations made regarding continued awarding of the assistantship.

H. Appointment Workload

Graduate assistantships require up to 20 hours per week of service and are generally made for a period of one academic year with a nine-month performance period. For a GTA, the work load should include no more than six hours of classroom teaching or nine contact hours of laboratory supervision per semester, plus normal preparation time.

Nominations should be submitted at least 30 days before the semester of employment in order to assure adequate time for processing. A graduate assistant funded through a grant or contract may be appointed for shorter periods if required by the conditions of the grant or contract.

An assistantship workload (up to 20 hours per week) may be divided between teaching and research duties with the approval of the dean of the appropriate academic college. A graduate assistant appointment may be renewed upon nomination, review of qualifications, and satisfactory previous performance.

I. Additional Employment

Full-time (20 hours per week) graduate assistants are not permitted to accept additional on-campus employment during the period of their assistantship. In particular, graduate assistants (graduate teaching assistants, graduate research assistants, and graduate administrative assistants) may not be paid for part-time teaching or other campus employment for the University in addition to their normal responsibilities. Exceptions to this policy may only be made under unusual circumstances and only with the approval of the dean of the appropriate college or equivalent administrator upon the written recommendation of the graduate program director and the department/school chair. Any outside employment (i.e., off-campus) should be undertaken with caution and in consultation with the GPD. It should in no way adversely affect academic performance or assistantship duties and responsibilities. Information on employment guidelines that are specific to international students may be obtained from the Office of Visa and Immigration Service Advising (VISA).

J. Evaluation and Monitoring

All graduate assistants shall be provided with a written job description of their responsibilities, and be evaluated at least once by their supervisor(s) during the period of the award, preferably before the end of the first semester of service is completed. The evaluation shall be discussed with the assistant and a copy forwarded to the appropriate graduate program director or chair.

K. Termination

A graduate assistantship normally ends when the period of appointment is concluded and the terms of the assistantship agreement are fulfilled. Otherwise, a graduate assistant may be terminated for the following reasons:

1. Resignation by the student. Resignation shall be in writing to the supervisor with a copy to the appropriate department chair, program director, and academic dean or equivalent administrator.
2. Failure of the student to perform his or her assigned duties adequately. Termination must be recommended by the student's supervisor and approved by the department chair, graduate program director, and the appropriate academic dean or equivalent administrator.
3. Failure of the student to remain in good academic standing in accordance with the graduate continuance regulations.
4. Failure of the student to maintain enrollment in the requisite number of graduate credits.
5. Expiration of a grant or contract that funds the student's stipend.
 - a. Any overpayment must be reimbursed to the University by the student as soon as possible after termination. Failure to repay the amount owed may result in legal action against the student for recovery.
 - b. If a student resigns from an assistantship or is terminated for reasons other than the completion of the appointment or expiration of the funding contract, the department chair or graduate program director should notify the appropriate academic dean or

administrator as soon as possible and nominate a replacement if necessary.

- c. A student who believes that he or she may have been unjustly terminated may appeal the decision. First, the student should meet with the supervisor, graduate program director, and department chair in an effort to resolve the situation. If this effort fails, the student may make an appeal in writing to the dean or administrator of the appropriate academic college. If the matter is not resolved, it will be referred to The Graduate School and then be automatically refer the matter to the Graduate Appeals Committee for review. The decision of the Appeals Committee is final.

L. Grievance Procedure

Should a graduate assistant believe that his/her assigned duties and/or the workload required to fulfill these duties do not conform to University Graduate Catalog policies, he/she should first attempt to reconcile the grievance with his/her academic/nonacademic immediate supervisor. If the grievance is not resolved, the graduate assistant will ask his/her graduate program director (GPD) to mediate the grievance between him/her and the immediate supervisor. If the GPD is the student's immediate supervisor, the GPD chair/dean's designee will attempt to mediate. If the chair is the student's supervisor, the GPD shall refer the case directly to the dean or the dean's designee. If this course of action does not resolve the grievance, the GPD/chair/dean's designee will seek mediation with the supervisor of the student's immediate supervisor. If a resolution cannot be achieved, the chair/dean's designee will appoint an ad hoc committee comprised of two senior faculty members from the student's department and one senior faculty member from another department. If the student's assistantship is a non-academic unit, the third member will be a senior level administrator from the nonacademic unit. Should the committee not resolve the grievance, it will be referred to the dean of the student's college for a final decision. For matters involving sexual harassment and/or discrimination, please see the "Student Complaint Procedure" or the "Discrimination Policy" in this catalog.

M. Recognition of Outstanding Performance

Each academic year, two graduate teaching assistants will be recognized for their outstanding performance as a classroom or laboratory instructor. Recipients of the Outstanding Teaching Assistant Awards will receive a \$1,000 financial award to be used to support their educational expenses. A request for nominations and criteria is distributed by the Graduate School.

Graduate Fellowships

Fellowships are awards granted for scholastic achievement and promise. Their objective is to enable full-time students to pursue graduate studies and research leading to advanced degrees without requiring them to render any service. Part-time and/or nondegree students are not eligible. Fellows are responsible for payment of their tuition, in- or out-of-state, as applicable.

University fellows are chosen by their graduate programs and are supervised by their colleges. Applicants should indicate their intent to apply for a fellowship when applying for admission. Letters of recommendation, current transcripts, and any additional evidence of scholastic achievement that would assist in an evaluation of the student should be on file in the Admissions Office.

Tuition Grants

Tuition grants are scholarships disbursed through the Office of Financial Aid and/or the Old Dominion University Research Foundation that are earmarked specifically for payment of tuition. They may be offered to regular or provisional degree-seeking graduate students who are enrolled full- or part-time. Tuition grants may be combined with other forms of scholarship or fellowship support. The decision to award a grant, including the amount, is made by the graduate program director in consultation with the chair and the dean or designee of the college. Students holding tuition grants who withdraw from courses may be held personally liable for repayment of funds utilized.

Tuition Waivers

Tuition waivers are partial-to-full remittances issued by the Office of Finance and/or the Old Dominion University Research Foundation specifically to accompany graduate assistantships. They may be offered to regular or provisional degree-seeking graduate students who are enrolled at least three-quarter time in fall and spring and at least half time in summer with some notable exceptions (see the section on “Enrollment Requirements” under the policy on Graduate Assistantships;” see also the related Catalog policy on “Enrollment Status”). The decision to award a waiver, including the percentage, is made by the graduate program director in consultation with the chair and dean or designee of the college. Students holding tuition waivers who withdraw from courses may be held personally responsible for repayment of funds utilized. Domestic graduate students who receive tuition waivers and who reside out-of-state are urged to declare Virginia residency as soon as possible.

Minimum Stipend Levels

In compliance with federal guidelines a graduate student must receive a minimum of \$3,200 in assistantship or fellowship support for the fall and spring semesters and a minimum of \$2,500 during the summer.

Supplements to the minimum stipend amount can be made based upon the availability of funds and upon approval of the appropriate dean and the funding agency. The stipend is considered to be taxable income since it is payment for services.

Return of Tuition Assistance

A student who completes less than half of the assistantship or fellowship appointment will be required to return his/her full tuition assistance award to the university.

Policies

- University Policies (p. 40)
- Graduate Policies & Procedures (p. 42)

University Policies & Procedures

Accommodations for Students with Disabilities

<https://www.odu.edu/about/policiesandprocedures/university/4000/4500>
(<https://www.odu.edu/about/policiesandprocedures/university/4000/4500/>)

Code of Student Conduct

<https://www.odu.edu/about/policiesandprocedures/bov/board-visitors-policy-1530> (<https://www.odu.edu/about/policiesandprocedures/bov/board-visitors-policy-1530/>)

Discrimination Policy

<https://www.odu.edu/about/policiesandprocedures/university/1000/1005>
(<https://www.odu.edu/about/policiesandprocedures/university/1000/1005/>)

Electronic Messaging Policy for Official University Communication

<https://www.odu.edu/about/policiesandprocedures/university/3000/3506>
(<https://www.odu.edu/about/policiesandprocedures/university/3000/3506/>)

Gun & Weapon Regulation

<https://www.odu.edu/bov/gun-and-weapon-regulation> (<https://www.odu.edu/bov/gun-and-weapon-regulation/>)

Closure of the University Due to Inclement Weather and Emergencies

<https://www.odu.edu/about/policiesandprocedures/university/1000/1020>
(<https://www.odu.edu/about/policiesandprocedures/university/1000/1020/>)

Policy on Title IX and Sexual Misconduct

<https://www.odu.edu/about/policiesandprocedures/university/1000/1008>
(<https://www.odu.edu/about/policiesandprocedures/university/1000/1008/>)

Posthumous Degree or Certificate of Recognition or Achievement for Terminally Ill and Deceased Students

<https://www.odu.edu/about/policiesandprocedures/bov/board-of-visitors-policy-1408> (<https://www.odu.edu/about/policiesandprocedures/bov/board-of-visitors-policy-1408/>)

Policy on the Use of Tobacco and Smoking-Related Products, and Electronic Cigarettes and Vaporizers

<https://www.odu.edu/about/policiesandprocedures/university/3000/3220>
(<https://www.odu.edu/about/policiesandprocedures/university/3000/3220/>)

Student Complaint Procedure

The University subscribes to the following 2009 statement on professional ethics of the American Association of University Professors, according to which “As teachers, professors encourage the free pursuit of learning in their students. They hold before them the best scholarly and ethical standards of their discipline. Professors demonstrate respect for students as individuals and adhere to their proper roles as intellectual guides and counselors.” The University recognizes that the instructor has the authority to maintain appropriate classroom behavior and respects the academic freedom of the faculty (see Board of Visitors Policy 1403: Academic

Freedom). The University will not normally interfere with content or style of teaching activities. The University recognizes the responsibility to establish procedures for addressing student complaints about faculty conduct that is not protected by academic freedom and not addressed in other procedures (see Board of Visitors Policy 1502: Student Rights and Freedoms).

This procedure describes how students may formally complain about inappropriate faculty behavior in formal academic, professional, or research settings. Student-initiated complaints in other areas, including grade appeals, sexual harassment, disability accommodations, and discrimination, are covered under separate policies and are not included in this procedure.

I. General Provisions Procedures

1. **Determination of Appropriate Procedure.** The student is responsible for filing the complaint under the proper procedure. Complaints should only be filed using this procedure if there is no other provision available. *Failure to follow the appropriate procedures may result in the complaint not being heard.*
2. **Student Complaints and Concurrent Procedures**
The act of filing a complaint under this procedure will not normally delay any pending process or procedure involving the student and/or faculty member. Normally, any concurrent process or procedure will move forward independently of the student complaint, though it may be delayed for good cause as determined by the appropriate University official(s).
3. **Retaliation**
No student who files a complaint under this procedure shall be subject to any form of retaliation by any person, department, program or college.

II. Procedures

1. **STEP 1 - Informal Resolution.** Students must first attempt to resolve complaints informally. Given the nature of complaints covered by this procedure, it is expected that in all but the most unusual circumstances, students will first raise the issue with the faculty member. In the event this is not feasible, the student will contact the Department Chair. In instances where there is no Department Chair, the student should contact the Program Director.
2. **STEP 2 - Formal Complaint.** If the issue is not resolved informally, the student may contact the Department Chair or Program Director if there is no Chair. In instances where the Chair is the subject of the complaint, the student should contact the Dean of the College to which the chair is assigned. The student must contact the Chair (or Program Director if there is no Chair or Dean if the Chair is the subject of the complaint) within 30 business days of the action from which the complaint rises or the complaint will be barred. The Chair or Dean has the discretion to accept a complaint filed after this deadline for good cause.

The complaint must be submitted in writing on the Student Complaint Procedure Formal Complaint Form (<https://www.odu.edu/dean-students/submit-a-student-complaint/>) and contain:

- a. The student's name and University Identification Number
- b. The faculty member's name and the course subject area prefix and number
- c. A detailed description of the nature of the complaint
- d. A detailed description of attempts at informal resolution with the faculty member and Chair
- e. A detailed description of the relief sought

C. STEP 3 - Investigation

The Chair may designate a faculty member to investigate the complaint. If the Chair is the subject of the complaint, the student shall contact the academic Dean who will designate a faculty member to investigate the complaint. The person investigating the complaint will meet, either independently or collectively, with the student and the

person who is the subject of the complaint within 10 business days from the filing of the complaint. The decision should be issued in writing to the student and the faculty member within 20 business days of the date the complaint is filed.

The complaint process is not intended to be an adversarial hearing and both the interviews of the student and the faculty member will usually be conducted without the other present.

- D. **STEP 4 - Appeal Procedure.** If the student is not satisfied with the resolution in Step 3, the student may file a formal appeal with the appropriate academic Dean. The appeal must be filed within five business days after the decision in Step 3 has been sent. The Dean has the discretion to accept a complaint filed after this deadline for good cause.

The appeal must be submitted in writing on the Student Complaint Procedure Formal Appeal Form (<https://www.odu.edu/dean-students/submit-a-student-complaint/>) and contain:

1. The student's name and University Identification Number
 2. The faculty member's name and the course subject area prefix and number
 3. A detailed description of the nature of the complaint
 4. A detailed description of attempts at resolution with the faculty member and Chair or Program Director
 5. A detailed description of the relief sought
 6. A copy of the Chair's (or Program Director's) finding and supporting documents. (No new information is permitted.)
1. The Dean shall provide the faculty member and Chair or Program Director a copy of the appeal.
 2. The Dean may consider the appeal or appoint a faculty member to consider the appeal. The person appointed shall not have been involved as a decision maker in Steps 1-3 above.
 3. The person considering the appeal shall review the materials and issue the finding within 30 business days from the date the appeal is filed. The review of materials will generally occur outside the presence of the complainant and respondent, and it will be limited to a review of the record. The person considering the appeal may interview any person, such as the original decision-maker, as needed.
 4. The person making the decision shall first determine whether the conduct in question is protected by academic freedom and whether the student's complaint is best addressed by this process.
 5. At the end of the review, a written decision will be issued. A copy of the decision will be sent to the complaining student, the faculty member, and the Chair or Program Director.
 6. The decision by the designee or the Dean is final.

III. Records

A. If the complaint concludes after Step 3 above, the Student Complaint Procedure Formal Complaint Form and all related documents will be kept in a secure location in the department chair's or program director's office for a minimum of three years after the last action.

B. If there is an appeal, the Student Complaint Procedure Formal Complaint Form, the Student Complaint Procedure Formal Appeal Form, and all related documents for each level of review will be kept in a secure location in the Dean's office for a minimum of three years after the last action.

-Approved by the president
May 13, 2011
Revised May 16, 2022

Veterans Grievance Policy

The Virginia State Approving Agency (SAA), is the approving authority of education and training programs for Virginia. Our office investigates

complaints of GI Bill beneficiaries. While most complaints should initially follow the school grievance policy, if the situation cannot be resolved at the school, the beneficiary should contact our office via email saa@dvs.virginia.gov.

GI Bill® is a registered trademark of the U.S Department of Veterans Affairs (VA). More information about education benefits offered by VA is available at the official U.S. government Webs site at <http://www.benefits.va.gov/gibill> (<http://www.benefits.va.gov/gibill/>).

Student Record Policy

<https://www.odu.edu/about/policiesandprocedures/university/4000/4100>
(<https://www.odu.edu/about/policiesandprocedures/university/4000/4100/>)

Technical Standards

To successfully complete a program at Old Dominion University, students must meet all academic and technical standards required by the program. Technical standards are all nonacademic criteria or standards for admission to or participation in the program in question. A technical standard is a description of the physical and mental abilities required of students to perform successfully in an academic program. Students are responsible for knowing the technical standards of their intended major program. Technical standards are documents that can and should be used in the advising process, both when students are exploring different majors and when they want specific information on what is required in a particular program.

Copies of all technical standards are located in the following offices: Educational Accessibility, Institutional Equity and Diversity, and University Counsel. In addition, each department chair has a copy. For students requiring accommodations, please contact the Office of Educational Accessibility for assistance. webpage: <http://www.odu.edu/educationalaccessibility> (<http://www.odu.edu/educationalaccessibility/>).

Use of Bicycles, Skateboards and Personal Transport Devices on University Property

<https://www.odu.edu/about/policiesandprocedures/university/3000/3231>
(<https://www.odu.edu/about/policiesandprocedures/university/3000/3231/>)

Graduate Policies & Procedures

The Graduate Policies are currently under review and subject to change. We will update this section as soon as the review is complete.

Attendance Policy

Regular classroom attendance is expected of all students and individual faculty may require class attendance. Course grades reflect not only performance on written assignments and exams, but also participation during class periods. As discussions cannot be reproduced, many times absences cannot truly be made up. Excessive absences therefore have a negative effect on the student's learning and performance. Students are responsible for all class work, and a student who misses a class is expected to have the initiative necessary to cover properly the material missed. Students must meet all course deadlines and be present for all quizzes, tests, and examinations.

Syllabus information will include a statement of the attendance policy for each course and the effect of nonattendance on grades. Reasonable provisions should be made by the instructor for documented representation at University-sponsored athletic or academic functions, mandatory military training and documented illness. The granting of provisions for other documented absences is left to the discretion of the faculty member.

Due to the nature of asynchronous courses, students are expected to participate in class, but in formats that may not require attendance at regular intervals.

Extended illness. The student should notify the Office of Student Enrollment, Engagement & Services when the student is going to be absent from classes for more than one week because of an illness. Student Enrollment, Engagement & Services will notify the student's course instructors of the absence on his or her behalf.

Audit Status

The audit grading status is available for students who would like to enroll in a course for the knowledge gained or personal satisfaction, not for academic credit. Any course that is elected to be carried as an audit will be subject to the normal fees and regulations of the University. Regular attendance is expected, but neither tests nor examinations are required. No grade will be recorded, except that an instructor may assign a grade of "W&" to a student who misses an appreciable portion of the classes. The student's record will be marked "audit" by the course so elected. A student may not audit a course and subsequently seek advanced placement credit for the same course. A student may audit a course and register for the same course for credit in a subsequent semester. Registration for the audit option must be selected by the end of the drop/add period in the given semester. Any course elected for audit cannot be changed to that of credit status after the end of the "add" registration period. Students receiving financial aid should be aware that registering for audit status may affect their financial aid eligibility. Selection of the audit status is accomplished through the normal registration procedures.

Class Attendance by Guests

Statement: The propriety for non-student presence in the classroom will vary dependent upon the nature of curricular offerings, dangers inherent to certain classrooms and labs, the optimum classroom environment for each class, and the preferences of each instructor. Guidelines specifying whether non-student guests will be permitted in the classroom, which are consistent with departmental policy, will be established for each class by the instructor.

Continuous Enrollment Policy

Master's and Education Specialist Students. Students who have completed all course work but are working during a given semester to complete other outstanding degree requirements (e.g., comprehensive examination, thesis, removal of an I or II grade) or wish to use University facilities and/or consult with faculty must be registered for at least one credit during that semester. In addition, graduate students must be registered for at

least one credit hour in the semester in which they graduate. The program designated 998 course or GRAD 998 may be used to fulfill this requirement.

Registration for the required program designated 998 course or GRAD 998 is subject to the normal fees and regulations of the University.

Doctoral Students After Advancement to Candidacy. After successful advancement to candidacy, all doctoral students are required to be registered for at least one graduate credit hour each term (fall, spring, and summer) until the degree is completed, including the semester in which they graduate. GRAD 999 or the program designated 999 course may be used to fulfill this requirement. Failure to comply with this requirement will result in charges to the student's account for one graduate credit hour plus required fees for each semester after advancement to candidacy. Students are not eligible for graduation until all charges are paid.

Master's Degree Seeking Students with Assistantship Appointments in Their Final Semester. Master's students holding graduate teaching, research, or administrative assistantships who are in their final semester and who are within six hours of completing their degree requirements, may register for six or fewer graduate credit hours needed for the completion of their degree. Those who are completing a Master's Thesis or Master's Project but have not yet defended it, may register for one hour of graduate credit in their final semester. Master's students are eligible for the reduced enrollment requirement for no more than one semester.

Additional Graduate Degrees Policy

Graduate students may pursue two graduate degrees concurrently at Old Dominion University, provided that they have been admitted to both degree programs. Minimum credit requirements must be met for each graduate degree that is awarded. In certain cases, students may request that graduate-level coursework used to fulfill requirements for the one graduate degree be applied to the other. Prior approval of the graduate program directors and appropriate college deans is required.

Policy on Nondegree Credits to Complete a Degree

No more than 12 credit hours of graduate-level course work taken at Old Dominion University as a nondegree student may be applied toward a graduate degree or certificate. These 12 credit hours may include only coursework for which grades of B or higher are earned. These credit hours are in addition to the 12 credit hours that can be transferred from other institutions and through experiential learning.

Graduate Writing Proficiency

Each graduate department or program will develop specific policies and procedures for evaluating and, if necessary, upgrading student writing.

Graduate Pass/Fail

Master's-level students may include pass/fail-graded experiences to fulfill a portion of their program requirements provided that they meet a University requirement of 24 credit hours of course work, of which at least 18 hours must be letter-graded course work, and any additional departmental or school requirements. The college, school, and/or department administering the program shall determine which student course work shall be considered for pass/fail credit.

Doctoral students must take dissertation credit as pass/fail and may select from among the designated pass/fail-graded experiences a portion of their program requirements, provided that they take a minimum of 24 credit hours of letter-graded course work, of which at least 18 hours must be letter-graded course work, beyond the master's degree, or equivalent, and meet any additional departmental or school requirements.

Deans may, at their discretion, designate courses as pass/fail, letter graded, or both.

A student electing the pass/fail option for a particular course cannot change his or her registration and elect to take the course for grade point credit after

the end of the “add” period. Similarly, courses cannot be elected as pass/fail after the end of the “add” period.

Readmission to the Institution Following Separation or Dismissal

Graduate students readmitted to the University following eight or more continuous years of separation or dismissal may apply to have all previous course grades and credits removed from the calculation of the GPA.

Students who wish to apply must complete and submit the appropriate form to the graduate program director. The form must be signed and approved by the graduate program director, the department chair, and the college dean before it is submitted to the Office of the University Registrar.

If approved, all previous graduate courses and grades will remain on the transcript but will not be used in calculating the GPA for the new graduate degree program.

Change of Program

A graduate student who wishes to change from his or her current program to a new program must make the request in writing to the Office of Graduate Admissions. The student’s graduate record will be examined to determine which additional supporting credentials must be submitted (e.g., test scores, letters of recommendation) prior to consideration for admission to the new program. If the new program requires additional supporting credentials, the student must submit these before consideration can be given to the change. If it is determined that no additional supporting credentials are necessary, the student’s record will be submitted to the graduate program director of the new program, with a request for consideration of admission. The student will be notified in writing of the graduate program director’s decision. If not admitted to the new program, the student will remain in the current program.

Graduate credits earned toward a degree or certificate from the current program may or may not be accepted by the director of the new graduate program. All grades earned in the original program will remain on the student’s transcript but only grades of B or higher, if accepted, may be used to compute the GPA in the new program. In such cases, the director of the new graduate program will request that the Office of the University Registrar adjust the student’s record.

Conversion from Doctoral to Master’s Program

A student in a doctoral program may be converted to an appropriate master’s program in special situations. The doctoral student making satisfactory progress but wishing to leave the University may apply in writing to the new master’s program director, with copies to the current program director and the applicant’s committee. The new program director, in consultation with the current program director, will review the request following program policy and procedures.

In the case where a doctoral student fails to pass or complete a particular degree requirement, the student’s committee may recommend the student to a master’s degree program. The student will follow the procedure outlined in the preceding paragraph, except that this approach requires supporting documentation from the current committee.

Once the student is accepted, the new program director will send a memorandum and a Notice of Change of Status Form, to the Office of the Registrar. The memo should clearly note which of the Old Dominion University credits and approved transfer credits may be applied to the master’s degree, and which, if any, should be reserved for future doctoral work.

Enrollment Status

Full-Time Status

A minimum of nine credit hours is considered to be a full-time course load for graduate students per fall and spring semesters. No more than twelve (12) credit hours may be carried, except in unusual circumstances and with the

permission of the graduate program director. In summer semesters, six (6) credit hours constitute a full-time load.

Part-Time Status

Graduate students who are registered for fewer than nine (9) credit hours during the fall or spring semesters or fewer than six (6) credit hours in the summer semester are classified as part-time graduate students. During the fall or spring semesters, six to eight (6-8) credit hours is considered to be three-quarter time, four to five (4-5) credit hours half time, and one to three (1-3) credit hours less than half time. During the summer semester, four to five (4-5) credit hours is considered to be three-quarter time, three (3) credit hours half time, and one to two (1-2) hours is less than half time.

Exceptions

Doctoral students who have successfully advanced to candidacy must register for at least one (1) credit hour (usually 899 or 999) every semester until graduation; they are considered full-time for registration and financial aid purposes (see “Continuous Enrollment” policy). Master’s students who have completed all course requirements are not required to be registered continuously; however, they must register for at least one (1) credit hour (998) during the semester of their graduation; they are considered part-time for registration and financial aid purposes.

Requirements for International Students

International students must comply with any regulations or conditions associated with their visa status, in addition to the requirements of this enrollment policy. Those international students taking fewer than nine (9) credit hours in either the fall or spring semesters must file a Reduced Course Load Request Form (RCL) with the Office of Visa and Immigration Service Advising (VISA). F-1 and J-1 visa holders have no summer enrollment requirement per federal immigration regulations; however, if the summer semester is the first semester of a new academic program, six (6) credit hours are required to maintain the visa status.

Requirements for Graduate Assistants

Students appointed as Graduate Assistants may have different minimum enrollment requirements depending on their source of financial support and/or residency status. Please refer to the subheading on “Enrollment Requirements” under the heading of “Graduate Assistantships” in the section of the Graduate Catalog titled “Financial Awards.”

Course-Load Distribution

In graduate study, at least three-fifths of the minimum required hours for a master’s degree or education specialist degree must be completed at the 600 level or above, and at least three-fifths of the minimum required hours for a doctoral degree must be completed at the 800 level. Some programs have instituted more stringent credit-hour distribution requirements at the master’s, education specialist, and/or doctoral levels. Exceptions to the credit-hour distribution requirements at any level must be approved in writing by the graduate program director, the dean or his or her designee, and the provost or his or her designee.

Submission of Written Work To More Than One Class

In general, it is not acceptable for a piece of work such as a term paper to be submitted to more than one class for credit. In cases where submission of the same paper is appropriate, prior approval must always be obtained.

An example of a situation in which the same paper might appropriately be submitted would be one in which a student was enrolled in two classes, in both of which a given research topic was not only of interest to the student but was completely appropriate to both classes. In such circumstances, the student would approach the instructors of the two classes and obtain approval to submit the same term paper to both classes, based on prior agreement concerning the depth of the study, amount of material covered, and the length of the paper to be submitted (which should be longer than a paper submitted to one class).

Re-Validation of Out-of-Date Graduate Credit

Graded coursework granted outside the eight-year time limit established for graduate degrees or certificates must be re-validated by an examination before the work can be applied toward the requirements of a degree program. Courses identified as research, thesis, or dissertation that were graded pass/fail do not require re-validation.

To be re-validated, the work must have been completed at Old Dominion University or be acceptable as transfer credit in lieu of an Old Dominion University course.

The following procedure shall be used to re-validate out-of-date work:

1. The student must receive the permission of his or her graduate program director and the chair of the department/school or dean of the college in which the course is offered to re-validate the course credit. For courses older than ten years, the additional permission of the dean or his or her designee is required, or in the event that the dean or his or her designee represents the second level of approval, the additional permission of the provost or his or her designee is required. The form for re-validation of out-of-date credit shall be used to record all transactions and must be submitted to the Office of the University Registrar upon completion of re-validation of work.
2. The graduate program director, department/school chair, or dean shall make appropriate referrals to faculty member(s) (an individual or a committee) teaching the course to request that an examination be prepared and evaluated. Before the examination, the faculty member(s) shall inform the student of the area of knowledge or course content on which he or she is to be examined.
3. After the examination has been completed, the re-validation form shall be filled out, signed by the examining faculty member(s), and forwarded to the dean of the academic college or his or her designee for approval, or in the event that the dean or his or her designee represents the second level of approval, the provost or his or her designee for approval.
4. Copies of the completed form shall be sent to the student, the graduate program director, and the university registrar.
5. Re-validation for any given course can be sought only once.

Final Examinations

The University firmly believes that a comprehensive evaluation of a student's achievement in a course is a vital part of the educational process. Final examinations for campus-based and higher education center courses, if given, are to be given at the time provided on the Registrar's Office website at www.odu.edu/registrar (<http://www.odu.edu/registrar/>). Upon request of the instructor, exceptions to this regulation may be made only by the dean. Final examinations are normally scheduled in the classroom where the course has met throughout the semester.

In the event that a final examination is changed to other than that of the scheduled time, provisions will be made by the instructor for any student who cannot comply with the schedule change.

Any student who has three examinations scheduled in one calendar day and is unable to resolve the problem informally with the instructor or instructors may petition the dean for relief.

All examinations are to be retained for one year by the faculty members. Students have the privilege of requesting conferences with the instructors in regard to their final grades.

All distance learning final exams shall be available for students to complete in a minimum 24-hour window as defined by the professor, including one business day, during the final examination period as defined for that course.

Students may secure proctoring at a higher education center or a Digital Learning partner site. For more information about proctoring and distance learning examinations, visit <http://dl.odu.edu/how-it-works/exams-proctors>.

Continuance

The following minimum requirements govern a student's continuance in a graduate program. A student is also obligated to meet all additional requirements as delineated in the handbook of the student's graduate program.

The following actions affect a student's continuance:

- Probation occurs when a student's grade point average (GPA) falls below 3.00.
- Suspension occurs when a student is unable to raise the GPA above 3.00 within the next 12 credit hours taken, thus preventing the student from registering for additional courses; reinstatement from suspension occurs only if the student is permitted to return to the graduate program after submitting an approved plan of study.
- Separation occurs when a student withdraws voluntarily from a graduate program.
- Deactivation occurs when a student fails to register for three or more consecutive semesters without permission or an approved leave of absence.
- Dismissal may occur for a variety of academic reasons or for infractions committed against the Code of Student Conduct.

Students who are placed on probation are still eligible to participate in all extracurricular activities as governed by the rules of the specific activity. However, students who are separated, deactivated, suspended, or dismissed from a graduate program are ineligible to participate in any extracurricular activities.

Probation, Suspension and Reinstatement

Degree-Seeking Students

A degree-seeking-student is defined as one who is formally admitted into a graduate program at either the master's, education specialist, or doctoral levels. At the end of each semester – fall, spring, and summer – the record of a degree-seeking student who does not maintain a 3.00 cumulative grade point average (GPA) is reviewed. A student who does not have a cumulative GPA of at least 3.00 will be placed on probation.

Probation and Suspension Policy for Degree-Seeking Students

A degree-seeking student on probation will have 12 credit hours to raise their cumulative GPA to 3.00. The student and Graduate Program Director should meet to discuss a plan for earning the return to good standing. The student must achieve a cumulative GPA of 3.00 after completing the next 12 credit hours. If not, they will be placed on indefinite suspension and prevented from enrolling in graduate courses. This does not affect the student's status with regard to undergraduate courses.

A student who believes the probation or suspension was due to an error in a grade assigned should contact their instructor.

Early Suspension for Degree-Seeking Students

If the Graduate Program Director determines the student cannot mathematically raise the GPA to 3.00 within 12 hours, the limit for degree-seeking students, they may discuss with the student whether an early suspension is warranted. If so, with the student's written approval, the Graduate Program Director can request early suspension in writing to the Dean of the Graduate School, so that the student may consider reinstatement options.

Reinstatement from Suspension Policy for Degree-Seeking Students

A degree-seeking student who has been suspended from a graduate program may be reinstated under the following conditions:

1. The student is responsible for initiating each of the following aspects of the request for reinstatement to the university:
 - a. Providing to the GPD of the program that the student is seeking to either continue enrollment or to be newly admitted a written explanation and documentation of the factors and circumstances that contributed to the failure to achieve the academic standards as well as evidence that these issues have been resolved. Students

should also explain why they will subsequently succeed if reinstated. Moreover, students who wish to maintain confidentiality regarding special medical or other personal issues, must obtain a letter from the Office of Student Outreach Services (SOS) certifying their validity and contribution to the suspension and that these issues have been or will be satisfactorily resolved prior to the reinstatement.

- b. Requesting the reinstatement within 45 calendar days of the suspension unless a later request with appropriate justification is approved by both the graduate program director and Dean of the Graduate School or designee (if the student is pursuing a grade appeal that may overturn the suspension, the grade appeal procedures are to be followed first until a decision is reached on that appeal; if the appeal is denied and suspension upheld, then the student has 45 calendar days to initiate a reinstatement request).
 - c. Developing a plan of study in consultation with the appropriate Graduate Program Director (GPD) of the program that the student is seeking to either continue enrollment or to be newly admitted. The plan of study must specify the initial 12 credit hours to be taken and the steps necessary to complete the degree requirements within the eight-year (master's) and the eight-year (education specialist and doctoral) time period as required by University policy. This plan should recognize that all prior courses in which grades of B- or less were earned must be repeated or replaced with an approved substitution. If reinstated, the student's GPA will revert to 0.00 and courses with a grade of B or above that were earned within the past eight years will be treated as internal transfer credit and have no bearing on the GPA. Courses older than eight years must be recertified prior to internal transfer credit being awarded. Upon reinstatement, the student must achieve a cumulative GPA of at least 3.00 in the next 12 credit hours of graduate credit attempted.
2. The GPD is responsible for each of the following steps of the request for reinstatement:
- a. Reviewing the student's letter and any written documentation the student provides, assisting in the development of the proposed plan of study, and assessing the student's potential for successful completion of the program.
 - b. Assessing the potential impact of reinstatement on departmental resources.
 - c. Submitting a recommendation on the student's request to the department chair either approving reinstatement and the plan of study for the student's return, or providing justifications for denying reinstatement and/or the plan of study. Specifically, the GPD's evaluation must address the reasonableness of i) the proposed plan of study; ii) the potential for successful completion of the program, and, iii) the potential impact of reinstatement on departmental resources. (Note: The GPD and the chair must agree for the student to be reinstated at the department level.)
3. If reinstatement is approved, the student will be informed in writing and the steps outlined in 1.a. and 1.b. of this policy shall be followed. A copy of the letter and the approved plan of study shall be forwarded to the Graduate School. The Graduate School will work with the Office of the Registrar to ensure the academic record is updated so the student may resume their study.
4. Upon reinstatement:
- a. All courses with grades of B- (2.70) or below will be dropped from consideration in the calculation of the grade point average for continuance or graduation. These grades will remain on the student's transcript, but the courses will not be counted toward the degree.
 - b. Courses with grades of B or above may be counted toward the degree if they were earned within the last eight years or have been recertified but will not be used in the calculation of the GPA.
 - c. Reinstated students must achieve a cumulative GPA of at least 3.00 upon completion of the next 12 hours of credit attempted. Subsequent performance will be monitored by the GPD.
5. If the student's request for reinstatement is denied, the student must be informed in writing by the graduate program director. The GPD's

denial must address the lack of reasonableness of i) the proposed plan of study, ii) the potential for successful completion of the program, iii) the potential impact of reinstatement on departmental resources, and iv) the right to appeal and the policy for appealing. A copy of the letter shall be forwarded to the Graduate School along with original materials submitted by the student.

6. The student has the right to appeal the decision to the Graduate Appeals Committee. The student must resubmit the written letter and documentation as outlined in 1.a. and 1.b. to the Graduate School within 45 calendar days of the Graduate Program Director's letter denying reinstatement. The Graduate School will forward the materials to the Graduate Appeals Committee. The Graduate Appeals Committee will review the documentation, including the student's reinstatement request, plan of study, and Graduate Program Director's assessment of the plan of study. The Committee may seek additional information from the program or student to aid its review. The Graduate Appeals Committee will render its decision and inform the Graduate School. The Graduate School will send a letter to the student, with a copy to the GPD, informing him or her of the Graduate Appeals Committee's decision. If the Graduate Appeals Committee supports the GPD's original decision, the student shall remain separated from the program. If the Graduate Appeals Committee approves reinstatement, the steps outlined in 1.a. of this policy shall be followed. The decision of the Graduate Appeals Committee is final.
7. A student may be reinstated only one time to the same academic program.

Non-Degree-Seeking Students

A non-degree-seeking student may fall into one of two categories: one who is pursuing a specific certificate or licensure program or one who is unaffiliated with a specific program.

Probation and Suspension Policy for Certificate or Licensure Students

A student who has been permitted to pursue a certificate or licensure program must maintain a cumulative GPA of at least 3.00. If the student fails to do so, the student will be placed on probation. The student and the certificate director or the licensure director, or the graduate program director should meet to discuss a plan for returning to good standing. The student must raise their cumulative GPA to 3.00 within the remaining allotted hours (not to exceed 12 credits). A student who fails to achieve a cumulative GPA of 3.00 after these remaining hours will be indefinitely suspended and prevented from enrolling in graduate courses. This does not affect the student's status with regard to undergraduate courses.

Early Suspension for Certificate or Licensure Students

If the director determines the student cannot mathematically raise the GPA to 3.00 within the remaining allotted hours (not to exceed 12 credits), then the director may discuss with the student whether an immediate suspension is warranted. If so, with the student's written approval, the director can request immediate suspension in writing to the dean of the Graduate School so that the student may consider reinstatement options.

Reinstatement from Suspension Policy for Certificate or Licensure Students

A suspended certificate or licensure graduate student seeking reinstatement should follow the procedures outlined earlier in this policy under the Reinstatement Policy for Degree-Seeking Students with the exception that the student's plan of study must specify the initial six credit hours (not 12) to be taken. Upon reinstatement, the student must achieve a cumulative GPA of at least 3.00 in the next six credit hours of graduate credit attempted. A student may be reinstated only one time to the same certificate or licensure program.

Probation and Suspension Policy for Unaffiliated Students

An unaffiliated student must maintain a cumulative GPA of at least 3.00. If not, the student is strongly advised to seek guidance from the Graduate School staff. The student must achieve a 3.00 by the completion of 12 hours. If not, the student will be indefinitely suspended and prevented from enrolling in graduate courses. This does not affect the student's status with regard to undergraduate courses. Unaffiliated students may not be reinstated

as unaffiliated students but may return to graduate courses if admitted to a degree program.

Early Suspension for Certificate or Unaffiliated Students

If the student cannot mathematically raise the GPA to 3.00 within the remaining allotted hours (not to exceed 12 credits) then the Graduate School staff may discuss with the student whether an immediate suspension is warranted. If so, with the student's written approval, the dean of the Graduate School may initiate immediate suspension.

Separation and Deactivation from a Graduate Program

A student may separate voluntarily from a graduate program at any time by notifying the graduate program director in writing.

If a student fails to register for three or more consecutive semesters, without prior approval from the graduate program director, their graduate status will be deactivated. To reactivate their graduate status, a student must submit a request in writing to the graduate program director and the Office of Graduate Admissions. The graduate program director must approve the student's request for reactivation to be processed.

Dismissal from a Graduate Program

A degree-seeking student's dismissal from a graduate program may occur for one or more of the following reasons:

1. Failure to maintain good academic standing based on minimum University grade point average (GPA) requirements following reinstatement (see Policy on Probation, Suspension and Reinstatement in the Graduate Catalog above);
2. Failure to maintain good academic standing based on specific program requirements (see specific program handbook);
3. Plagiarism, falsification of data, and/or other instances of academic dishonesty (see the Code of Student Conduct and/or the Policy for Responding to Allegations of Misconduct in Scientific Research and Scholarly Activity);
4. Inability to meet specific technical requirements (see specific program handbook);
5. Failure to pass a required examination or meet a program benchmark as determined by the appropriate review committee (see specific program handbook);
6. Failure to maintain satisfactory progress on a thesis or dissertation as determined by the designated thesis or dissertation committee (see specific program handbook);
7. Unprofessional and/or unethical behavior as a graduate assistant, student intern, student clinician, student teacher, student worker, or other University-affiliated role (see the University Code of Ethics and applicable standards); and/or
8. Any behavior that may involve criminal activity, that may pose a threat to the health or safety of the University community, that may infringe upon the rights or property of others in the University community, and/or that may breach the peace of the University community (see the Code of Student Conduct).

A student must be informed of their dismissal from a graduate program in writing by the graduate program director (GPD). The letter provides reasons for dismissal and information about appealing per the policy in this section.

A copy of the dismissal letter shall also be sent to the dean administering the program or their designee, the Graduate School, and, if relevant, the Office of Visa and Immigration Service Advising. All units notified, including the student, should also receive a copy of the Notice of Student Separation or Dismissal from Program form. Except in cases involving probation and suspension, the Code of Student Conduct, and/or the Policy for Responding to Allegations of Scientific Misconduct in Scientific Research and Scholarly Activity, a student may appeal their dismissal from a graduate program in writing to the dean or their designee within 45 calendar days of the Graduate Program Director's dated letter notifying the student of dismissal. If dissatisfied with the decision of the dean administering the program or their designee, a student may appeal their dismissal from a graduate

program in writing with the Graduate Appeals Committee by submitting a Student Appeal Request Form to the Graduate School. The student is also responsible for submitting all documents related to the dismissal (e.g., copies of decision letters by the GPD and dean and dismissal forms) with the official appeal. The student must submit their appeal of the dean or designee's decision for dismissal within 14 calendar days of the decision letter.

If the original dismissal decision is based in full or in part on a course grade and that grade is being appealed, the student follows procedures for a grade appeal until that decision is rendered. If the dismissal status is unaffected by the grade appeal results (e.g., the appeal is denied, or the overturned grade does not alter the program's dismissal decision), the student must then follow procedures for dismissal appeal, beginning with a maximum of 45 calendar days from the grade appeal decision letter to when the dismissal appeal is received by the dean or designee.

The Graduate Appeals Committee will review materials submitted by the student. It may also seek additional information from the program or student to aid its review. The Committee will render its decision and inform the Graduate School. The Graduate School will send a letter to the student, with a copy to the GPD and dean's office, informing him or her of the Graduate Appeals Committee's decision. If the Graduate Appeals Committee supports the GPD's original decision, the student shall remain separated from the program. If the Graduate Appeals Committee approves reinstatement, the GPD shall work out a plan of study with the student that guides him or her to the successful completion of the program. The decision of the Graduate Appeals Committee is final.

A student's dismissal shall ordinarily remain in effect for eight years before they may seek readmission to the same graduate program at the master's level or for eight years before they may seek readmission to the same graduate program at the education specialist or doctoral levels. If the student seeks readmission to the same program after eight years and is accepted, they will work with the program to recertify courses for which a grade of B or better was awarded for those credits to count toward the degree as transfer credits. Their GPA will be reset to zero as a student returning from reinstatement (see policy Readmission to the Institution Following Separation or Dismissal). A student may appeal dismissal only one time for the same program.

Graduate Registration Requirements and Procedures

Office of the University Registrar

The Office of the University Registrar provides a wide variety of student services, including registration, verification of enrollment, maintenance of student records and academic history, transcripts, degree certification and diplomas. A calendar of important dates, the examination schedule, and information about various policies and procedures is available at <http://www.odu.edu/registrar> (<http://www.odu.edu/registrar/>).

The Office of the University Registrar also is responsible for determining in-state tuition status, athletic eligibility, and registration of students enrolling through the Virginia Tidewater Consortium and the Interinstitutional Study Program with Norfolk State University.

Self-service is available for most processes online at <https://my.odu.edu/>. On the Norfolk main campus, walk-up services are available at the office in 1009 Rollins Hall; on the Macon & Joan Brock Virginia Health Sciences at Old Dominion University campus, walk-up services are available at the office in Lewis Hall Building. Additionally, many services are available at the higher education centers. The offices are open Monday-Friday from 8 a.m. - 5 p.m. and can be reached at 757-683-4425 for the main campus, and at 757-446-5806 for VHS campus.

Academic Calendar and Course Scheduling

The academic calendar includes the fall and spring semesters, as well as a summer term. The fall semester begins one or two weeks prior to Labor Day Weekend and ends 16 weeks later. Classes will be held on Saturday and Sunday of Labor Day weekend, but classes are canceled for the Labor Day holiday. A Fall Break is scheduled for mid-October (Columbus Day Weekend) and runs from Saturday through Tuesday of that weekend. Thanksgiving break begins after classes on Tuesday prior to the holiday, and classes resume on the following Monday. Commencement is scheduled on the Saturday after exams have been administered.

Spring semester includes a Winter session that begins after fall commencement and ends before the rest of the spring semester classes begin.

Spring semester begins on Tuesday following the holiday weekend of Martin Luther King (MLK). Spring Break is scheduled eight weeks after the start of classes, from Monday through Saturday. Classes resume on the following Sunday and continue until Monday of week 15 into the semester. A reading day is held the Tuesday after classes end, with exams beginning on Wednesday and continuing to the following Wednesday. Commencement is scheduled on the Friday and Saturday after exams have been administered; Saturday is the degree conferral date.

Summer term includes a three-week Maymester, along with one 12-week and two six-week sessions.

Note: Asynchronous courses may or may not follow these terms. The University will determine the duration of each course, and students may opt for self-paced study when enrolling in this online format.

Authorization to Enroll in Graduate Courses

Degree Seeking Students

All students who have been admitted in regular or provisional status to graduate degree programs must have the advisor block updated prior to registration each semester. Students should consult with their advisors to discuss their program of study and to schedule appropriate courses in advance of registration whenever possible.

Nondegree Seeking Students

Nondegree graduate students should seek advice from the department/school offering the course, or if registering for engineering or business courses, obtain permission of the department/school.

All nondegree graduate students who have completed six credit hours of graduate courses will receive an “advisory” notice upon attempting to register for additional graduate courses. This notice will advise the student to contact the Graduate School to obtain counseling and recommendations. This “advisory” notice will not prevent registration.

All nondegree graduate students who have completed or will exceed 12 credit hours will be blocked from registering or attempting to register for additional graduate courses. To remove this registration block, a student must contact the Graduate School for advice on gaining admission into a graduate program or to receive written permission to take additional hours as a nondegree student.

Students taking graduate courses for licensure, certification or professional development (e.g., Virginia Department of Education “endorsements”) will not receive the advisory notice and will be exempt from the registration block. Contact the department offering the program for specific registration information and procedures.

Students should consult the Registrar’s Office website at <http://www.odu.edu/registrar> (<http://www.odu.edu/registrar/>) each semester for the most current advising and registration policies.

Audit Status

The audit grading status is available for students who would like to enroll in a course for the knowledge gained or personal satisfaction, not for academic credit. Any course that is elected to be carried as an audit will be subject to the normal fees and regulations of the University. Regular attendance is expected, but neither tests nor examinations are required. No grade will be recorded, except that an instructor may assign a grade of “W&” to a student who misses an appreciable portion of the classes. The student’s record will be marked “audit” by the course so elected. A student may not audit a course and subsequently seek advanced placement credit for the same course. A student may audit a course and register for the same course for credit in a subsequent semester. Registration for the audit option must be selected by the end of the drop/add period in the given semester. Any course elected for audit cannot be changed to that of credit status after the end of the “add” registration period. Students receiving financial aid should be aware that registering for audit status may affect their financial aid eligibility. Selection of the audit status is accomplished through the normal registration procedures.

Graduate Numbering (Graduate Level)

Courses at the 500, 600, 700, and 800 levels are generally for graduate credit.

Courses at the 500 level are cross-listed to undergraduate 400-level courses, with additional work and higher-level outcomes required for 500-level courses. Except in cases where topical content changes by each semester, cross-listed courses taken previously at the 400 level may not be retaken at the 500 level. A limited number of 500-level courses may be used to satisfy the requirements for a master's degree, education specialist degree, or a doctoral degree.

Courses at the 600 level form the core of master's programs, including those taken in connection with a thesis, and they are not cross-listed with numbers at other levels. A limited number of 600-level courses may be used to satisfy requirements for an education specialist degree or a doctoral degree.

700- and 800-level courses are generally, but not always, cross-listed. 700-level courses are generally reserved for master's students and 800-level courses for doctoral students. When 700- and 800-level courses are cross-listed, additional work and higher-level outcomes are required for 800-level courses. Except in cases where topical content changes, cross-listed courses taken previously at the 700 level may not be retaken at the 800 level. A limited number of 700-level courses may be used to satisfy the requirements for a doctoral degree.

Course numbers ending in “29” at all levels are reserved for courses taken through the Virginia Tidewater Consortium Exchange Program.

Cooperative Education course numbers are generally 667 and 867.

Internship course numbers are generally 668 and 868.

Practicum course numbers are generally 669 and 869.

Seminar, Colloquium, and Capstone course numbers include 690, 691, 692, 693, 790, 791, 792, 793, 890, 891, 892, and 893.

Topics course numbers include 595, 596, 695, 696, 795, 796, 895, and 896. These numbers are generally to be used to designate topics courses taught as a class. The course title should be modified to include the particular topic for that semester when the course is scheduled. If a particular topic is offered more than three times, it should be submitted for approval as a regular course offering and assigned a course number.

Individual and Tutorial course numbers include 597, 697, 797, and 897. These numbers are generally to be used to designate courses involving individual or tutorial study within a discipline. These individually arranged courses will require prior approval by the department chair and/or instructor.

Research/Project course numbers are generally 698 for the master's level and 898 for the doctoral level.

The Thesis course number is 699 and is reserved for the master's thesis.

The Dissertation course number is 899 and is reserved for doctoral dissertation courses.

The Continuous Enrollment course number 999 is available for the purpose of maintaining active status at the doctoral level. This may be a discipline-specific 999 course or GRAD 999.

The Continuous Enrollment course number 998 is available for the purpose of maintaining active status at the master's level. This may be a discipline-specific 998 course or GRAD 998.

Grading

Grade	Grade Points	Undergraduate	Graduate
A	4.00	Superior	Excellent
A-	3.70	Superior	Excellent
B+	3.30	Good	Good
B	3.00	Good	Good
B-	2.70	Good	Fair
C+	2.30	Satisfactory	Poor
C	2.00	Satisfactory	Poor
C-	1.70	Passing	Poor
D+	1.30	Passing	Not Used
D	1.00	Passing	Not Used
D-	0.70	Passing	Not Used
F	0.00	Failing	Unsatisfactory
WF	0.00	Unofficial Withdrawal	Unofficial Withdrawal
P	None	Pass	Pass
F (P/F)	None	Fail	Fail
O	None	Audit	Audit
I	None	Incomplete	Incomplete
II	None	Not Used	Incomplete not Subject to Time Limit
W	None	Official Withdrawal	Official Withdrawal
Q	None	Progress but not Proficiency	Not used
Z	None	No Grade Reported	No Grade Reported

The use of plus and minus grades is at the discretion of the instructor.

The grade point average is calculated by dividing the accumulated number of grade points earned by the accumulated number of credit hours attempted. Grades of F and WF and repeats are included, but official withdrawals,

audits, and grades on noncredit courses and pass/fail degree courses are not included. All undergraduate-level courses, including courses taken as a non-degree seeking student and courses taken after graduation, will be included in calculating the undergraduate cumulative grade point average. All graduate-level courses, including courses taken as a non-degree seeking student and courses taken after graduation, will be included in calculating the graduate cumulative grade point average.

For completion of an undergraduate degree or certificate, a student must have a minimum cumulative grade point average of C (grade point average of 2.00) in all courses taken and a grade point average of at least 2.00 in the major except for those degree programs or certificate programs requiring grade point averages above a 2.00.

A minimum cumulative grade point average of 3.00 is required for the award of a graduate degree or certificate.

Grades in courses accepted for transfer credit are not counted in the computation of grade point averages.

Grades are available to students through the secure website. Grades are mailed to students only if a written request is submitted to the Office of the University Registrar.

WF and W Grades. The grades of WF and W indicate withdrawal from a course only under those conditions described in the sections entitled Class Schedule Change Procedure and Grading Policy for Withdrawal From Classes.

Incomplete Grades. A grade of I indicates assigned work yet to be completed in a given course or absence from the final examination and is assigned only upon instructor approval of a student request. The I grade may be awarded only in exceptional circumstances beyond the student's control, such as illness, and only after 80% of the time allocated for the course has elapsed and substantial progress has been made toward completion of course requirements with the exception of courses that do not fit within the traditional semester calendar.

In cases of exceptional circumstances beyond the student's control, it is the responsibility of the student to approach the instructor to request an I grade and to provide documentation, including a written statement of when the work will be completed, to support the request. The authority to award an I grade rests with the instructor whose decision is final. Students whose requests for I grades are approved must not re-register for the class until the I grade has been resolved. The I grade becomes an F if not removed when grades are due the following term according to the following schedule: I grades from the fall semester become F's if not removed by the day grades are due for the spring semester; I grades from the spring semester and the summer session become F's if not removed by the day grades are due for the fall semester.

When there is an existing incomplete grade and the instructor who assigned the incomplete has left the university or is no longer available, the chair of the department or the program director will be responsible for making sure that the completed work is graded, and a final grade is submitted.

An I grade may be changed to a W only in very unusual circumstances and when the student's situation has changed since the I grade was awarded. In these cases, the request for a change to a W must be in writing, documented, and approved by the instructor, department chair and dean. Students will not be allowed to graduate until all grades of I have been resolved.

In the case of courses that do not fit within the traditional semester calendar, the faculty member assigns the I grade. The time periods for the removal of I grades before they become grades of F are the same as those stated in the previous paragraph.

Extension of the I time limitation normally will not be approved except for reasons beyond the student's control and only if the supervising faculty member is available and willing to supervise the work beyond the normal time limit. Students should submit the request to the instructor, who should submit approval, via the chair, to the University Registrar in order to retain the I. The approval from the instructor should designate the expiration date of the extension.

A grade of II indicates incomplete work not subject to the time limits described above for I grades. The II grade can be used only in those courses directly related to the research for and preparation of the graduate thesis/dissertation.

Z Grades. A grade of Z indicates that no grade has been reported by the instructor and will convert to a grade of F if not removed through the last day of classes of the following term (excluding the exam period) according to the following schedule: Z grades from the fall semester become F's if not removed by the last day of classes of the spring semester; Z grades from the spring semester and the summer session become F's if not removed by the last day of classes of the fall semester. Students will not be allowed to graduate until all grades of Z have been resolved.

Interim Academic Evaluation

Faculty teaching 100- and 200-level undergraduate courses will provide specific feedback regarding progress in the course in the fifth week of the semester in the fall and spring semesters. Providing timely information to students on graded work makes students aware of their performance so they can determine whether to seek additional help from the faculty member, tutoring services when available, their academic advisor, and/or withdraw from the course prior to the established deadline for withdrawal.

Mid-Semester Feedback

The University believes that regular assessment of students and feedback to them is essential to effective teaching and learning. Therefore, faculty members will provide all students with evaluation of their progress in a course prior to midsemester (or equivalent in a nonsemester course) so that students have information about their progress before the withdrawal deadline, which is the end of the tenth week of classes.

Registration

There are several registration options available to students: registration via the web at my.odu.edu (<http://my.odu.edu>), click LEO online, in person, on-campus registration, and off-campus registration.

Eligible students are encouraged to preregister in order to improve the likelihood of obtaining satisfactory schedules of classes. Preregistration is reserved for currently enrolled degree-seeking students. Eligible students will be assigned a "time ticket" four to six weeks prior to preregistration. Open registration begins immediately following the preregistration period.

Complete registration information, important deadlines and the final examination schedule can be found at www.odu.edu/registrar (<http://www.odu.edu/registrar>). The course schedule is available at www.leonline.odu.edu (<http://www.leonline.odu.edu>) by March 7 for summer and fall semester classes and by October 7 for spring semester classes.

Priority Preregistration for Active Duty, Veterans, Reservists and Virginia National Guard Service Members

Code of Virginia § 23.1-904 (C) states that:

The governing board of each public institution of higher education shall, in accordance with guidelines developed by the State Council of Higher Education for Virginia, implement policies that recognize the scheduling difficulties and obligations encountered by active-duty members of the United States armed forces.

The State Council of Higher Education for Virginia in consultation with the Military Education Advisory Committee (MEAC) has issued guidelines that require state colleges and universities to establish course registration policies that provide reasonable accommodation to students who are active-duty military members, veterans, reservists and Virginia National Guard members. The policy can be found at the following link: <https://www.odu.edu/about/policiesandprocedures/bov/board-of-visitors-policy-1418> (<https://www.odu.edu/about/policiesandprocedures/bov/board-of-visitors-policy-1418>).

Staff in the Office of the University Registrar, Military Connections Center, and the Office of Admissions will be trained to communicate the policy to students who may be qualified for this benefit.

Dropping, Adding, and Withdrawing From Classes

See the academic calendar in this Catalog or the Registrar's Office website at <http://www.odu.edu/registrar> (<http://www.odu.edu/registrar>) for deadlines for adding or dropping classes. For information regarding the refund schedule, see the chapter on Financial Information or go to the Office of Finance's web page at <http://www.odu.edu/finance> (<http://www.odu.edu/finance>).

Class Schedule Changes and Drop/Add Procedures

During the fall and spring semesters, students may add and drop classes within the first 11 calendar days after the first day of classes for the semester (for full semester classes). Please refer to www.odu.edu/registrar (<http://www.odu.edu/registrar>) and click on the link to "Academic Calendar" for the dates to drop classes in courses not spanning the full semester.

Once registered, a student must drop or add classes via the secure website at <https://portal.odu.edu>, click LEO online or submit a completed drop/add form to the Office of the University Registrar. The date the form is received in the Office of the University Registrar or processed via LEO determines tuition adjustments, if applicable. If needed, drop/add forms can be downloaded from the Registrar's Office website: <http://odu.edu/registrar/forms> (<http://odu.edu/registrar/forms>) and submitted electronically to register@odu.edu.

First-year students are strongly encouraged to seek advising before dropping or adding any class. Students enrolled in degree programs in which sequencing is critical are urged to consult their academic advisors before scheduling changes. In such programs, dropping of courses without prior consultation with academic advisors may necessitate additional time to complete University and/or departmental degree requirements.

See the academic calendar in this Catalog or at <https://www.odu.edu/academics/calendar> (<https://www.odu.edu/academics/calendar>) and click on the link to "calendars" for the dates for adding or dropping classes. For information regarding the refund schedule, see the chapter on Tuition, Fees and Financial Information or go to the Office of Finance's web page at www.odu.edu/finance (<http://www.odu.edu/af/finance>). There may also be financial aid implications to dropping or withdrawing from a course. For more information about how financial aid could be impacted, seek advice from a financial aid advisor or visit the Office of Financial Aid website at www.odu.edu/finaidoffice/manage/dropping-a-class (<https://www.odu.edu/finaidoffice/manage/dropping-a-class>).

ODU does not automatically drop or withdraw students from classes for failure to attend or failure to pay tuition. The student must initiate the process to withdraw from classes.

Withdrawal From Classes or From the University

Policy for Dropping and Withdrawing From Classes

Dropping Classes

Prior to the start of and during the first 11 calendar days of the semester, a student may drop a course; during this period no grade will be assigned and no record of the course will be entered on the student's permanent academic record. Please refer to www.odu.edu/registrar (<http://www.odu.edu/registrar>) and click on the link to "Academic Calendar" for the dates to drop classes in courses not spanning the full semester.

Withdrawal from Classes

After the first 11 calendar days of the semester, a student may withdraw from any course through the end of the twelfth week of classes of a regular semester not including the exam period. For all other non-standard semester

courses (i.e., Summer Sessions, Maymester, Winter Session, or eight-week sessions), a student may withdraw after the drop/add period through the day prior to the last day of classes for that session. A grade of W will be assigned during this period. However, some degree programs have withdrawal, continuance and progression policies that supersede this policy because of the nature of the professional standards and practices underlying the specific curriculum. Students should consult with their advisor or student success coach (for online students) to determine if there are more stringent requirements for withdrawing from courses in specific majors.

Withdrawal from a course after the twelfth week of a regular session (or its equivalent in a non-semester course) is usually not permitted. However, in the event of an illness or other severe hardship beyond the student's control, the student should submit, no later than the last day of classes, a written petition for permission to withdraw to the instructor. If permission is granted, a grade of W will be recorded. If permission is not granted, the student will not be allowed to withdraw from the course. Any appeal of decisions should be brought to the department chair.

Please refer to www.odu.edu/registrar/ and click on the link to "Academic Calendar" for the dates to withdraw from classes in courses not spanning the full semester. Information on tuition refunds can be found on the Office of Finance website at <https://www.odu.edu/tuition/refunds> (<https://www.odu.edu/tuition/refunds/>).

Students are encouraged to contact their instructor, advisor, and Student Success Director (for online students) to discuss the implications of withdrawing. Prior to withdrawing from any course, students receiving financial aid should consult their financial aid counselor. Course withdrawal may adversely impact satisfactory academic progress for financial aid purposes and limit the student's ability to continue receiving financial aid.

Withdrawal from a course after the last day of classes of a regular semester (or after the day prior to the last day of classes for non-semester courses) is not permitted.

Students who have a financial hold on their record are not able to withdraw from classes online. However, they may withdraw by the published deadline at the Registrar's Office between 8:00 a.m. and 5:00 p.m. Monday-Friday or by email to register@odu.edu (registrar@odu.edu). The office is located at 1009 Rollins Hall.

A student who stops attending classes without withdrawing from the course will receive a grade of WF, except if the student's performance was an F at the time the student stopped attending class, in which case a grade of F will be assigned. The grade of WF will carry no grade points, and will be computed in the grade point average as a grade of F.

ODU does not automatically drop or withdraw students from classes for failure to attend or failure to pay tuition. The student must initiate the process to withdraw from classes and file a Tuition Appeal if applicable.

Tuition Appeal forms and full details are available from the Office of Finance web site: <https://www.odu.edu/tuition/refunds/appeals> (<https://www.odu.edu/tuition/refunds/appeals/>).

Drop and Withdrawal Deadlines

Specific deadline dates for dropping and withdrawing from classes can be found on the Academic Calendar at <https://odu.edu/academics/calendar> (<https://odu.edu/academics/calendar/>).

Administrative Withdrawal From the University

During the course of any semester, there will be situations, such as severe illness, death in the immediate family, or disciplinary actions, which will require that the University initiate an administrative withdrawal from the University to assist a student or to implement a University-imposed sanction. The following procedures will be used.

1. The request for withdrawal is initiated either by the student because of an extenuating personal situation or by the University because of a disciplinary situation.

2. This action will normally be handled by the Vice President for Student Enrollment, Engagement & Services or designee. If the student initiates the withdrawal, the Office of the Vice President for Student Enrollment, Engagement & Services will determine what verification is necessary and document the situation.
3. A request will be submitted to the Office of the University Registrar to withdraw the student from all classes.
4. The student's instructors will be notified. If the student is withdrawing after the last day of classes, part of this notification will include the opportunity for the faculty member to raise objections if the student's classroom performance is such that a withdrawal (W) would not be appropriate. If a faculty member objects, the faculty member will inform the University Registrar and the original grade assigned by the faculty member will stand.
5. The request for withdrawal must be initiated by the student within one calendar year counting from the first day of classes of the term for which administrative withdrawal is sought. Requests for withdrawal that have the necessary documentation but are received after the one-year deadline may be reviewed by an appeals committee consisting of at least three members and including both faculty and administrators, to be convened by the Director of Student Outreach and Support in Student Enrollment, Engagement & Services. These requests must include clear and compelling reasons for not submitting the request within one calendar year.
6. Tuition refund appeals are handled separately and must be submitted to the Office of Finance. Students submitting requests after the one-year deadline are not eligible for a tuition appeal.
7. Students receiving financial aid should consult their financial aid counselor prior to submitting a tuition refund appeal.

Any exceptions for undergraduate students must be approved by the Vice Provost for Academic Affairs or designee. Exceptions for graduate students must be approved by the Dean of the Graduate School.

Sudden Withdrawal and Prolonged Absence Due to Military Mobilization

Guidelines are provided for students whose service in the armed forces of the United States has required their sudden withdrawal or prolonged absence from enrollment at Old Dominion University. The policy can be found at the following link:

<https://www.odu.edu/about/policiesandprocedures/bov/board-of-visitors-policy-1416> (<https://www.odu.edu/about/policiesandprocedures/bov/board-of-visitors-policy-1416/>)

Guidelines and Procedures for Grade Adjustments for Nonacademic Reasons

1. Students are responsible for notifying the faculty member of errors in the assignment of grades (e.g., a C received instead of an A) immediately upon receipt of the grade. If confirmed, the instructor will submit a grade change using the "Report a Change of Grade" link in the Faculty & Advisors menu in Leo Online. If the grade is older than two semesters or has previously been changed, the instructor should complete the electronic Grade Change Form available via the MyODU portal. Once submitted, the grade change request is forwarded to the chair or program director for consideration. If the chair or program director approves, the form will be signed electronically and forwarded to the Office of the University Registrar for processing. If the chair or program director does not approve, they should notify the instructor of the reasons for denial.

When a grade change is needed and the instructor who assigned the grade has left the university or is no longer available, the student should contact the chair of the department or program director who will be responsible for verifying the change and submitting the electronic Grade Change Form to the Office of the University Registrar.

Students are responsible for notifying the Office of the University Registrar of administrative errors immediately upon receipt of the grade.

2. Students are notified via email when a change of grade is processed by the Office of the University Registrar.

Grade Appeals: Policy and Procedures

I. Policy and Purpose

- A. The purpose of the grade appeal procedure is to serve the needs of graduate and undergraduate students who believe that they were unjustly awarded a final course grade by a faculty member through prejudice or caprice. This policy applies to the final grade for the award of academic credit and does not apply to graduate and undergraduate examinations that are administered as part of the degree progression and certification processes (such as comprehensive examinations and candidacy examinations at the graduate level).
- B. The basis for a grade appeal is the student's charge that the final grade was awarded through prejudice or caprice. The burden of proof rests with the student.
- C. Students must initiate the first review of the appeal within 45 days of the official end of the semester in which the grade was awarded. For grades awarded and appealed from fall and summer semesters, the entire appeal process must be completed before the official end of the next semester; the entire appeal process for grades awarded and appealed from the spring semester must be completed before the official end of the next fall semester.

II. Procedure

Prior to initiating a formal appeal, the student must attempt to consult with the instructor to request an explanation of the method of evaluation and to determine whether an error has been made. This consultation may be face to face, via e-mail, phone, or video conference if both agree, and efforts to consult with the instructor must be documented by the student. If at any point in the appeals process the student and instructor, or the student and a subsequent appeals body, agree that a grade of P is acceptable, that grade shall be assigned for the course and the appeals process will conclude. At all stages of the grade appeal processes outlined below, the instructor and student shall be notified of any actions recommended or taken by the chair, Grade Appeal Review Committee, Dean (or designated Associate Dean) or Provost and Vice President for Academic Affairs (or designated Vice Provost).

A. First Review of Appeal

1. If the student is not satisfied with the results of the consultation with the instructor, or the instructor is not available as described in section IV. B, then the student may file a grade appeal. The chair of the department in which the instructor is teaching will conduct the first review of the student's appeal, unless the instructor is the department chair. The student's case must be presented on the Grade Appeal Form with supporting documents/explanations to the instructor's department chair within 14 days of the consultation with the instructor.
2. The student's Grade Appeal Form should (1) state specific reasons and give examples of faculty prejudice or caprice, (2) show that prejudice or caprice affected the awarding of the final course grade, and (3) be presented as a complete package and include all other supporting documentation.
3. The chair shall notify the instructor of the appeal and provide the instructor with copies of the form and other documents that were submitted. The chair or Dean (or designated Associate Dean) shall also request a response from the instructor that should include at a minimum the course syllabus, grade distribution for the course, attendance policy, the grading plan for the course, and other grading rubrics.
4. The chair shall review all documents and may hold a hearing where both the instructor and student are present. (See section V. for guidelines for hearings.) No other persons will attend the hearing and the hearing must be recorded.
5. If the chair concludes that there is no cause for complaint, the student and the instructor will be notified in writing of

the decision within seven days of receipt of the request for an appeal and the supporting documents. The student may request a second review of the appeal (see section II.B. for details).

6. If the chair concludes that there is valid cause for the complaint, the chair should consult with the instructor and student and attempt to mediate the dispute by working with both parties to agree on an appropriate course grade. Among the alternatives available for resolution of the case will be the assignment of the grade of P if the chair, the instructor, and the student express their agreement in writing. If the instructor and student agree to a grade change or to award a grade of P, the instructor will make the official grade change.
7. If mediation fails, the chair will notify the college Grade Appeal Review Committee of the need for a review and submit all documents to the committee. The instructor and the student will be notified of this action.
8. The chair will ask the college Grade Appeal Review Committee to appoint the reviewers within five working days. (See Section III for the composition of the committee.)
 - a. The faculty and the student who form the Grade Appeal Review Committee will notify the instructor and student involved in the appeal when the review will take place and request needed documents.
 - b. The Grade Appeal Review Committee will review the documents, consult with relevant parties as needed and determine if there is sufficient evidence in the documents to support the student's appeal, or if more information is needed in which case a hearing with the student and instructor may be held. (See Section V for details about the hearing.) The review and hearing must be scheduled within 15 days of the receipt of the materials by the committee.
 - c. If the Grade Appeal Review Committee finds that there is sufficient evidence that the grade was awarded with prejudice or caprice, they may consult with the instructor to suggest a grade change and provide a rationale for that decision. The decision and rationale must be provided in writing to the instructor. The final outcome of the committee's review will be documented and communicated to the instructor, the student, the department chair, and Dean.
 - d. If the committee finds on behalf of the student and recommends a change of grade and the instructor refuses to change the grade but is willing to assign a grade of P, then the committee will consult with the student about the advisability of accepting a P grade. Should the student agree to accept a grade of P, the instructor will make the official grade change.
 - e. If the committee finds on behalf of the student and recommends a change of grade and the student is unwilling to accept a grade of P, the Dean will review and make a recommendation to the Provost and Vice President for Academic Affairs. The Provost and Vice President for Academic Affairs or a designated Vice Provost will submit the recommended grade change to the Registrar. Only the Provost and Vice President for Academic Affairs or designated Vice Provost is authorized to change an instructor's grade. The instructor, chair, student, and Dean will be notified. The Provost and Vice President for Academic Affairs' decision will be final.
 - f. If the committee finds on behalf of the instructor, the original grade will stand and the instructor and the student will be notified.
9. If the instructor is the department chair, the student will submit the Grade Appeal Form and documents to the Dean (or designated Associate Dean) and the Dean (or designated Associate Dean) will conduct the first review following the procedures described in II.A.1-8.

10. If the instructor is a Dean or Vice President, the student will submit the Grade Appeal Form and documents to the chair of the department in which the Dean or Vice President is teaching the course.

B. Second Review of Appeal

1. The student may request a second review of the appeal if the conclusion of the first review is that there is no cause for complaint. The request for a second review must be submitted within seven days of the denial of the first review. The student should request in writing that the person responsible for conducting the first review forward the grade appeal package to the person responsible for conducting the second review. The instructor is notified of this action.
2. When the instructor is a faculty member, the Dean (or designated Associate Dean) is responsible for conducting the second review. If the instructor is the chair and the Dean (or designated Associate Dean) conducted the first review, the Provost and Vice President for Academic Affairs or designated Vice Provost is responsible for conducting the second review. If the instructor is a Dean or Vice President and the chair of the department in which the Dean or Vice President is teaching conducted the first review, the Provost and Vice President for Academic Affairs or designated Vice Provost is responsible for conducting the second review.
3. The second review shall follow the same procedures as the first review, as described in section II.A.1–4.
4. If the person to whom the second review is submitted concludes that there is no cause for complaint, the student and the instructor will be notified in writing that the grade appeal process is complete. No further appeal will be allowed.
5. If the person to whom the second review is submitted concludes that there may be valid cause for the complaint, the procedures as described in section II.A.6–8 will apply.

III. Grade Appeal Review Committee

A. Committee Composition and Duties

1. Each college will create a Grade Appeal Review Committee that has one representative from each department in the college and a list of potential student members. If an appeal is heard, the Grade Appeal Review Committee will select two faculty members and one student from these lists.
2. Representatives must be full-time tenured or tenure-track faculty in an academic department elected by the department faculty. At least two committee members shall be tenured. No administrator, such as a Chief Departmental Advisor or Graduate Program Director, shall be eligible to serve on the committee.
3. Terms of service will be for two years. Members may be re-elected for an additional two-year term.
4. At the beginning of each academic year, each department in the college will submit a list of full-time students who are eligible and willing to serve on the committee. This list will be formulated each year. When needed, one student will serve on a review committee.
5. The committee will select its own chair and develop guidelines for the review process and procedures.
6. Two faculty members and one student selected from the names submitted by each department will review the appeal including documents from the student filing the appeal and the instructor of record. Neither the faculty members nor the student member shall be from the instructor's or student's department.
7. Both the instructor and the student will have the right to challenge, for valid cause, any or all of the members of the committee, and in that event replacements will be appointed and no further challenge will be permitted.

IV. Instructors' Responsibilities and Rights

- A. The following are guides for the instructor's responsibilities and rights.

1. Instructors have a responsibility to meet with students to explain the course grading procedure and the process for determining the final grade.
2. When requested, instructors must provide the documents requested for a review at all levels. These documents will include at a minimum the course syllabus, grade distribution for the course, attendance policy, and grading procedures for course tasks with rubrics. Other documents may be included or requested.
3. The instructor must assist in making arrangements for a hearing when one is needed.
4. Instructors have the responsibility to participate in a grade appeal.
5. No instructor shall be forced or coerced into making a grade change.

B. Unavailable Instructors

1. In the event a student makes documented efforts to consult with an instructor and is unable to find the instructor, or does not receive a response, the student shall seek assistance from the chair.
2. When the chair has made reasonable efforts to contact an instructor whose final grade is being appealed and is unsuccessful, the Grade Appeal Review Committee and chair will independently review available materials and reach a consensual decision. In the event that these two reviews reach different decisions that are not reconciled, the Provost and Vice President for Academic Affairs or designated Vice Provost will make a final decision. No other appeal can be made.
 - a. If the decision is in favor of the student, and the student is not willing to accept a grade of P, the Provost and Vice President for Academic Affairs or designated Vice Provost will submit the recommended grade change to the Registrar. Only the Provost and Vice President for Academic Affairs or designated Vice Provost is authorized to change an instructor's grade upon the recommendation of the college Grade Appeal Review committee.
 - b. If the decision is not in favor of the student, the instructor's original grade will remain.
3. In the event of an instructor's unavailability due to death, serious illness, or any other cause that would prevent the instructor from participating in the process in time for the process to be completed during the designated semester, the procedure in II.A.1. and IV.B.2 will be followed.

V. Procedures for Hearings

A hearing involving the faculty member and the student may be held at any level of appeal.

- A. After the Grade Appeal Review Committee reviews the appeal form and supporting documents and the instructor's documents, a hearing may be held to clarify issues and/or to receive further evidence. Both the student and the instructor may submit additional materials at the hearing.
- B. Hearings may be held at any level only when both the instructor and the student can participate. No other persons may attend this hearing.
- C. The conclusions, decision(s), and a rationale for these must be disseminated in writing to the instructor and to the student.
- D. If either the instructor or the student believes that the established procedures for the appeal of grades have not been followed, an appeal for an additional hearing may be made to the Dean (or designated Associate Dean), or when the chair or Dean is the instructor, to the Provost and Vice President for Academic Affairs or designated Vice Provost. The only basis for an appeal will be the failure to have been provided due process as prescribed by the policy.

VI. Records

- A. If the grade appeal concludes after the first review, the original Grade Appeal Form and all decision letters for each level of review

will be kept in a secure location in the department chair's office for a minimum of one year.

- B. If the grade appeal advances to the second level, the original Grade Appeal Form and all decision letters for each level of review will be kept in a secure location in the Dean's office for a minimum of one year.
- C. Recordings of hearings will be kept in the department chair's office or the Dean's office for a minimum of one year.

VII. Assignment of P Grade

A P grade established under this policy at any stage of the grade appeal process will be given irrespective of the University policy on hours permitted for P grades or restrictions on when a P grade is permissible and will not prevent progression in the degree program or courses for which this course is a prerequisite.

Transcripts

Transcripts are provided by the Office of the University Registrar and are issued only as requested through LEO Online. Official electronic transcripts (PDF) can be ordered through Parchment, the University's electronic transcript service provider. Transcripts should be requested at least five business days before the date needed to allow for processing and delivery. Students picking up transcripts must present valid identification. Students may access and print unofficial transcripts for personal use through LEO Online at no charge.

All grades, academic standing, degrees awarded, and degree honors are included on the transcript. Recent graduates that need to show proof of the degree earned should confirm that the graduation status in Leo Online shows "Awarded" prior to ordering a transcript.

An official transcript carries the University Seal and an authorized signature. Official transcripts are usually mailed directly to educational institutions, employers, etc. Any transcript mailed to or given directly to a student will be marked, "Issued to Student." Partial transcripts are not issued; each transcript must include the student's complete record at Old Dominion University. A transcript of work completed at any high school or at any college other than Old Dominion University must be obtained directly from that institution.

Graduation Information

All students must apply for graduation during the semester prior to the expected completion of degree requirements. The deadline to file the intent to graduate is generally the last day of November, February, and June for the following semester. Specific deadlines are published on the Registrar's Office website, <http://www.odu.edu/registrar> (<http://www.odu.edu/registrar/>).

Students can view their application and degree status in LEO Online, via <https://my.odu.edu> (<https://my.odu.edu/>). Once the application has been processed, the student's graduation status appears as "pending." The status changes to "awarded" once the degree is conferred. Awarded status may take up to four weeks following the published degree conferral date.

Applications, complete instructions, and deadlines regarding graduation are available on the Registrar's Office website at <http://www.odu.edu/registrar> (<http://www.odu.edu/registrar/>). A separate application for each degree is required if the student is pursuing more than one degree.

Students who do not complete degree requirements as expected must reapply for the next graduation date.

Application for Graduation for Graduate Students

Graduate students should apply online at <https://my.odu.edu> (<https://my.odu.edu/>). Graduation staff members will coordinate the evaluation process with the appropriate graduate program advisor.

All outstanding work and incomplete or unreported grades must be completed or resolved before the degree will be conferred. Master's level and doctoral students must have submitted the thesis (if required) or dissertation to the Registrar's Office no later than the Friday one week before commencement as well as evidence of successful completion of

oral, written or other degree requirements. Graduate students should confer with the graduate program director and review materials available on The Graduate School's website for complete information (<http://www.odu.edu/graduateschool> (<http://www.odu.edu/graduateschool/>)).

Commencement

Commencement exercises are intended for students who are eligible and reasonably expect to complete degree requirements to graduate from the University within the current or following graduation period.

Commencement ceremonies are managed through the Commencement Office. Information about requirements for participation in commencement ceremonies is available at <https://www.odu.edu/commencement> (<https://www.odu.edu/commencement/>). To be eligible to participate in ceremonies, candidates must indicate their intent when they apply for graduation; any change, including changes to graduation dates, must be communicated to the Commencement Office.

May commencement ceremonies are intended for candidates graduating in May and students who expect to complete studies in August. December commencement ceremonies are intended for candidates graduating in December and students who completed studies the preceding August.

Students who expect to attend commencement ceremonies must have applied for graduation. Tickets will not be provided by the Commencement Office to students that have not applied. Participation in commencement ceremonies does not confirm that a degree has been (or will be) conferred. Degree conferral may take four to six weeks from the date of the commencement ceremony. With the exception of doctoral degrees, diplomas are not distributed at commencement.

Diplomas

Diplomas are mailed to the student's permanent address in Banner approximately 6-8 weeks after graduation. Students should verify address information in LEO when applying for graduation.

The student's legal name (as maintained in the official student record) and the degree title (Bachelor of Arts, Bachelor of Science, etc.,) appear on the diploma. Neither the major nor the minor appears on the diploma, but will appear on the transcript.

Interinstitutional Agreements and Opportunities to Fulfill the Degree

Attendance at Other Institutions

Graduate students who are enrolled at Old Dominion University may attend another institution and transfer credit earned to a degree program at Old Dominion University. While formal Old Dominion University permission is not required, students should consult the graduate program advisor to ensure that the credits to be taken at the other institution will transfer to the Old Dominion University program in which the student is enrolled. An official transcript from the other institution must be submitted to the graduate program advisor along with any supporting materials that may be requested such as a syllabus, course description, etc. The graduate program advisor will complete an evaluation of external credits and submit the result to the Office of the University Registrar for posting to the student's academic record.

The other institution may ask the student to provide documentation of good standing or eligibility to continue at Old Dominion. These forms should be submitted to the Office of the University Registrar. Forms that require the student to demonstrate that the course(s) will be accepted for transfer credit at Old Dominion University should be submitted directly to the academic advisor.

Academic Common Market

Old Dominion University, through a number of its undergraduate and graduate programs, participates in the Southern Regional Education Board's Academic Common Market. Eligible residents of participating states may enroll (following admission to degree status) as Academic Common Market students at in-state tuition rates. Evidence of legal domicile must

be presented to the Office of the University Registrar, 1009 Rollins Hall. Information on available programs can be viewed at <https://www.schev.edu/financial-aid/academic-common-market> (<https://www.schev.edu/financial-aid/academic-common-market/>).

Interinstitutional Study Program with Norfolk State University

Old Dominion University students have the opportunity to elect courses at Norfolk State University through a student exchange program agreed to by the two institutions.

The registrar of each institution will register a student for courses at the other institution if the student presents a properly signed form listing the course or courses to be taken at the other institution. The student exchange will be honored both in the regular session and in the summer session and applies to both undergraduate and graduate students. All credits earned by students will be considered as resident credit at the home institution for degree purposes. (Courses taken at NSU under this policy will be considered the same as Old Dominion University courses; all other courses are subject to transfer credit policy limitations.)

Regular bus service is provided between campuses, but is not available for evening classes.

Student Exchange Policy Between the College of William and Mary and Old Dominion University

The registrars at Old Dominion University and the College of William and Mary will each register students in all departments in the College of Sciences (Old Dominion) and the School of Marine Science (William and Mary) for courses at the other institution. If the student presents a properly signed form listing the course(s) to be taken at the other institution, the exchange will be honored in both regular sessions and in summer sessions, and will apply to graduate students at the master's, certificate of advanced study, and doctoral levels at both institutions.

The student must have completed prerequisites for the course(s) for which he/she registers. Core curriculum requirements must be met at the home institution. Elective courses and departmental requirements may be satisfied through exchange courses, but approval is required from the student's department. If a particular course is offered at the home institution, it may not be taken for credit at the other institution. All credits earned will be considered as resident credit at the home institution for degree purposes.

The tuition and fees are determined and retained by the student's home institution.

Navy Education Consortium and Educational Agreements

A consortium of higher education institutions, located near major naval facilities, has developed a means to enhance the opportunities for active duty naval officers to participate in graduate education at the master's level. The institutions are Old Dominion University, George Washington University, The University of Memphis, The University of Rhode Island, San Diego State University, and the University of West Florida. The program areas which may be offered under the auspices of the consortium include international and political studies, computer information sciences, and computer science. These higher education institutions also provide a common curriculum that satisfies competency areas as set forth by the Navy for the ETMS program. Officers participating in the program are enrolled in the Master of Science in Education degree program with a major in educational administration. For current information, contact the Office of Academic Affairs.

Virginia Tidewater Consortium Exchange Program

Old Dominion University students may also take courses at any of the following Virginia Tidewater Consortium institutions: Christopher Newport University (Newport News), College of William and Mary (Williamsburg), Eastern Shore Community College (Melfa), Hampton University (Hampton), Joint Forces Staff College (Norfolk), Norfolk State University, Camp Community College (Franklin), Regent University (Virginia Beach),

Thomas Nelson Community College (Hampton), Tidewater Community College (all campuses), and Virginia Wesleyan College (Norfolk).

Cross-registration is subject to the following regulations:

1. Cross-registration is limited to degree-seeking students with cumulative grade point averages of 3.00 or better.
2. Graduate students who opt to cross-register under the Virginia Tidewater Exchange Program may accumulate a maximum of 12 external credit hours to include any combination of transfer or consortium credit hours. Exceptions are granted to students enrolled in approved joint programs within the Virginia Consortium.
3. Graduate students must get pre-approval from their Graduate Program Director (GPD) before registering for consortium classes.

For further information, contact the Office of the University Registrar, 1009 Rollins Hall or register@odu.edu.

Linked Programs

Old Dominion University hosts a number of linked undergraduate to graduate programs, including bachelor's to master's programs and bachelor's to doctoral programs, that permit undergraduate students to begin graduate study as early as the junior year. If you would like more information on how to apply, please talk with your undergraduate advisor and the graduate program director for the graduate program you are interested in pursuing.

Approved Bachelor's to Master's Linked Degree Programs

Please refer to your specific program page and consult with an advisor for additional information. The programs listed below are bachelor's to master's programs for specific subject areas.

College of Arts and Letters

- Bachelor of Arts or Bachelor of Science (various majors) to Master of Business Administration (see below for details)
- Bachelor of Arts or Bachelor of Science (various majors) to Master of Public Administration (see below for details)
- Bachelor of Arts in English to Master of Arts in Applied Linguistics (<http://catalog.odu.edu/undergraduate/arts-letters/english/english-applied-language-studies-ba/#mastersdegreeoptiontext>)
- Bachelor of Arts in Art History to Master of Arts in Humanities (<http://catalog.odu.edu/undergraduate/arts-letters/humanities/#programtext>)
- Bachelor of Arts or Bachelor of Science in Communication to Master of Arts in Humanities (<http://catalog.odu.edu/undergraduate/arts-letters/humanities/#programtext>)
- Bachelor of Arts or Bachelor of Science in Communication to Master of Arts in Lifespan and Digital Communication (<http://catalog.odu.edu/undergraduate/arts-letters/humanities/#programtext>)

The linked bachelor's/master's degree in communication/lifespan and digital communication is administered by the Communication and Theatre Arts Department. The purpose of this option is to allow exceptional majors in communication to count up to 12 hours of 500-level graduate coursework towards both the BA or BS in communication and, if accepted, the MA in lifespan and digital communication. Students in the linked program must earn a minimum of 150 credit hours (120 discrete credits for the undergraduate degree and 30 discrete credits for the graduate degree). For more information, please contact Dr. Gary Beck.

- Bachelor of Arts or Bachelor of Science in Geography to Master of Arts in Humanities (<http://catalog.odu.edu/undergraduate/arts-letters/humanities/#programtext>)
- Bachelor of Arts in History to Master of Arts in History (<http://catalog.odu.edu/undergraduate/arts-letters/history/#programtext>)
- Bachelor of Arts or Bachelor of Science in Interdisciplinary Studies (Individualized Integrative Studies) to Master of Arts in Humanities (<http://catalog.odu.edu/undergraduate/arts-letters/humanities/#programtext>)
- Bachelor of Arts in International Studies to Master of Arts in International Studies (<http://catalog.odu.edu/undergraduate/arts-letters/political-science-geography/international-studies-ba/#mastersdegreeoptiontext>)
- Bachelor of Arts in Philosophy to Master of Arts in Humanities (<http://catalog.odu.edu/undergraduate/arts-letters/humanities/#programtext>)
- Bachelor of Arts in Visual Studies to Master of Arts in Humanities (<http://catalog.odu.edu/undergraduate/arts-letters/humanities/#programtext>)
- Bachelor of Arts in Women's Studies to Master of Arts in Humanities (<http://catalog.odu.edu/undergraduate/arts-letters/humanities/#programtext>)

- Bachelor of Arts in World Languages and Cultures to Master of Arts in Humanities (<http://catalog.odu.edu/undergraduate/arts-letters/humanities/#programtext>)
- Bachelor of Fine Arts (Art) to Master of Arts in Humanities (<http://catalog.odu.edu/undergraduate/arts-letters/humanities/#programtext>)

Strome College of Business

- Bachelor of Arts or Bachelor of Science (various majors in other colleges) to Master of Business Administration
- Bachelor of Arts or Bachelor of Science (various majors in other colleges) to Master of Public Administration
- Bachelor of Science in Business Administration to Master of Business Administration
- Bachelor of Science in Business Administration to Master of Public Administration
- Bachelor of Science in Business Administration to Master of Science in Accounting (<http://catalog.odu.edu/undergraduate/business/accounting/accounting-bsba/#mastersdegreeoptiontext>)

School of Cybersecurity

- Master of Science in Cybersecurity (may be available in various BA and BS programs)

School of Data Science

- Master of Science in Data Science and Analytics (may be available in various BA and BS programs)

Darden College of Education and Professional Studies

- Bachelor of Science (various majors) to Master of Business Administration (see below for details)
- Bachelor of Science (various majors) to Master of Public Administration (see below for details)
- Bachelor of Science (various majors) to Master of Science in Education (contact program director for details).

Batten College of Engineering and Technology

- Bachelor's to Medical Doctor (in cooperation with Eastern Virginia Medical School)
- Bachelor's in Engineering or Engineering Technology to Master's programs in Engineering
These are designed to allow qualified students to secure a space in a master's program available in the Frank Batten College of Engineering and Technology while they are still pursuing their undergraduate degrees. An eligible student can choose a master's program in the same discipline as his/her bachelor's program or in a complementary discipline. Subject to the approval of the undergraduate and graduate program directors, a student enrolled in a linked program can count up to six credit hours of course work towards both the undergraduate and the graduate degrees. Full-time students may be able to complete the requirements for the bachelor's degree in four years and the master's degree in one additional year. Students in linked programs must earn a minimum of 150 credit hours (120 discrete credit hours for the undergraduate degree and 30 discrete credit hours for the graduate degree).

Students who are matriculated in an undergraduate major in the Frank Batten College of Engineering and Technology with a GPA of at least 3.00 overall and 3.00 in the major are eligible to apply for admission to a linked bachelor's/master's program. Transfer students who desire to be admitted to a linked program at the time they join an undergraduate major at Old Dominion University are eligible to apply if their overall GPA at their previous institution is 3.25 or higher. Prerequisite courses may be required for engineering technology majors to pursue a master's degree in engineering.

Continuance in a linked bachelor's/master's program requires maintenance of a GPA of 3.00 or higher overall and in the major.

College of Health Sciences

- Bachelor of Science in Dental Hygiene to Master of Science in Dental Hygiene (<http://catalog.odu.edu/undergraduate/health-sciences/dental-hygiene/#programtext>)

School of Nursing

- Bachelor of Science in Nursing to Master of Science in Nursing (<http://catalog.odu.edu/undergraduate/nursing/#mastersdegreeoptiontext>)

Joint School of Public Health

- Bachelor of Science in Public Health to Master of Public Health (<http://catalog.odu.edu/undergraduate/joint-school-public-health/programs/public-health-bsph/#mastersdegreeoptiontext>)

College of Sciences

- Bachelor of Science (various majors) to Master of Business Administration (see below for details)
- Bachelor of Science (various majors) to Master of Public Administration (see below for details)
- Bachelor of Science (various majors) to Medical Doctor (in cooperation with the Eastern Virginia Medical School)
- Bachelor of Science in Biochemistry to Master of Science in Chemistry (<http://catalog.odu.edu/undergraduate/sciences/chemistry-biochemistry/biochemistry-bs/#mastersdegreeoptiontext>)
- Bachelor of Science in Chemistry to Master of Science in Chemistry (<http://catalog.odu.edu/undergraduate/sciences/chemistry-biochemistry/chemistry-bs/#mastersdegreeoptiontext>)
- Bachelor of Science in Computer Science to Master of Science in Computer Science (<http://catalog.odu.edu/undergraduate/sciences/computer-science/computer-science-bscs/#mastersdegreeoptiontext>)
- Bachelor of Science in Computer Science to Master of Science in Data Science and Analytics (<http://catalog.odu.edu/undergraduate/sciences/computer-science/computer-science-bscs/#mastersdegreeoptiontext>)
- Bachelor of Science in Mathematics to Master of Science in Computational and Applied Mathematics (<http://catalog.odu.edu/undergraduate/sciences/mathematics-statistics/#programtext>)

General Linked Program Options

BA or BS to MBA (Master of Business Administration) Linked Program

The linked BA/MBA or BS/MBA program is an early entry to the MBA program of study. The early-entry program is designed for qualified non-business undergraduate ODU students to start their MBA program prior to completing their undergraduate degree. Well qualified non-business undergraduate students may take MBA-level courses as early as three semesters prior to graduation and count up to 12 graduate credits toward their undergraduate degree. Students participating in the early-entry program must earn a minimum of 150 credit hours (120 discrete credit hours for the undergraduate degree and 30 discrete credit hours for the graduate degree). Early-entry program students should carefully consider their undergraduate degree program requirements when planning their course of study. Students in the early-entry program work in close consultation with the MBA Program Office and should refer to information in the Strome College of Business section in the graduate catalog (<https://catalog.odu.edu/graduate/stromecollegeofbusiness/>) to develop an individualized plan of study based on the required coursework.

BA or BS to MPA (Master of Public Administration) Linked Program

The linked BA/MPA or BS/MPA program provides qualified Old Dominion University undergraduate students with the opportunity to earn a master's degree in public administration while taking credits in the MPA program as

an undergraduate student. The program is designed for highly motivated students with the desire to immediately continue their education after the bachelor's degree. The program is especially relevant to individuals seeking to work (or currently working) in the public or non-profit sectors, but is suitable for students from any undergraduate major. Graduate courses may be taken during the fall and spring semester of the student's senior undergraduate year. Up to 12 graduate credits can count toward both the undergraduate and graduate degree and can meet upper-level General Education requirements. After receiving the undergraduate degree, a student will continue with the MPA program, taking MPA courses until completing the required 39 credit hours. Students in the linked program must earn a minimum of 150 credit hours (120 discrete credit hours for the undergraduate degree and 30 discrete credit hours for the graduate degree).

Requirements for admission to the graduate program can be found in the School of Public Service section of the Graduate Catalog (<https://catalog.odu.edu/graduate/business/public-service/>). For additional information, please contact the School of Public Service in the Strome College of Business.

Approved linked bachelor's to doctoral degree programs are as follows:

College of Engineering and Technology

- Bachelor's in Engineering or Engineering Technology to PhD in Engineering

For a select number of exceptionally well-qualified students, the college has established a linked doctoral program that enables students to be admitted directly into the PhD program upon completion of the baccalaureate degree. A select number of exceptionally well-qualified students can be admitted to the Bachelor/PhD program in their junior year while they are pursuing one of the undergraduate programs at Old Dominion University. This program encourages admitted students to work closely with faculty members and pursue a research experience. Just as in the linked Bachelor/MS program, six credit hours of graduate course work may again be counted towards the undergraduate degree and doctoral course work mentioned above for the Bachelor/PhD program. For linked bachelor's to doctoral programs, students must earn a minimum of 198 credit hours (120 discrete credit hours for the undergraduate degree and 78 discrete credit hours for the graduate degree). Students in these programs must maintain a GPA of 3.50 or better throughout their bachelor's and doctoral studies.

The student may opt to obtain the master's degree along the way to the doctorate. To obtain the master's degree, the student must utilize the six graduate credits obtained as part of their undergraduate program, use 18 credits of the graduate course work that is part of the PhD, and also write a master's thesis.

University Requirements for Graduate Degrees & Certificates

Completion of Requirements

Graduate students who complete their graduate degree or certificate within eight years following admission to Old Dominion University will follow the requirements in the catalog in effect at the time of their first enrollment. For military service exception, see the policy on Sudden Withdrawal and Prolonged Absence Due to Military Mobilization under Requirements for Graduate Degrees and Certificates. If a catalog other than the catalog of the year of initial enrollment is to be used, written permission of the graduate program director and dean or designee must be obtained. Graduate students should consult their advisors to determine if any out-of-date credits may be re-validated by examination.

In all cases, students must have been duly admitted to the University and an academic program of study and meet all of the requirements for graduation in one catalog. Students may not create their own degrees or certificates by selecting partial requirements from more than one catalog.

Prior Learning Assessment Credit Options at the Graduate Level

Old Dominion University offers Prior Learning Assessment, a program for assessing graduate-level knowledge gained through work and life experience and self-study. Students should meet with their advisors or distance learning representative to determine how Prior Learning Assessment credit affects their degree planning. A student may ordinarily earn a maximum of six semester hours at the graduate level through the following mechanisms:

1. Knowledge-based examinations.* Upon approval of the student's graduate program director and the appropriate chair and/or dean of the college involved, a student may take a knowledge-based examination, and with a satisfactory score, receive academic credit for the course(s).
2. External examinations. Upon approval of the student's graduate program director and the appropriate chair and/or dean of the college involved, a student may submit satisfactory scores of professional examinations that are evaluated and recommended for graduate-level credit by the American Council of Education, and receive academic credit for the relevant course(s).
3. Credit for training. Upon approval of the student's graduate program director and the appropriate chair and/or dean of the college involved, a student may submit documentation of completion of professional and/or military training that is evaluated and recommended for graduate-level credit by the American Council on Education, and receive academic credit for the relevant course(s).
4. Portfolio development. Upon approval of the student's graduate program director and the appropriate chair and/or dean of the college involved, a student may develop a portfolio for a graduate-level course(s) offered by Old Dominion University to earn academic credit. Portfolios are submitted to and assessed for credit by the appropriate department and/or college involved.

The following regulations for Prior Learning Assessment credit apply:

1. Prior Learning Assessment credit may be granted upon the written recommendation of the student's graduate program director and the chair of the department/school (or designated faculty assessor) having jurisdiction over the courses involved.
2. Applicability of Prior Learning Assessment credit toward a specific degree program is subject to departmental/school approval.
3. A student may not receive credit for the same course in which any grade has been previously awarded, including W (withdrawal), F (fail), or O (audit).
4. No letter grades will be entered on the student's transcript for Prior Learning Assessment credit. This credit will be treated in the same way as transfer credit: a "XP" (Pass) will be assigned and it will not count in the student's grade point average.

5. A student should request Prior Learning Assessment credit as early as possible upon admission to degree status. A student must meet with the degree program advisor and the director at the beginning of his or her academic career at Old Dominion University to determine how the Prior Learning Assessment program may be applicable to the degree.
6. Satisfactory scores for knowledge-based examinations and professional examinations are determined by the appropriate department/school and/or dean of the college involved.
7. Necessary documentation for academic credit for professional training is determined by the appropriate department/school and/or dean of the college involved.
8. A maximum of six semester hours of graduate credit may be earned through Prior Learning Assessment mechanisms. The six hours is included in the maximum number of graduate credits that may be transferred into a graduate program at Old Dominion University. The student must be aware of individual degree program requirements. Programs may grant exceptions in the case of approved inter-institutional programs or in extraordinary circumstances with the approval of the dean or designee of the Graduate School.
9. A student in a certificate or endorsement area may earn a maximum of six credit hours through Prior Learning Assessment credit to apply to a certificate, endorsement or teacher licensure program. Prior Learning Assessment hours gained in these programs would be applicable to approved degree programs at Old Dominion University. In an approved graduate degree program at Old Dominion University, a graduate student who has earned six credit hours in a certificate or endorsement program that is applicable to the degree program has met the maximum number of Prior Learning Assessment credit hours. No additional Prior Learning Assessment credit may be applied to that graduate degree program.
10. Prior Learning Assessment credit earned at another institution may be re-evaluated by Old Dominion University faculty at their discretion to determine whether credit may be awarded at Old Dominion University.

Procedures for Prior Learning Assessment

Students wishing to receive academic credit for departmental examinations, training or portfolio development through Prior Learning Assessment should do the following:

1. Contact the Prior Learning Assessment representative to discuss possible challenges. The Prior Learning Assessment representative and student will discuss guidelines on requesting approval to challenge a course(s) through the available Prior Learning Assessment options.
2. Submit a resume and cover letter demonstrating learning outcomes based upon prior learning to the Prior Learning Assessment representative.
3. The Prior Learning Assessment representative will submit the documentation to the department chair, or a designated faculty assessor, who will examine the request and determine eligibility to challenge the course(s). The department's decision will be forwarded to the Prior Learning Assessment representative who will then notify the student.
4. Once determination is made that the student is eligible to challenge the course(s) through Prior Learning Assessment, the student will complete and return to the Office of Prior Learning Assessment the appropriate intake request form. At this time, the student's account will be billed, and the appropriate Prior Learning Assessment fee should be paid. Specific instructions for completing the process will be available from the Office of Prior Learning Assessment.

If the conclusion for the portfolio assessment process results in a negative decision of the award of credit, a student may appeal the decision to the college having the responsibility for the course(s) for which credit is sought. The basis for a portfolio assessment appeal is the student's charge that the assessment decision was awarded through prejudice or caprice. The burden of proof rests with the student.

Students must initiate appeals in writing within three weeks of receiving the completed portfolio evaluation form. The appeal must be written to the Prior Learning Assessment representative.

The Prior Learning Assessment representative will forward the appeal letter to the appropriate department chair. The chair will review the student's appeal. The chair will get input from the student and from the faculty assessor and may form an independent committee to review the appeal. The chair makes the decision on the validity of the appeal. If the chair concludes there is no cause for complaint, the student has the right to appeal to the dean of the college.

If the faculty assessor is the chair, the student may go directly to the dean. The dean will follow the procedures as outlined above. The decision of the dean of the college is final.

External Examinations

External examinations, including CLEP and DANTES, are administered through the Credentialing Center. Students wishing to receive academic credit for external examinations should contact the Credentialing Center at 757 683-6089. Additional information is available from the website at <https://www.odu.edu/academics/academic-records/score-analysis/clep-dantes>.

Prior Learning Assessment Fees*

Students participating in the Prior Learning Assessment program are responsible for assessment fees as follows:

1. External Examination. Students are responsible for the testing fees for external examinations such as CLEP and DANTES, and should check with the Credentialing Center at Old Dominion University for fee information. There is no additional Prior Learning Assessment fee for the granting of academic credit for external examinations.
2. Departmental Examination. The Prior Learning Assessment fee is equal to 30% of the current approved in-state on-campus rate for undergraduate and graduate courses.
3. Training Evaluation. The assessment fee for training not previously evaluated by Old Dominion University is equal to 20% of the current approved in-state on-campus rate for undergraduate and graduate courses. For information about training programs that have been evaluated by Old Dominion University (and therefore incur no additional fee), visit the Prior Learning Assessment web site at: <https://www.odu.edu/academics/academic-records/evaluation-of-credit/prior-learning>.
4. Portfolio. Portfolio assessment fee equal to 50% of the current approved in-state on-campus rate for undergraduate and graduate courses.

Fees are based on the credit hours attempted and are not refundable if the student does not receive credit as a result of the evaluation. There is no appeal of the fee charge. The fees must be paid at the time the student is approved to submit a portfolio, departmental examination or training documentation for evaluation.

For more information call (757) 683-5650, visit the web site at <https://www.odu.edu/academics/academic-records/evaluation-of-credit/prior-learning> or email priorlearning@odu.edu.

* All fees are tentative and subject to final approval by the Board of Visitors and/or the president. Current Prior Learning Assessment fees are available on the website at <http://www.odu.edu/priorlearning>.

Exceptions

In exceptional circumstances, an additional six semester hours of graduate credit may be awarded using Prior Learning Assessment at the request of the graduate program director and with the approvals of the chair or designee and the dean or designee of the college involved. Prior Learning Assessment fees may also be waived under established inter-institutional agreements or in exceptional circumstances at the request of the graduate program director and with the approvals of the chair or designee, the dean or designee of the college involved, and the Office of Prior Learning Assessment.

Graduate Credits by Transfer

A maximum of twelve (12) semester hours of graduate credit earned as a non-degree graduate student at Old Dominion University may be applied

toward a graduate degree program; additional credits may be applied from approved graduate certificate programs within ODU. An extra combined maximum of twelve (12) graduate credits may be applied toward a graduate degree program from another accredited institution, if those credits were not part of a conferred degree, or through Prior Learning Assessment (see the Graduate Catalog Policy on "Prior Learning Assessment Credit Options at the Graduate Level"). Programs may grant exceptions to the number of transfer credits in the case of approved inter-institutional programs or in extraordinary circumstances with the approval of the dean or designee of the Graduate School. Students beginning their graduate studies at another institution and wishing to follow their faculty mentors who may have relocated to Old Dominion University will have their total allowances for transfer credits evaluated on a case-by-case basis and approved by the dean or designee of the Graduate School. Without exception, a majority of the total credits for the completion of a graduate degree or graduate certificate must be earned at Old Dominion University (see the Graduate Catalog Policy on "Institutional Credit Requirements for Graduate Degrees and Graduate Certificates"). Transfer credit will be given only for those courses that are certified as being applicable toward a comparable degree or certificate at the institution that offered the courses, and that were completed with a grade of B or better. Specifically, in-service courses that are established especially for groups of teachers and are not intended by the home institution to be part of a degree program will not be acceptable for transfer at Old Dominion University. Exceptions to this regulation may be made only with the approval of the graduate program director and, the dean of the college. In case of doubt, it is the responsibility of the student to show that the course in question would be acceptable toward a comparable degree at the home institution.

No credit toward a graduate degree may be obtained by examination (except through the Prior Learning Assessment options noted above). Credits earned at another institution for a graduate degree may not transfer, however, experiences gained in those courses could be evaluated with Prior Learning Assessment with appropriate credit given. No credits may be transferred or be eligible for Prior Learning Assessment if they are older than eight years.

Process: Students who wish to transfer allowable credit earned prior to admission to a degree program at Old Dominion University must submit a special request for evaluation of transfer credits through the graduate program director to the Office of the University Registrar. Following admission to a degree program, students must obtain written permission from the graduate program director before registering for a course at another institution with the intention of transferring the credit for that course toward a graduate degree at Old Dominion University. In no case is a transfer of credit final without the signed approval of the graduate program director and the academic dean overseeing the program on the Evaluation of Transfer Credits Form.

Evaluation of Transfer Credits

In the case of a student who has changed programs of study at Old Dominion University, the graduate program director of the new program may or may not accept any previously transferred course work or work completed in the former programs.

Credits accepted for transfer from another institution will satisfy partial hour requirements, but grades earned in such courses are not calculated in the student's overall grade point average.

No credits will be accepted toward the degree or certificate if more than eight years old unless properly validated by examination.

Institutional Credit Requirements for Graduate Degrees and Graduate Certificates

A majority of the total credits for the completion of a graduate degree or graduate certificate must be earned at Old Dominion University. Some colleges, schools, and departments may have additional requirements that must be fulfilled. Students interested in applying for transfer credits and/or prior learning assessment credits should refer to the Graduate Catalog

policies on Prior Learning Assessment Credit Options at the Graduate Level and Graduate Credits by Transfer.

Graduate Assessment Requirement

Old Dominion University has developed an institution-wide plan to assess the quality of its graduate academic degree programs. In addition, students are asked to assess their experiences with support services, University administration, and other aspects of their University experience. Students will complete the assessment at the end of their graduate degree program.

Prior to the completion of degree requirements, all graduate students must complete their assessment. Students will receive advanced notice of their eligibility to complete the measures, which may be accessed through the University's site at www.odu.edu. Failure to complete the assessments normally precludes the student's right to receive his or her graduate degree. Assessment results are used to improve student learning and the educational experience at Old Dominion University, and they do not become part of students' records. Confidentiality is assured, as only aggregate data are reported and used in analyses.

Responsible Conduct of Research Policy

1. All graduate students who were admitted or readmitted to a degree or graduate licensure program as of fall 2010 must complete the Collaborative Institutional Training Initiative (CITI) basic course. The basic course includes the following modules: Misconduct (falsification, fabrication, and plagiarism); Data acquisition, management, sharing and ownership; Mentor/trainee relationships; Publication practice and responsible authorship; Peer review; Conflicts of interest; and Collaborative research. Completion of the RCR modules will be tracked through the CITI website and is a graduation requirement. The RCR modules must be completed prior to completion of 12 semester hours. Students who fail to complete this requirement will have a registration hold placed on their records. As appropriate to their general field of study, students may complete the Biomedical Social and Behavior Research, Physical Science, or Humanities RCR track offered by CITI to fulfill this requirement. Graduate students who are admitted into a certificate program only or are considered non-degree-seeking without being affiliated with a licensure program are exempt from this requirement.
2. All investigators conducting human subjects research protocols (both Exempt and Non-Exempt) as well as all graduate students enrolled in Thesis and Dissertation projects involving human subjects are required to complete the CITI (Collaborative Institutional Training Initiative) Program for Human Subjects Research.
3. All investigators conducting animal subjects research protocols as well as all graduate students enrolled in Thesis and Dissertation projects involving animal subjects are required to complete the LATA (Laboratory Animal Training Association) training program.

Time Limits

All requirements for a graduate degree or graduate certificate must ordinarily be completed within an eight-year period. Exceptions to these time limits must be approved by the graduate program director and the college dean or designee. Graded coursework older than eight years at the time of graduation must be re-validated by an examination before the work can be applied to a graduate degree. Courses identified as research, thesis or dissertation that were graded pass/fail do not require re-validation. See the "Policy on Re-validation of Out-of-Date Graduate Credit."

Students whose graduate study is interrupted by military service will be granted an extension of time for program completion for the period of their military service, not to exceed five years. In such cases, graded coursework older than eight years at the time of graduation must still be revalidated.

Graduate Certificate Programs

Graduate certificate programs are available to both non-degree and degree seeking graduate students. These certificates are ideal for students who want to explore areas of professional interest or meet accreditation requirements. They also provide the opportunity for students to further their knowledge

and become more competent in their profession. The University's minimum requirement for admission into a graduate certificate program is completion of a bachelor's degree. Some colleges, schools, or departments have additional requirements, such as a degree in a particular area or specific coursework. Students seeking a graduate certificate accept responsibility for adhering to the minimum requirements as well as those applied by the department where the certificate is managed.

Graduate certificate programs generally include a minimum of nine credit hours and a maximum of 21 credit hours. An overall grade point average (GPA) of 3.0 or above in all courses specified as a requirement for the certificate is required for the award of a graduate certificate.

Certificates of Advanced Graduate Studies (CAGS) are for students seeking a formal award certifying completion of study beyond the master's degree in an academic or occupational field of study. These programs are intended for professional licensure or professional development and may be completed prior to or concurrently with doctoral studies. These programs generally require a minimum of 24 credit hours. Students must have a 3.0 overall GPA in the required courses to be awarded a certificate of advanced graduate study.

Master's Degrees

This section specifies the minimum requirements for a master's degree from Old Dominion University. Some colleges, schools and departments have requirements in addition to the requirements described below. In seeking a master's degree, each student accepts responsibility for the following University requirements as well as any imposed by the major department.

The master's degree is awarded in recognition of the candidate's command of a comprehensive body of knowledge and ability to perform productively in the field of study. All master's degrees require a minimum of 30 semester hours of graduate credit. Any variation within an individual program's approved degree framework, including course substitutions, must be approved in writing by the graduate program director in consultation with the student's faculty advisor when appropriate.

Thesis and Non-Thesis Option

Candidates for the master's degree at Old Dominion may have the choice of two options: the thesis option or the non-thesis option. The choice will depend upon the availability of the two options within the selected discipline, the professional interests of the candidate, and the advice and approval of the appropriate graduate program director.

Thesis Option

A minimum of 30 semester credits is required, including 24 semester credits in approved course work and six semester credits in research. The candidate is required to prepare and present a thesis or equivalent creative work. A final oral examination covering the research is required. A comprehensive written and/or oral examination covering the program of study may be required.

Non-Thesis Option

A minimum of 30 semester credits of approved course work is required, including one or more courses at the conclusion of study that deal directly with special topics and/or training related to current problems or research in the discipline. A comprehensive written and/or oral examination, or an approved equivalent, on the program of study is required.

Student Advising

The Master's Degree

The graduate program director in consultation with the student, will assign a graduate advisor who must be certified for graduate instruction. An annual evaluation may include student's performance in courses, assistantships (teaching, research), the development and re-evaluation of his/her plan of study, guidance in selecting projects and mentors, preparation and scheduling of qualifying/comprehensive or equivalent exams, time management, and obtaining employment or further education. The advisor's

annual evaluation and recommendation will be shared with the student and the graduate program director.

Program of Study

Prior to completion of 12 semester hours, the degree candidate is required to prepare a program of study with the guidance of the advisor. The purpose of the program of study is to ensure that the student organizes a coherent, individualized plan for the course work and research activities. The program of study is to be consistent with the requirements for the degree as described in the catalog and must be approved by the graduate program director. The successful completion of the program of study, along with the collateral reading, research, practica, etc., will enable the student to demonstrate the high level of professional competence required of all graduate students in their respective fields.

Master's Examination

A comprehensive written examination and/or oral examination, or its equivalent, is required under the non-thesis option and, depending on the program, may be required under the thesis option. The examination tests the candidate's competence in the fields covered by the program of study. The nature of the master's examination will depend on the degree sought and the requirements of the major department and examining committee. A program may propose, through the appropriate college graduate committee and academic dean, replacing the master's examination with an equivalent requirement. Such equivalent requirements shall be approved by the dean of The Graduate School. For further information, the student should consult the section on requirements under each degree program.

The examining committee is appointed by the graduate program director with appropriate notification to the student. The examining committee is composed of a minimum of three members who may or may not be those who serve as advisors or members of the thesis committee. Members are expected to be certified for graduate instruction in the major department/school and college. This examination may not be scheduled until all major requirements have been satisfied.

The results of the examination must be received in the Office of the University Registrar at least two weeks prior to the end of the semester. In order to pass the final examination or approved equivalent, a master's degree candidate must have a favorable vote from a majority of the examining committee. A student who has failed the examination may repeat it once. Students who fail the comprehensive examination twice cannot subsequently elect a thesis option. At the discretion of the graduate program director, a student who passes the examination but does not graduate within twelve months may be required to repeat the examination.

Thesis Committee

The graduate program director, in consultation with the student, appoints a thesis committee of at least three members, two of whom must be full-time current ODU faculty members. All committee members must either be graduate certified at the appropriate level or have the academic backgrounds and research interests necessary to counsel, direct, and evaluate the student's proposed research and progress toward completion of the program of study and the thesis. The graduate program director approves the constitution of the committee and ensures that all committee members are graduate certified.

Two of the committee members must be full-time Old Dominion University faculty. The third member may be one of the following: a full-time University faculty; an adjunct, part-time, or emeritus University faculty; or a non-ODU academic or professional with special knowledge of the thesis subject area. No more than one-third of the committee's membership can be individuals external to the University.

The committee chair must be full-time Old Dominion University faculty, be certified for graduate instruction at the highest level, and be an authority in the field of specialization of the proposed thesis. Research faculty based in the University's research centers may also serve in the role of chair when graduate certified at the appropriate level with a University department or school. Researchers or faculty at affiliated external research institutions may also serve in the role of chair when specifically designated by memoranda

of understanding. External, part-time, adjunct, and/or emeriti faculty may serve in the role of committee co-chair with the approval of the graduate program director and the dean or designee. Full-time University faculty who are appointed to the committee who transition to emeriti status or who leave the University may continue to serve, but if they were chair, they will become co-chair with one of the remaining full-time faculty assuming the role of chair.

Replacement of the thesis committee chair or any other substantial change in the composition of the thesis committee initiated by the student requires that the reconstituted thesis committee re-evaluate and re-approve the thesis prospectus. Committee changes that occur outside of the student's control (e.g., faculty retirement, faculty loss of graduate certification) may or may not require a prospectus re-evaluation pending a discussion among the student, new and continuing committee member(s), and graduate program director.

Decisions to determine whether or not the thesis prospectus, final thesis written document, and oral defense of the thesis passes must have the majority approval of the thesis committee. All committee members sign where relevant on University forms reporting the thesis outcomes.

Thesis

The candidate for the master's degree whose program of study includes a thesis is required to prepare and present a thesis (or equivalent in creative work) acceptable to the thesis director and committee, the graduate program director, and the appropriate academic dean. The thesis must represent in content and methods the skills, disciplines and knowledge required for graduate study, including competence in written language. The character of the final work must testify to the distinction of the student and standards of the University. The thesis or equivalent creative work must be worthy as a culminating experience for graduate study. Candidates will be required to defend the thesis in an oral examination. The Thesis Acceptance Form must be submitted to the Office of the University Registrar upon completion of Part A of this form. The Thesis Delivery Form must accompany this form.

The candidate should consult the Guide for Preparation of Theses and Dissertations available from the Graduate School web site or from the Dean's office of the appropriate college.

Change From Thesis to Non-Thesis Option

A student who wishes to change from the thesis option to the nonthesis option for the master's degree must obtain the permission of the thesis advisory committee and the graduate program director. The permission must be forwarded to the Office of the University Registrar prior to the last semester for the intended graduation using the Change of Status Form. The candidate must meet all requirements of the nonthesis option. A maximum of three credits earned in thesis research can be counted toward the degree requirements for the nonthesis option. The thesis advisory committee must indicate that the thesis research work was productive in and of itself and warrants credit as a special problem or special topics course.

Departmental Requirements

Individual colleges and/or programs may establish requirements above and beyond those set by the University as minimum. Students are obligated to follow the requirements of the appropriate graduate program section of the catalog in effect at the time of their first enrollment for this degree.

Education Specialist Degrees

This section specifies the minimum requirements for an education specialist degree (Ed.S.) from Old Dominion University. Some colleges, schools and departments have requirements in addition to the requirements described below. In seeking an education specialist degree, each student accepts responsibility for the following University requirements as well as any imposed by the major department.

The education specialist degree is normally granted at the end of the sixth collegiate year of study and as such falls between the master's degree and the doctorate in time; however, it is not necessarily viewed as intermediate

between the two degrees. The education specialist degree provides advanced professional preparation for various positions in education.

For admission to an education specialist program, the University requires a master's degree from an accredited institution and a minimum grade point average of 3.00. Some programs have additional requirements such as a minimum Graduate Record Examination (GRE) aptitude score, grade point average, and graduate courses in specific areas.

The education specialist degree requires a minimum of 30 semester hours of graduate credit beyond a master's degree. All requirements for the degree must be completed within a six-year period. Students must pass a written comprehensive examination and satisfy research requirements. Specific course requirements are found in the appropriate section of this catalog. Any variation within an individual program's approved degree framework, including course substitutions, must be approved in writing by the graduate program director in consultation with the student's faculty advisor when appropriate.

Doctoral Degrees

This section specifies the minimum requirements for a doctoral degree from Old Dominion University. Some colleges, schools and departments have requirements in addition to the requirements described below. In seeking a doctoral degree, each student accepts responsibility for the following University requirements as well as any imposed by the major department.

The doctorate is the highest degree awarded at Old Dominion University, and it represents the summit of academic achievement. The University offers four doctoral degrees:

1. Doctor of Engineering (D.Eng.)
2. Doctor of Nursing Practice (D.N.P.)
3. Doctor of Physical Therapy (D.P.T.), and the
4. Doctor of Philosophy (Ph.D.)

Doctoral degrees require at least 78 hours of study beyond the bachelor's degree or 48 hours beyond the master's degree, unless a professional accreditation specifies otherwise. Any variation within an individual program's approved degree framework, including course substitutions, must be approved in writing by the graduate program director in consultation with the student's faculty advisor when appropriate.

Doctor of Engineering

The purpose of the Doctor of Engineering program is to provide the Commonwealth and the nation with exceptionally educated engineering practitioners. These individuals will have developed high-level capabilities to provide innovative solutions in specialized engineering endeavors. The graduates of the program will meet the highest standards for advanced level engineering and leadership positions in industry and government.

The curriculum consists of a minimum of 48 credit hours of graduate work beyond the master's degree, including 18 credit hours of common courses, 18 credit hours of graduate coursework in the student's area of specialization, and 12 credit hours of applied doctoral project.

Doctor of Nurse Practice

This program is designed to develop the roles and practice skills of advanced practice nurses including nurse practitioners, nurse midwives, clinical nurse specialists, nurse anesthetists, and nurse executives. Nurses enrolled in this program will be prepared to serve as leaders, researchers, clinicians, and executives capable of transforming lives and the healthcare of the communities they serve. Specific emphasis is on addressing the needs of underserved and vulnerable populations.

Doctor of Physical Therapy

The professional doctorate degree in physical therapy (D.P.T.) provides individuals with the knowledge, skills, and clinical internship experiences required to sit for licensure in any jurisdiction in the United States. This curriculum is comprised of a series of required didactic and clinical education courses prescribed in a specific sequence that offers students the knowledge, professional skills and competencies necessary for entry into the practice of physical therapy. In the place of a dissertation, each student

is required to develop a selected case study based upon the observations of a patient examined and treated during one of the clinical internships, a research proposal, and a research project with platform and poster presentations. In addition to satisfactorily completing the didactic and clinical education curriculum, students must pass both written and oral comprehensive examinations prior to graduation.

The curriculum consists of 117 credit hours over a three-year, nine-semester period of time including summers. There are five full-time clinical internships in the three years of study totaling 40 weeks.

Doctor of Philosophy

Programs leading to the Ph.D. are designed to help superior students develop the capability to become creative leaders in their chosen fields. The degree is awarded upon mastery of the subject area, the development of appropriate research skills, and a concentration of knowledge in the field of specialization.

It is important to recognize that the attainment of this degree is not a matter of accumulating course credits and satisfying residency and language or research skill requirements, even though minimum requirements for these categories are set forth by the University. The final basis for granting the degree shall be the candidate's knowledge of the field of study and his or her demonstrated ability to do independent, original, scholarly research.

Each graduate program is responsible for setting out the requirements and procedures appropriate to its area of study. The requirements and regulations set forth below are to be construed as the minimal requirements established by the University. Students also are obligated to meet all additional requirements established by the appropriate graduate program.

Prerequisites for Admission

The applicant must complete the appropriate application for admission, submit official transcripts of all college- or university-level work, and supply letters of recommendation and official results of test scores as specified by the individual program. Baccalaureate and post baccalaureate work must reflect superior performance.

Minimum Requirements

Minimum degree requirements for the Doctor of Philosophy which must be considered in preparing the preliminary plan of study are:

1. Satisfactory completion of at least 48 semester hours of post-master's course work, including the dissertation or equivalent level of performance course work;
2. Demonstrated competency in research skills as required by the specific graduate program;
3. The passing of written and oral candidacy examinations at the end of the program of course work;
4. The completion of a dissertation representing independent, original research worthy of publication in a refereed scholarly journal; and
5. The successful oral defense of the dissertation before an appropriately selected committee of faculty knowledgeable in the field of the dissertation research.

Student Advising

The Doctoral Degree

Before completion of nine semester hours, the graduate program director, in consultation with the student, will assign a program advisor or advisory committee. The advisor or advisory committee members must be certified for graduate instruction and will meet with the student at the end of each semester to evaluate student's academic progress. Among the advisor's/ advisory committee's responsibilities are a review of student's performance in courses, assistantships (teaching, research), the development and re-evaluation of his/her plan of study, guidance in selecting projects and mentors, preparation and scheduling of qualifying/comprehensive or equivalent exams, time management, and obtaining employment or further education. These annual evaluations are signed by the advisor/advisory committee and the student. The evaluation is filed in the student's record and a copy given to the graduate program director.

Plan of Study

Before completion of nine semester hours, the student shall prepare a plan of study with the aid and approval of the advisor or advisory committee. The plan of study also should be approved by the graduate program director to ensure that it meets established requirements. Failure to present the plan on time may prolong the period of study for the degree. Before drawing up and approving the plan the graduate program director should verify that there is on file a set of transcripts of all undergraduate and graduate work the student has taken. When appropriate, a diagnostic examination also may be used in developing a plan of study.

The successful completion of all work indicated on the approved plan of study is a fundamental prerequisite to the granting of the degree.

Research Skills

Program skill requirements reflect the University's expectations of one or more significant skills distinct from the dissertation but fundamental to doctoral and postdoctoral research. Specific skill requirements vary with programs. Traditionally, a reading knowledge of one or more foreign languages has been required; more recently a demonstrated proficiency in computer science or quantitative methodology has been introduced.

Under University policy, each academic program leading to the Doctor of Philosophy establishes its own requirements for research skills. Responsibility for the level of competency, the nature of validating the competencies, and the standards utilized in the evaluation rests with the department/school that offers the program. Descriptions of individual programs should be consulted for appropriate regulations and procedures. Information about schedules of examination, standards, and general procedures is available from all departments/schools and graduate program directors.

The research skills requirement must be met before taking the candidacy examination. For specific information, the student should consult the appropriate program, school or college.

Candidacy Examination

The written and oral components qualifying a student for candidacy for the degree of Doctor of Philosophy are comprehensive in nature. The graduate program director is responsible for coordinating the administration of the written and oral candidacy examinations and will appoint a committee to administer the exams. The examination committee will be made up of at least three faculty members, all of whom must be graduate certified. Before taking the qualifying examinations, the student must meet the appropriate departmental, school and college requirements and have the recommendation of the advisor or advisory committee. The examinations are taken near the end of the student's coursework. The candidacy examinations are usually taken during the semester in which the last formal graduate courses listed in the study plan are taken.

When the student and the advisor or advisory committee have determined that the examination should be taken, the student should obtain a Request for Permission to Take the Ph.D. Candidacy Examination no later than one month before the date of the first examination. The student should secure the signature of the advisor or advisory committee and submit the form to the graduate program director, who will verify that the student meets the prerequisites for the candidacy examinations. The graduate program director should be consulted on the schedule of the examinations. Once permission has been granted, postponement of the examinations must have the approval of the graduate program director.

After successful completion of the written examination, an oral examination, which must be taken prior to the end of the next semester, is given addressing topics discussed in the written examination and possible additional materials. The oral examination is a serious and integral part of the qualifying procedure.

A student must pass both the written and oral candidacy examinations. The written examination must be passed before the oral examination may be taken. For either the written or oral examination, more than one negative vote from the examining committee will result in a failure. A failed written examination must be retaken successfully within one year. A student who

passes the written examination on the first attempt need not repeat the written exam in the event of failing the oral exam. A failed oral exam, which also may be attempted a second time, must be retaken prior to the end of the next semester.

Neither the written nor the oral examination can be passed conditionally. A pass cannot be made contingent upon doing extra courses, additional projects, etc.

The examination committee will report, in writing, to the graduate program director and the dean the results of the examinations.

Students must be registered in any semester in which they are scheduled to appear for the examination.

Dissertation Committee

After the candidacy examinations have been passed, the dissertation committee is formed to supervise the dissertation research, which begins with the approval of a topic. Membership of the dissertation committee may overlap with the advisory committee if one has already been established (see section under Student Advising). Faculty who agree to serve on a dissertation committee understand that they are committed to serve until the dissertation is completed.

The student selects a dissertation committee chair and may consult with the graduate program director for assistance in doing so. The committee chair must be full-time Old Dominion University faculty, be certified for graduate instruction at the highest level, and be an authority in the field of specialization of the proposed dissertation. Research faculty based in the University's research centers may also service in the role of chair when graduate certified at the appropriate level with a University department or school. Researchers or faculty at affiliated external research institutions may also serve in the role of chair when specifically permitted by memoranda of understanding.

The dissertation committee chair, in consultation with the student, appoints a dissertation committee of at least three members who are graduate certified at the appropriate level and who have the academic backgrounds and research interests necessary to counsel, direct, and evaluate the student's proposed research and progress. At least two committee members must be full-time current ODU faculty members. At least one member must be from outside the student's department/school at ODU or a non-ODU academic or professional with special knowledge of the dissertation subject area. Faculty may not serve as the outside committee member in the department/school of their primary appointment. No more than one-third of the committee's membership can be individuals external to the University. The graduate program director approves the constitution of the committee. The dean of the college or designee approves the final constitution of the committee and ensures that all committee members are graduate certified.

External, adjunct, and/or emeriti faculty committee members may serve in the role of committee co-chair with the approval of the graduate program director and the dean or designee.

Emeriti faculty who were appointed to the committee while they were full-time faculty may continue to serve as one of the members after receiving emeritus status but cannot continue as chair of the committee although co-chairing is permissible. This or another replacement of the dissertation committee chair or any other substantial change in the composition of the dissertation committee initiated by the student may require that the reconstituted dissertation committee re-evaluate and re-approve the dissertation prospectus. Committee changes that occur outside of the student's control (e.g., faculty retirement, faculty loss of graduate certification) may or may not require a prospectus re-evaluation pending a discussion among the student, new and continuing committee member(s), and graduate program director.

Decisions to determine whether or not the dissertation prospectus, final dissertation written document, or oral defense of the dissertation passes must have the majority approval of the dissertation committee. All committee members sign where relevant on University forms reporting the dissertation outcomes.

Change in Dissertation Committee

Changes must be made in advance of the oral dissertation defense. Changes made in the dissertation committee are made only with the approval of the graduate program director and the college dean.

Advancement to Candidacy

Advancement to candidacy is a formal step that occurs after the student:

- Passes the Ph.D. written and oral candidacy examinations,
- Submits a topic that is approved by the dissertation committee chair, and
- Completes formal course work.

Once these requirements have been met, the graduate program director must file the “Advancement to Candidacy” form with the Office of the University Registrar. Please check with the appropriate graduate program director for further information.

Dissertation Preparation

General regulations and procedures governing the submission of a doctoral dissertation are given in the Guide for Preparation of Theses and Dissertations. Full information, including detailed procedures and qualifications for undertaking a doctoral dissertation, is available in the student’s major/school and should be obtained by the student and the dissertation advisor at the beginning of the planning for research and writing of a dissertation.

After approval of the dissertation proposal, the chair of the dissertation committee shall recommend the student’s admission to candidacy to the graduate program director and the dean.

Oral Dissertation Defense

The format of a defense is determined by the dissertation committee with the approval of the graduate program director. The defense is chaired by the chair of the dissertation committee. The chair will act as moderator, ruling on questions of procedure and protocol that may arise during the defense. The chair of the defense represents the college dean, to whom he or she makes a complete and prompt report on the defense. The chair should also promptly notify the graduate program director of the results of the defense.

The oral dissertation defense is scheduled for the time and place approved in the request for the dissertation defense. A two-week lead time is required for scheduling. This information is published in the appropriate University news media. The oral dissertation defense is open to the University community; all interested members are encouraged to attend the examination.

The aim of the defense is to explore with the candidate the methodological and substantive contributions of the already approved dissertation. Majority approval by the examiners constitutes successful completion of the defense of the dissertation. In case of failure, the dissertation committee may recommend that the candidate be dropped or be allowed re-examination no earlier than three months after the first examination.

Satisfactory performance on this examination and adherence to the regulations outlined above complete the requirements for the degree. The Dissertation Acceptance and Processing Form must be submitted to the Office of the Registrar with the completed dissertation upon completion of requirements for the degree.

Dissertation Load Registration

All doctoral students who have advanced to candidacy are required to be continuously registered for an appropriate number of dissertation units during each semester and summer session. (See “Graduate Student Registration Requirement.”)

Thesis and Dissertation Procedures

Graduate students who plan to write theses or dissertations should obtain a copy of the Guide for Preparation of Theses and Dissertations from The Graduate School's web site (<http://www.odu.edu/graduateschool/>) for use in conjunction with any style manual preferred or required by their respective departments/schools or colleges. Minimum University requirements for

the preparation of theses and dissertations are contained in the guide; departments/schools and/or colleges may set additional requirements.

Information regarding compliance with policies regulating research involving human subjects, animals, radiation, potential biohazards (e.g. recombinant DNA), lasers, controlled substances, or hazardous materials and policies regarding intellectual property can be found on the Office of Research web site at <https://www.odu.edu/researchoffice> (<https://www.odu.edu/researchoffice/>).

All research involving human subjects, animal care and use, radiation, potential biohazards, lasers, controlled substances, or hazardous materials requires the approval signature of the appropriate review committee chair or designee, or safety officer, prior to the initiation of any research activities.

Students should be aware that in most cases, the University owns intellectual property created with University resources and can claim an interest in the intellectual property. Intellectual property must be disclosed to the Office of Research using an invention disclosure form. In order to fulfill its contractual obligations, and to adhere to the Policy on Patents and Copyrights, it may be occasionally necessary for the University to temporarily delay publication of a thesis or dissertation that contains potentially patentable information in order to ensure the availability of worldwide patent protection. Such situations would arise when a faculty member directing the research, under his/her duty as a University employee, discloses potentially patentable subject matter to the Office of Research. A student’s degree requirements can still be fulfilled even though publication of the thesis or dissertation is delayed.

Presentation of a thesis or dissertation in partial fulfillment of degree requirements necessitates submission of the finished original work to the dean of the college for final approval, following oral defense and signature approval by the thesis/dissertation committee and graduate program director. Approval of the dean of the college should be obtained prior to reproduction of the original work, in the event corrections need to be made.

The University has adopted an Electronic Thesis and Dissertation (ETD) submission process which has replaced mandatory productions of bound copies. Instructions for submitting the thesis/dissertation to ProQuest, after the dean of the college has given final approval, can be found on The Graduate School's web site (<http://www.odu.edu/graduateschool/>) or within the Guide for Preparation of Theses and Dissertations. If desired but not required, students can obtain hard copies via ProQuest or another vendor. The Registrar should also receive the Master's or Doctoral-relevant Result of Examination and document Acceptance and Processing forms. The ETD process and submission of forms to the Registrar should occur no later than the last day of classes of the semester in which the degree will be taken. The date on the title page of the thesis/dissertation should be within the same semester that the student intends to graduate.

Leave of Absence

A candidate who finds it necessary to be excused from registration for a semester must report formally, before the beginning of the semester, to the dissertation committee and the graduate program director and request by petition a leave of absence using the Leave of Absence from Doctoral Program form. A leave of absence may not exceed one year and may not be repeated. During a leave of absence, the candidate will not be entitled to assistance from the dissertation committee or to the use of University facilities. The granting of leave of absence does not change the candidate’s responsibility for meeting the time schedule for the completion of degree requirements.

Graduate Student Resources

- Academic Resources (p. 64)
- Research Resources (p. 65)
- Campus Services (p. 67)

Academic Resources

University Libraries

Old Dominion University Libraries enrich the academic, research, and learning experience of the University community by inspiring and empowering the Monarch community to learn, grow, and create. The University Libraries provide students access to extensive digital resources, online journals, e-books, streaming media, and other electronic resources in all fields of research and instruction. The Libraries also offer access to Naro Video @ ODU Libraries (<https://guides.lib.odu.edu/narovideo/>), a collection of 43,000+ videos and materials made available to the Monarch community and to any member of Friends of the ODU Libraries.

On the University Libraries' website at www.odu.edu/library (<http://www.odu.edu/library/>), students can find library guides, instructional videos, Chat reference, and many other services. The Libraries include the Patricia W. and J. Douglas Perry Library, the Elise N. Hofheimer Art Library, and the Music Library and F. Ludwig Diehn Composers Room. Each facility holds specialized book collections, maps, scores, recordings, microforms, and equipment available for borrowing. At our Help Desks, staff are on hand to provide assistance with information, location, instruction, and information technology questions. Additionally, students and faculty members have online access to the Virtual Library of Virginia's collections and may borrow books and other materials from participating libraries across the Commonwealth.

Edward E. Brickell Medical Sciences Library at Macon and Joan Brock Virginia Health Sciences at Old Dominion University

The Edward E. Brickell Medical Sciences Library is the major health care information resource for Macon and Joan Brock Virginia Health Sciences at Old Dominion University. It serves the faculty members, students, and staff of VHS (Virginia Health Sciences) as well as provides a resource for the communities of Hampton Roads.

The Brickell Library subscribes to a variety of information resources including DynaMed, UpToDate, the Cochrane Library, VisualDX, PubMed/MEDLINE, CINAHL, ClinicalKey, BMJ Best Practice, AccessMedicine, PsycINFO, Web of Science, EndNote, and others. Brickell Library employees can provide training sessions in the use of these resources and also assist with copyright questions and evaluating the validity of information.

Our Clinical Medical/Reference Librarians (CML) can help with literature searches, compile bibliographies, and provide systematic and scoping review assistance for VHS. CML librarians also work to support the Institutional Review Board (IRB) and Institutional Animal Care and Use Committee (IACUC).

The Brickell Library includes a computer lab with color and b/w printers and a scanner and is available 24/7 with badge access. Residents have unlimited free printing. VHS students are provided \$200 of printing credit annually. There are also 25 group study rooms: 16 on the second floor and nine on the third floor. These are equipped with DVD players, 52-inch monitors and whiteboards. The Brickell Library also has a collection of hand-held ultrasound probes for check out at the Circulation desk.

Information on staffed hours of operation, additional services and resources can be found at <https://www.evms.edu/library/> or you may call the Brickell Library for information or assistance at (757) 446-5850 or email at library@evms.edu (https://old Dominion-my.sharepoint.com/personal/delneka_b_odu_edu/Documents/Documents/library@evms.edu). The Brickell Library employees look forward to working with you during your time

at Macon and Joan Brock Virginia Health Sciences at Old Dominion University.

Elise N. Hofheimer Art Library

Barry Arts Building, 47th Street and Monarch Way, Room 2008, second floor; 757-683-4059

The Hofheimer Art Library contains specialized books, journals, online resources, videos, audio-visual titles, and other materials for students and faculty in the visual arts. Reserve materials for ODU Art Department classes are available at the service desk. Individual and group study space, computers, drawing tablet, scanner, and network printer are available. Visit the Art Library at www.odu.edu/library/art (<http://www.odu.edu/library/art/>).

Music Library and F. Ludwig Diehn Composers Room

Diehn Center for the Performing Arts, Room 189; 757-683-4173

The Music Library contains print scores, music audio, and video content. Reserve materials for School of Music classes are available at the service desk. Students have access to PC and Mac computers, a DVD/VCR player, CD player, audio cassette player, turntable, flatbed scanner, and network printer.

The Diehn Composers Room is co-located with the Music Library and contains unique and rare manuscripts, scores, audio recordings, memorabilia, and other specialized music materials. Reference and research services are available in the Reading Room, including the use of a Steinway grand piano by appointment only. Visit the Music Library and Diehn Composers Room at www.odu.edu/library/diehn (<http://www.odu.edu/library/diehn/>).

Patricia W. and J. Douglas Perry Library

Perry Library offers quiet study space, collaborative rooms for group projects, accessibility services, a café, meeting space, and other facilities for student success. The Monarch community will also find Naro Video @ ODU Libraries (<https://guides.lib.odu.edu/narovideo/>). This unique collection of 43,000+ videos and materials is located in Room 1222 of Perry Library.

Learning Commons @ Perry Library

First Floor, 757-683-4178

The Learning Commons @ Perry Library is a collaborative project of the University Libraries, Information Technology Services, and the Office of Academic Success Initiatives & Support (ASIS), providing year-round services. The facility includes individual study space, group collaboration space, presentation practice, computers, wireless access, printers, scanners, GIS/digital media/other specialized software, and a sound room that can be reserved by students. Students can access research assistance and resources, information technology assistance, tutoring and writing centers, and other services supporting student success.

At the Perry Library Help Desk, located in the Learning Commons (www.odu.edu/learningcommons (<http://www.odu.edu/learningcommons/>)), students with a valid University ID may borrow equipment, media, books, reserve materials, and other items. Graduate student study carrels are also available. Information on borrowing privileges, loan periods, and policies is available at www.odu.edu/library/services/borrowing (<http://www.odu.edu/library/services/borrowing/>).

Interlibrary Loan and Document Delivery Services

757-683-4170, 4172

Interlibrary loan allows ODU students, faculty, and staff to request journal articles, books, and other needed research materials not available in the University Libraries. The Commonwealth's Virtual Library of Virginia interlibrary loan agreement ensures that students, faculty, and staff may obtain items located in other Virginia libraries. Document delivery services provide copies of materials held in the University Libraries' collection to online and other eligible students, faculty, and staff. Interlibrary loan and document delivery requests can be submitted online at www.odu.edu/library/

services/interlibrary-loan (<http://www.odu.edu/library/services/interlibrary-loan/>).

Research Help Services

Help Desk, First Floor, 757-683-4178

ODU Libraries staff assist students and faculty with all types of research using all formats of library resources. Librarians and staff provide direct individual assistance by telephone, e-mail, live online Chat, and face-to-face and virtual consultation by appointment. Local and online students may obtain assistance by visiting or calling the Help Desk, directly contacting a subject librarian, using the Chat service, or submitting a question through *Ask-A-Librarian* at <https://www.odu.edu/library/help> (<https://www.odu.edu/library/help/>).

Instructional Support

ODU Libraries offer library instruction sessions to courses with research assignments or library-related learning goals. The Libraries also provide online tutorials, videos, and online guides to help students build research skills and increase knowledge in information literacy, as well as workshops and programming designed to support student learning and to facilitate connections between students, the Libraries, and the University community. Additional information can be found at www.odu.edu/library/services/instruction/.

Special Collections & University Archives

Third floor, 757-683-4483

Special Collections & University Archives, located on the third floor of Perry Library, preserves and provides access to the Libraries' unique and rare collections documenting the history of ODU, Virginia, and the region. The collections cover a wide range of topics that enrich scholarly opportunities, and students and faculty are encouraged to visit and use the collections and services. Special Collections' materials include rare books, diaries, letters, legal and campaign files, oral histories, music, film, photographs, maps, and more. Moreover, the University Archives document the history of the University and include yearbooks, department records, student organization records, course catalogs, film, photographs, etc. Special Collections staff are available to assist students and faculty with research requests and host class sessions specializing in active-learning exercises with primary sources. Visit Special Collections at www.odu.edu/library/special-collections/.

Several digitized collections of materials from Special Collections & University Archives are also freely available online. Visit the ODU Digital Collections at <https://olddomuni.access.preservica.com/>.

ODU Digital Commons and Scholarly Communications Services

The Department of Research & Scholarly Communication includes the Libraries' dedicated subject specialist librarians, who provide reference and research assistance, library instruction, collection development, and collaboration to students and faculty at ODU. Our librarians are also available to assist with questions related to copyright and author rights, research data management, publishing, and research impact. The department also oversees ODU Digital Commons (digitalcommons.odu.edu (<https://digitalcommons.odu.edu/>)), the University's institutional repository. Digital Commons brings together scholarly, creative, and institutional works for preservation, visibility, and worldwide open access. Digital Commons also provides a publishing platform for hosting journals, proceedings, and events.

Accessibility Services

First Floor, 757-683-4178

The Library Accessibility Room in the Learning Commons provides specialized equipment and quiet space for students registered with the University's Office of Educational Accessibility (<http://www.odu.edu/educationalaccessibility/>). This wheelchair-accessible room can be reserved for individual use. The facility houses CCTV, workstations with FUSION Professional, Read and Write Gold, and other adaptive technologies. Orientation, reservations, and research consultation appointments are available through the Learning Commons Help Desk.

Also, the Help Desk provides on-demand paging to students who need special assistance with retrieving materials from the upper floors. Information about accessibility is available on the University Libraries' website at www.odu.edu/library/services/accessibility (<http://www.odu.edu/library/services/accessibility/>).

Career Pathways

Career Pathways offers a gateway to resources, programs, events, and planning tools for all Old Dominion University graduate students and postdoctoral scholars. The program is designed to meet graduate students' career and professional development needs, preparing students for successful transition into thriving careers. Career Pathways offers two professional development programs and associated certificates:

- **Preparing Future Faculty (PFF)** - designed for graduate students interested in an academic career. Graduate students can earn the **PFF Certificate** by: (1) completing a mentored teaching experience; (2) creating a CV; (3) attending PFF and other professional development events; and (4) producing an ePortfolio to document and highlight their professional development and growth.
- **Preparing Future Professionals (PFP)** - designed for graduate students interested in a non-academic career such as in industry, non-profit/non-governmental organizations, or government agencies. Graduate students can earn the **PFP certificate** by: (1) developing an individual development plan; (2) creating a resume; (3) attending professional development events or completing professional development activities; and (4) producing an ePortfolio to document and highlight their professional development and growth.

The Career Pathways program is free, and is open to all ODU graduate students. Workshops are offered on campus and can be accessed via web conferencing. An archive of previously offered professional development workshops is also available for students to access 24/7.

More information about Career Pathways is available at <http://sites.wp.odu.edu/careerpathways>. (<http://sites.wp.odu.edu/careerpathways/>)

Writing Center

The Writing Center provides supplemental instruction to help students improve their writing strategies. Instead of providing a proofreading service, the Writing Center offers tutoring sessions that assist students in learning to proofread their own work, in getting projects started, and in developing the writing process for a paper.

The Writing Center offers 45-minute appointments with graduate student tutors who work with individual students or with groups. Most tutoring sessions are by appointment; walk-in appointments are provided when tutors are not in a scheduled session. For online students, we use WOnline for online appointments. Students have the option of making standing appointments with tutors once per week, for up to four weeks at a time.

In addition to tutoring services for undergraduate and graduate students, the Writing Center will visit classrooms to provide writing lessons and group tutorials, and it offers a program called Graduate Student Write-Ins. Graduate Student Write-Ins are weekly retreats hosted by the Writing Center on Saturdays designed to provide a structured time for graduate students to focus on their writing without interruption in a supportive environment, and WC tutors are available for 30-minute appointments during the session.

The Writing Center is located at 1208 Perry Library. For more information, go to <https://www.odu.edu/al/centers/writing-center> (<https://www.odu.edu/al/centers/writing-center/>) or email writingcenter@odu.edu.

Research Resources

Office of Research

Old Dominion University is classified by the Carnegie Foundation as having High research activity. Old Dominion's Office of Research works on behalf of faculty, staff and students to enhance and grow the University's research enterprise through strategic planning, infrastructure support, proposal development services for faculty and administrators, assuring research

compliance, encouraging technology transfer, promoting applied research, and by facilitating opportunities for collaboration with local, state, and federal agencies, foundations, and industry sponsors of research. The office is led by the Vice President for Research and includes staff members who leverage a breadth of experience from both academic and private sector backgrounds. Sponsored research administration services, encompassing the range of pre- and post-award grant and contract administration, are provided by the Old Dominion University Research Foundation, a 501(c) 3 organization.

While most of Old Dominion's research activities and centers are housed within specific colleges, the ones that are the most diverse in terms of their research focus and/or scope are organized in the Office of Research. The Virginia Modeling, Analysis, and Simulation Center (VMASC), the Frank Reidy Research Center for Bioelectrics, the Center for Educational Partnerships (TCEP), and the Commonwealth Center for Recurrent Flooding Resiliency (CCRFR) are four such entities.

The **Virginia Modeling, Analysis, and Simulation Center (VMASC)** is a multidisciplinary modeling, simulation and visualization collaborative research center. With industry, government, and academic partners, VMASC furthers the development and application of modeling, simulation, and visualization as decision-making tools and promotes economic development through transferring its intellectual property into the commercial sector. Its core capabilities are: military modeling and simulation (primarily combat simulations), homeland security and homeland defense modeling and simulation, medical simulations including biomedical representations, social system modeling, transportation modeling, virtual environments for training, coastal resilience analyses, and use of big data in simulations. VMASC creates computer simulations and conducts program analyses to meet stakeholders' needs. Computer simulations provide the capability to: quickly and economically test theories and ideas; help visualize and understand complex situations; prioritize labor and capital investment opportunities; and reduce the risk inherent in business decisions. The research interests and capabilities of VMASC include: simulation methodologies, mathematical modeling, simulation inter-operability, verification and validation, distributed simulation, computer visualization, immersive virtual environments, human factors, social behavior, performance analysis, intelligent systems, decision support and collaboration methodologies, and modeling and simulation systems integration.

The **Frank Reidy Research Center for Bioelectrics (FRRCB)** is recognized as a leader in understanding the interaction of electromagnetic fields and ionized gases with biological cells and applying this knowledge to the development of medical diagnostics, therapeutics, and environmental decontamination. The center is part of an International Consortium for Bioelectrics that includes universities and research institutes from Japan, Germany, France and the United States. The objectives of the center are to perform leading edge interdisciplinary and multi-institutional research, recruit top faculty and exceptional graduate students, support regional, national and international programs, and increase external funding and institutional visibility. Research conducted at the FRRCB has attracted substantial federal agency support including multiple grants from the National Institutes of Health, Department of Defense, and the National Science Foundation. The FRRCB has expertise in pulsed power technology for biological and medical applications in the sub-nanosecond to the millisecond range and includes the design and modeling of pulse delivery systems. A wide range of research is conducted at the center including new cancer therapies, wound healing, decontamination, imaging, and cardiovascular applications. Old Dominion University is licensing proprietary FRRCB technology in medicine and biology.

The **Center for Educational Partnerships (TCEP)** establishes collaborative educational enterprises with schools and school divisions that support dissemination of proven practices, rigorous field trials of promising models, and development and testing of innovative research-based models in collaboration with Old Dominion University's primary educational partners.

TCEP focuses its efforts on the following activities:

- Developing broad-based partnerships with school divisions in the Hampton Roads area and greater Virginia.

- Serving as a conduit through which Old Dominion University will endeavor to make available the best local, state, national, and international resources to the primary partners to fulfill our mutual obligation to assure academic achievement, development of responsible citizenship, and self-fulfillment of the youth served by our partner schools.
- Pursuing selected inter-institutional and international educational partnerships that capitalize on identified areas of strength at ODU or enhance strategic relationships between these partners and the Hampton Roads community.

The **Commonwealth Center for Recurrent Flooding Resiliency (CCRFR)**, a full partnership between ODU, the Virginia Institute of Marine Science, and William and Mary, was established in 2016 by the Virginia General Assembly. The center engages the expertise, resources, and intellectual vibrancy of the partner institutions in support of building resilience to recurrent flooding and sea level rise. The center serves, advises, and supports Virginia by conducting interdisciplinary studies and providing training, technical and non-technical services, and policy guidance in recurrent flooding resilience to the Commonwealth and its local governments, state agencies, industries, and citizens. Recognizing that flooding impacts the entire Commonwealth, the CCRFR works throughout Virginia by supporting short- and long-term projects within cities, in regions or throughout the state. Faculty are currently engaged in research that will provide cities and counties with localized subsidence data, build risk communication strategies within stakeholder groups, increase resilience within the tourism industry, map flood hazards in western Virginia, and test resilience strategies. The CCRFR is committed to working with partners across the Commonwealth and aims to leverage and enhance existing resilience strategies in Virginia.

Research and Enterprise Centers

The University has established a number of research and enterprise centers: <https://www.odu.edu/impact/centers> (<https://www.odu.edu/impact/centers/>). Please check the web pages of the Office of Research <http://www.odu.edu/research> (<http://www.odu.edu/research/>) and those of the individual colleges for information regarding centers in specific areas.

Research Policies

The Office of Research is responsible for regulatory oversight of research involving human subjects, animal subjects, and biological materials. Students intending to conduct research in these areas should be aware that approval from a relevant committee (i.e. IRB, IACUC, IBC) may be required before the research can be initiated. The Office of Research also provides oversight and guidance regarding Responsible Conduct of Research, Conflicts of Interest, and Export Controls.

Students engaged in scientific research or other scholarly activity at Old Dominion University should also be aware of the University's Policy, Procedures and Timeline for Responding to Allegations of Misconduct in Scientific Research and Scholarly Activity. The policy can be found in its entirety in the Board of Visitors manual section on Research Policies at <http://www.odu.edu/about/policiesandprocedures/bov> (<http://www.odu.edu/about/policiesandprocedures/bov/>).

Innovations Commercialization

Students who are self-sponsored and did not use significant resources of Old Dominion University own their inventions. Only students who receive compensation through sponsored research, tuition/fee waivers, scholarships, assistantships, or other financial arrangements and/or make substantial use of University facilities in developing proprietary ideas or technology are covered by Old Dominion University's Policy on Intellectual Property. This policy covers the ownership and use of copyrighted works, inventions, and any other form of intellectual property. In those cases where the University has a vested interest in intellectual property, the policy specifies how inventions are disclosed, evaluated for protection and commercialization, and how any revenues derived will be distributed between the inventor/author and the University. The policy can be found in

its entirety at: <https://www.odu.edu/research/innovations-commercialization> (<https://www.odu.edu/research/innovations-commercialization/>).

Students who used significant resources of Old Dominion University could be offered exclusive licenses at very attractive terms. Please call the Office of Research for more details at 757-683-4027.

Research Foundation

The Old Dominion University Research Foundation is a separate, private, not-for-profit corporation chartered under the laws of the Commonwealth of Virginia in 1965. The foundation serves as the fiscal and administrative agent to manage research and sponsored programs for Old Dominion University. The foundation's purpose is to promote the education, research, and public service objectives of Old Dominion University by encouraging, advancing, fostering, and conducting research and sponsored programs in engineering, the physical and life sciences, the humanities, education, and all other branches of learning.

The foundation is the contracting agent for University research grants and contracts with external funding agencies. In fiscal year 2016, the Research Foundation received \$47.3 million in awards for research and sponsored programs. Research and sponsored program activity for fiscal year 2016, measured by amount of expenditures, totaled \$50.5 million for projects sponsored by federal, state, and local government agencies and a variety of corporations and private foundations.

Technical direction of a sponsored program remains the responsibility of the principal investigator. The foundation supports the University and assists investigators by providing a broad range of administrative and technical support services. Among these services are: financial administration, budget preparation and monitoring, financial compliance guidance, proposal preparation and submission assistance, project payroll and human resources, financial reporting, technical reporting support, procurement, and equipment inventory control.

Campus Services

Center for Career & Leadership Development

The Center for Career and Leadership Development (CCLD) empowers undergraduate and graduate students and alumni in their career and leadership development from their first day as a Monarch through graduation and their career. Through strategic collaboration with campus and community partners, CCLD offers several programs and services, including career coaching and workshops, leadership development, resume reviews and job search preparation, career fairs and employer connections, a job search database called Handshake, student employment coordination and training, volunteer and service-learning programs, career treks, professional mentorship programs, living-learning and theme communities, and the Monarch Pantry.

The Student Employment Program is designed to assist students in locating on- or off-campus, part-time, seasonal, or Federal Work-Study (FWS) positions for those who qualify.

The Center for Career and Leadership Development collaborates with on- and off-campus organizations to post open jobs of all types, including permanent full-time positions, as well as on-campus roles, through ODU Handshake. This powerful interactive web-based system is available for free to students and alumni of Old Dominion University. The ODU Handshake database contains employer information, career information, a career events calendar and interview schedules, and the means to electronically apply for positions posted. Handshake is the primary tool used by CCLD to communicate with students about various career opportunities and events to help students succeed at Old Dominion University and into their careers.

Individual career coaching and electronic assessment tools, as well as workshops on career exploration, development, and the job search, are available to assist in major and career path selection. Students may sign up for an appointment with a career coach via Handshake or by visiting the office during drop-in coaching hours. CCLD also provides students with

experiential learning opportunities through leadership seminars, service-learning course partnerships, career treks, job shadow, and mentorship opportunities. Students can also volunteer in and receive support from the Monarch Pantry and Monarch Clothing Closet. More information on career coaching, workshops, and experiential learning opportunities are located on CCLD's website at odu.edu/career-leadership (<https://www.odu.edu/career-leadership/>).

Career and internship fairs are held twice a year and are supplemented by specialized fairs for specific populations. Employers are also present on campus through information and tabling sessions, as well as employer and alumni career information panels and etiquette meals. Additional opportunities to connect with internships and co-operative opportunities are coordinated by ODU's Monarch Internship and Co-Op Office (odu.edu/internship) (<https://www.odu.edu/internship/>).

More information is available by calling the CCLD main office at 757-683-4388 during normal office hours, via email at cclld@odu.edu, or via the website at <http://www.odu.edu/career-leadership> (<http://www.odu.edu/career-leadership/>). Staff members are also available in 2202 Webb Student Center.

Health Insurance for Graduate Students and Post-Doctoral Fellows

Degree-seeking graduate students enrolled in courses at Old Dominion University's main campus or one of the higher education centers are eligible to enroll. Graduate assistants being paid \$5,000 or more per semester are eligible to enroll as subsidized graduate assistants. Degree-seeking domestic graduate students who reside within a 50-mile radius of campus and who are enrolled in online courses are eligible to enroll for the plan. These students have access to the Student Health Center with payment of the student health fee. All other eligible graduate students may enroll as non-subsidized graduate students. In addition, individuals in post-doctoral fellow positions hired by Old Dominion University or the ODU Research Foundation are eligible to enroll in this insurance plan. For more information, go to <http://www.odu.edu/graduateschool/graduate-student-health-insurance> (<http://www.odu.edu/graduateschool/graduate-student-health-insurance/>) or email gradhealth@odu.edu.

College of Arts & Letters

Web Site: <http://www.odu.edu/al> (<http://www.odu.edu/al/>)

9000 Batten Arts & Letters Building
(757) 683-3925
(757) 683-5746

Laura Delbrugge, Dean
Martha Daas, Associate Dean for Undergraduate Studies and Administration
Dale E. Miller, Associate Dean for Research, Graduate Studies, and Faculty Affairs

Mission

The College of Arts and Letters is committed to the ideals of the liberal arts. Its curriculum introduces students to the full range of human experiences through the study of cultural heritage, forms of artistic and literary expressions, patterns of social and political behavior, and methods of critical inquiry. The mission of the College of Arts and Letters is to prepare students for rigorous, intellectual and creative inquiry leading to their full development as human beings and to their responsible engagement with society. We accomplish this mission by:

1. Endowing all students with the essential skills of critical reading and thinking, effective oral and written communication, and proficient use of technology
2. Providing foundational knowledge in the arts, humanities and social sciences for all undergraduates
3. Offering excellent disciplinary and interdisciplinary programs of study and training that introduce students to accumulated knowledge, scholarly debate, and innovations in the field
4. Fostering global awareness and sensitivity to the breadth and diversity of the human condition, which includes acquiring an understanding of the roles of gender, race, ethnicity, and culture
5. Providing an environment for the free exchange of ideas among faculty and students, and by vigorously defending academic and intellectual freedom
6. Promoting research projects, collaborative learning experiences, and challenging internships that connect our students to the community and prepare them for the world of work
7. Supporting a broad array of cultural experiences that enrich the lives of students, faculty, the University, and the community

Overview

Graduate programs in the College of Arts and Letters foster the scholarship and creativity of individual students through close personal contact between faculty and students. Arts and Letters faculty members dedicate themselves to excellence in teaching; take pride in their achievements in research; and commit to enhancing in every way possible the exciting and stimulating environment that is Old Dominion University. The College of Arts and Letters has graduate programs in Applied Linguistics, Applied Sociology, Creative Writing, Criminology and Criminal Justice, English, History, Humanities, International Studies, Lifespan and Digital Communication, and Music Education. The College offers M.A. degrees in Applied Linguistics, Applied Sociology, English, History, Humanities, Lifespan and Digital Communication, International Studies, and Music Education; the M.F.A. degree in Creative Writing; and Ph.D. degrees in Criminology and Criminal Justice, English, and International Studies.

Departments

- Department of Communication & Theatre Arts (p. 69)
- Department of English (p. 70)
- Department of History (p. 86)
- Department of Political Science and Geography (p. 92)
- Department of Sociology and Criminal Justice (p. 100)
- Department of Women's and Gender Studies (p. 101)

- F. Ludwig Diehn School of Music (p. 89)
- Institute for the Humanities (p. 88)

Programs

Doctor of Philosophy Programs

- Criminology and Criminal Justice (PhD) (p. 100)
- English (PhD) (p. 81)
- International Studies (PhD) (p. 95)

Master of Arts Programs

- Applied Linguistics (MA) (p. 70)
- Applied Linguistics with a Concentration in Language, Society, and Social Justice (MA) (p. 71)
- Applied Linguistics with a Concentration in Teaching of English to Speakers of Other Languages (TESOL) (MA) (p. 72)
- Applied Sociology (MA) (p. 100)
- English with a Concentration in Literature (MA) (p. 76)
- English with a Concentration in Rhetoric and Composition (MA) (p. 78)
- English with a Concentration in Teaching of English (MA) (p. 79)
- English with a Concentration in Technical Writing (MA) (p. 80)
- History (MA) (p. 86)
- Humanities (MA) (p. 88)
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Master of Fine Arts Programs

- Creative Writing with a Concentration in Fiction (MFA) (p. 73)
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Master of Music Education Programs

- Music Education with a Concentration in Applied Studies (MME) (p. 89)
- Music Education with a Concentration in Pedagogy (MME) (p. 90)
- Music Education with a Concentration in Research (MME) (p. 91)

Certificate Programs

- Geographic Information Science Certificate (p. 98)
- International Development Certificate (p. 99)
- Literature Certificate (p. 85)
- Maritime History Certificate (p. 87)
- Modeling and Simulation - International Studies Certificate (p. 99)
- Music Performance Certificate (p. 91)
- Professional Writing Certificate (p. 85)
- Spatial Analysis of Coastal Environments Certificate (p. 99)
- Teaching English to Speakers of other Languages (TESOL) Certificate (p. 85)
- Teaching of Writing Certificate (p. 85)
- Women's Studies Certificate (p. 101)

Centers and Institutes

China Center

The China Center's mission is to promote and coordinate research, cultural exchanges, and academic programs in China-related Studies; to enhance mutual understanding of the two cultures; and to facilitate economic and business cooperation between China, other Chinese societies, and the United States with particular emphases on the Commonwealth of Virginia.

Gay Cultural Studies

ODU's Gay Cultural Studies Advisory Council has established a program, unique in Virginia's academic community, that focuses on the contributions, concerns, and challenges associated with LGBT culture. The Gay Cultural Studies program promotes academic research and provides graduate and undergraduate educational opportunities, and engages the local Hampton Roads LGBT community through ongoing dialogue and community involvement.

Institute for Ethics and Public Affairs

The Institute for Ethics and Public Affairs seeks to raise awareness and stimulate discussion of the ethical dimension of matters of public concern within the campus community and the larger Hampton Roads community; to strengthen moral community and foster a commitment to ethical ideals in public life; to facilitate reflection on the ethical standards that govern the professions; and to highlight the unique and valuable contribution that philosophical reasoning can make to practical decision making.

Institute for the Humanities

The Institute for the Humanities offers a Master of Arts degree in the Humanities that fosters cross-disciplinary learning and interdisciplinary research outcomes with a primary focus on humanistic methodologies. The program allows students to pursue individualized programs of study that incorporate classes from across the College of Arts and Letters. In alignment with the mission of the college and university, the program aims to develop students' skills in critical thinking, effective communication, and creative problem solving. Students will become engaged citizens and stewards of the value of the human experience to transform the world and improve their own lived experiences. You can peruse our catalog page (p. 88) and visit our website (<https://ww1.odu.edu/al/institutes/humanities.html>).

Institute for Jewish Studies and Interfaith Understanding

In 2002, with a \$300,000 matching grant from the Dudley Cooper Trust, Old Dominion University announced the establishment of an Institute for Jewish Studies and Interfaith Understanding dedicated to the idea that interfaith understanding involves both an appreciation of Judaism's historic role in the development of Western civilization and an understanding of the cross-cultural development of the world's religions. To this end, the Institute coordinates lectures, symposia, and reading groups related to Jewish history and thought, as well as Judaism's continuing dialogue with Christian, Islamic, and Asian faith traditions. Presenting information about the world's religious and ethnic diversity in a University setting of open dialogue to thoughtful students, young and old, can enrich overall understanding of the issues and challenges that confront us in the twenty-first century.

Institute for the Study of Race and Ethnicity

In support of the mission of Old Dominion University to place special emphasis upon understanding the perspectives of women, minorities, and non-Western cultures, the Institute for the Study of Race and Ethnicity (ISRE) seeks to develop, promote and implement academic, research and public service programs that focus on the study of race and ethnicity in the region, the nation, and globally. The political, social, economic, and cultural experiences of African Americans, Filipino Americans, and other communities of color are emphasized in the work of the institute. ISRE seeks to establish itself as a major archive and research center in Virginia and the southeastern region of the United States by providing archival resources through its Resource Center and engaging in the collection, analysis, and dissemination of data and research.

Institute of Asian Studies

Old Dominion University seeks to promote an expanded awareness and understanding of the nations and cultures of Asia, to support and encourage research on Asia, and to make resources available to foster better understanding and more effective interaction between organizations and individuals in the Hampton Roads area and those in Asia. To achieve these goals, the Institute of Asian Studies coordinates special programs and administers a major and minor in Asian studies. It also facilitates cooperative

relationships with higher education institutions and other organizations within the United States and throughout Asia. The Institute director works closely with the Office of International Programs regarding scholarships and study abroad programs and opportunities.

Model United Nations

The Old Dominion University Model United Nations Society is ODU's window on the United Nations and international activism. The Society's mission is promoting global, multicultural education and leadership experience through experiential learning, stressing student participation in simulation conferences and academic courses. The Society represents the university at model U.N., European Union, NATO and crisis simulation conferences around the country, and by organizing major simulations of its own, including U.N. Day in October and ODUMUNC, held every February. Membership is open to students from all colleges and disciplines at the university.

Monarch Institute for Game Design and Development (MIGDD)

The Monarch Institute for Game Design and Development (MIGDD) supports the college's Game Design, Development, and Criticism majors, which are housed in the Department of Interdisciplinary Studies. Its mission includes promoting collaborative gaming research and interdisciplinary cooperation between existing colleges and departments, encouraging the translation of research into product development and commercialization, providing students with internships and other experiential learning opportunities, and facilitating community engagement and outreach.

Social Science Research Center

The Social Science Research Center is located on the campus of Old Dominion University in Norfolk, Virginia. The SSRC has been in operation since 1998 and is staffed by two, full-time research and management professionals, a full-time project coordinator, and several part-time research assistants. The SSRC has successfully managed a variety of research and evaluation projects involving several national, regional and statewide surveys, and many program evaluations.

Department of Communication & Theatre Arts

3000 Batten Arts and Letters
757-683-3828

Tim Anderson, Department Chair

Programs

Master of Arts Program

- Lifespan and Digital Communication (MA) (p. 69)

Master of Arts Lifespan and Digital Communication (MA)

Gary Beck, Ph.D., Graduate Program Director

The Master of Arts in Lifespan and Digital Communication focuses on the study of human communication and digital media as they develop across the lifespan and is based on the assumption that relational communication, information gathering, conflict management, entertainment consumption, and social media use differs among, within, and between people at various stages of life (childhood, adolescence, young adulthood, middle age, and elder adulthood). Understanding and analyzing the inseparable relationship between lifespan communication and digital media is a key to success in most 21st century jobs, particularly in the interrelated employment areas of applied research and policy, community networking and outreach, creative industries, education and training, and health and wellness. *This program is offered traditionally and fully online.*

Admission Information

In addition to meeting all general University requirements, an applicant must have an undergraduate average of at least 3.25 in Communication or a related field and a 3.0 overall; two letters of recommendation from faculty members, or those who can evaluate the applicant's academic potential; and a 500-word essay that outlines the applicant's professional and personal goals in pursuing this degree, while explaining the relationship of these aforementioned goals to the Lifespan and Digital Communication degree program. The GRE is waived for this degree.

Curriculum Requirements

The Master of Arts degree in Lifespan and Digital Communication requires 36 credit hours for either the non-thesis or thesis option. No more than 12 credit hours may be taken at the 500 level. Both non-thesis and thesis option students take five required core courses (15 hours) as well either a thesis preparation course (3 hours) or a capstone course (3 hours) for a total of 18 hours of required classes that include:

COMM 601	Lifespan Communication Research and Theory	3
COMM 602	Digital Communication Theory and Research	3
COMM 603	Social Change and Communication Systems	3
COMM 604	Lifespan Communication Research Methods	3
COMM 605	Critical Methods and Digital Communication	3
Total Credit Hours		15

Additional Requirements

In addition, students pursuing the non-thesis option take 18 credit hours of COMM electives and a required 3-credit hour capstone seminar COMM 685. Students pursuing the thesis option take an additional 9 credit hours of COMM electives, COMM 689 (3 hours) (in the first semester they register for thesis hours) as well as COMM 698 & COMM 699: Thesis (six hours) in lieu of COMM 685. This thesis is based on original scholarly research and must address a specific and viable topic salient to the student's core and elective coursework in Lifespan and Digital Communication.

The thesis option is recommended for those students who have maintained a high GPA, have the support of a faculty advisor from the Communication and Theatre Arts department, and who are considering further studies at the doctoral level. The thesis committee, consisting of a chair and two other faculty members certified for graduate instruction, direct and evaluate the student's work. Approval of the thesis proposal by the student's committee and GPD is required before the completion of 27 hours of coursework. Upon completion of the thesis, the committee will conduct a two-hour examination and defense of the thesis.

Department of English

www.odu.edu/englishdept

Veronica Watson, Department Chair

Staci Defibaugh, Associate Chair of Curriculum and Assessment

Kristi Costello, Associate Chair of Writing Studies

AJ Nolan, Assistant Chair of Scheduling & Special Projects

5000 Batten Arts and Letters
757-683-3991

Graduate Programs in English

There are four graduate programs in the English department:

1. Master of Arts in English;
2. Master of Arts in Applied Linguistics;
3. Master of Fine Arts in Creative Writing, and
4. Ph.D. in English.

Each program has its own guidelines and admissions policy.

Programs

Doctor of Philosophy Programs

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Master of Arts Programs

- Applied Linguistics (MA) (p. 70)
- Applied Linguistics with a Concentration in Language, Society, and Social Justice (MA) (p. 71)
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Master of Fine Arts Programs

- Creative Writing with a Concentration in Fiction (MFA) (p. 73)
- Creative Writing with a Concentration in Non-Fiction (MFA) (p. 74)
- Creative Writing with a Concentration in Poetry (MFA) (p. 75)

Graduate Certificates

- Literature Certificate (p. 85)
- Professional Writing Certificate (p. 85)
- Teaching English to Speakers of other Languages (TESOL) Certificate (p. 85)
- Teaching of Writing Certificate (p. 85)

Master of Arts Applied Linguistics (MA)

Staci Defibaugh (sdefibau@odu.edu), Graduate Program Director

The Master of Arts in Applied Linguistics prepares students to pursue advanced graduate study in fields like linguistics, applied linguistics, law, psychology, and education; for careers in government and industry; to teach in colleges, adult education programs, businesses, private schools, or institutions in the U.S. or abroad, and for other professions requiring good analytical, linguistic, discourse, and writing skills. The program has two concentrations: Teaching English to Speakers of Other Languages (TESOL) and Language, Society, and Social Justice. Students may elect to pursue a concentration area by taking the required 9 credits of specialized coursework for each concentration or they may complete a general MA degree in Applied Linguistics without a concentration. Students in the program can complete their degree in-person on the main campus in Norfolk as well as by taking select courses synchronously online or asynchronously online. They may also earn a graduate certificate in TESOL and/or use appropriate courses in the program as requirements toward obtaining the Commonwealth of Virginia Endorsement for English as a Second Language.

Admission Information

In addition to general University admission requirements, applicants must have a grade point average of 3.0 or better, and must have taken some upper-level English, linguistics, or foreign language courses. The Graduate Record Examination (GRE), General Test is optional. Applicants must also submit a sample of scholarly writing, statement of purpose, and two letters of recommendation. International students must submit scores from the TOEFL iBT, (88 for regular admission and 80 for provisional admission), from the TOEFL PBT (570 for regular admission and 550 for provisional admission) or from IELTS Academic Module (6.5 or higher), a sample of scholarly writing, statement of purpose, and two letters of recommendation, both of which should also address the applicant's proficiency in English. After 12 hours of graduate work, international students must meet the language proficiency requirement for regular admission if admitted provisionally.

Applications submitted after the deadlines will be considered for review but admission for the desired semester is not guaranteed.

Curriculum Requirements

The M.A. in Applied Linguistics requires 33 credit hours, including 18 credit hours of program core courses and 15 credit hours of electives, and the passing of an oral comprehensive examination. Elective credit hours may be used to complete one of two concentration areas offered by the program or a general MA degree in Applied Linguistics without a concentration. Students should discuss their plans with the graduate program director at the beginning of their studies. No more than 12 hours may be taken at the 500 level. Courses taken PASS/FAIL are not included in the 33 credit hours.

Applied Linguistics: Core Courses

ENGL 540	General Linguistics	3
ENGL 671	Phonology	3
ENGL 672	Language Structure Analysis	3
ENGL 673	Discourse Analysis	3
or ENGL 763	Seminar in Discourse Analysis	
ENGL 679	First and Second Language Acquisition	3
ENGL 770	Research Methods in Language Analysis	3
or ENGL 780	Corpus Use, Research, and Material Design	
Total Credit Hours for Concentration or Electives		15
Total Credit Hours		33

Additional Requirements

Master of Arts - Applied Linguistics, Thesis Option

Writing a thesis may benefit those who contemplate further graduate work, as well as those who have a desire to pursue a single topic in depth. Under the guidance of a member of the graduate faculty, a student may earn six hours of credit for a completed approved thesis. Students who write a thesis will defend the thesis early in their final semester and complete their oral exam in a separate examination.

Master of Arts - Applied Linguistics, Oral Comprehensive Examination

At the end of the program, all students must complete an oral comprehensive examination that covers each student's program of study and, where applicable, the thesis. Students who fail the oral comprehensive examination may re-take it one more time in a different semester. Students who fail a second time will no longer be eligible to receive the Master of Arts degree in applied linguistics from Old Dominion University. During their final semester, students must submit an electronic portfolio that will include course syllabi, a selection of assignments for each course, along with a reflection on their experiences in the MA program.

Continuance

Students must:

1. Meet all university and program requirements;
2. Maintain a 3.0 grade point average or better;
3. Retake any core course in which grades below B- are earned.

Exit

In order to graduate from the program, students must:

1. Complete the required course of study for a total of, at least, 33 credit hours of course work. Credit hours with grades below B- and courses taken PASS/FAIL are not included in the 33 credit hour total;
2. Submit a program electronic portfolio;
3. Pass an oral comprehensive examination;
4. Fulfill all university exit requirements.

Master of Arts

Applied Linguistics with a Concentration in Language, Society, and Social Justice (MA)

Staci Defibau (sdefibau@odu.edu), Graduate Program Director

The Master of Arts in Applied Linguistics prepares students to pursue advanced graduate study in fields like linguistics, applied linguistics, law, psychology, and education; for careers in government and industry; to teach in colleges, adult education programs, businesses, private schools, or institutions in the U.S. or abroad, and for other professions requiring good analytical, linguistic, discourse, and writing skills. The program has two concentrations: Teaching English to Speakers of Other Languages (TESOL) and Language, Society, and Social Justice. Students may elect to pursue a concentration area by taking the required 9 credits of specialized coursework for each concentration or they may complete a general MA degree in Applied Linguistics without a concentration. Students in the program can complete their degree in-person on the main campus in Norfolk as well as by taking select courses synchronously online or asynchronously online. They may also earn a graduate certificate in TESOL and/or use appropriate courses in the program as requirements toward obtaining the Commonwealth of Virginia Endorsement for English as a Second Language.

Admission Information

In addition to general University admission requirements, applicants must have a grade point average of 3.0 or better, and must have taken some upper-level English, linguistics, or foreign language courses. The Graduate Record Examination (GRE), General Test is optional. Applicants must also submit a sample of scholarly writing, statement of purpose, and two letters of recommendation. International students must submit scores from the TOEFL iBT, (88 for regular admission and 80 for provisional admission), from the TOEFL PBT (570 for regular admission and 550 for provisional admission) or from IELTS Academic Module (6.5 or higher), a sample of scholarly writing, statement of purpose, and two letters of recommendation, both of which should also address the applicant's proficiency in English. After 12 hours of graduate work, international students must meet the language proficiency requirement for regular admission if admitted provisionally. Applications submitted after the deadlines will be considered for review but admission for the desired semester is not guaranteed.

Curriculum Requirements

The M.A. in Applied Linguistics requires 33 credit hours, including 18 credit hours of program core courses and 15 credit hours of electives, and the passing of an oral comprehensive examination. Elective credit hours may be used to complete one of two concentration areas offered by the program or a general MA degree in Applied Linguistics without a concentration. Students should discuss their plans with the graduate program director at the beginning of their studies. No more than 12 hours may be taken at the 500 level. Courses taken PASS/FAIL are not included in the 33 credit hours.

Applied Linguistics: Core Courses

ENGL 540	General Linguistics	3
ENGL 671	Phonology	3
ENGL 672	Language Structure Analysis	3
ENGL 673	Discourse Analysis	3
or ENGL 763	Seminar in Discourse Analysis	
ENGL 679	First and Second Language Acquisition	3
ENGL 770	Research Methods in Language Analysis	3
or ENGL 780	Corpus Use, Research, and Material Design	
Total Credit Hours for Concentration or Electives		15
Total Credit Hours		33

Language, Society, and Social Justice Concentration

Language, Society, and Social Justice Concentration

ENGL 550	American English	3
ENGL 678	Sociolinguistics	3
or ENGL 778	Seminar in Sociolinguistics	
Select one of the following:		3
ENGL 542	English Grammar	
ENGL 543	Southern and African American English	
ENGL 544	History of the English Language	
ENGL 545	Forensic linguistics	
ENGL 577	Language, Gender and Power	
ENGL 595	Topics in English (Linguistics)	
ENGL 674	Internship in Applied Linguistics	
ENGL 677	Language and Communication Across Cultures	
ENGL 695	Topics (Linguistics)	
ENGL 705	Discourse and Rhetoric Across Cultures	
ENGL 732	Digital Activisms	
ENGL 754	Cultural Studies	
ENGL 755	Critical Race Theory	
Electives *		
Complete electives		6
Total Credit Hours		15

* Or a thesis approved by the graduate program director. The elective requirement can be satisfied by selecting from the list of electives in each of the concentrations or from courses offered by other graduate programs at the University if they are language oriented. Elective courses can be at the 500, 600, or 700 level and they should be pre-approved by the Graduate Program Director.

Additional Requirements

Master of Arts - Applied Linguistics, Thesis Option

Writing a thesis may benefit those who contemplate further graduate work, as well as those who have a desire to pursue a single topic in depth. Under the guidance of a member of the graduate faculty, a student may earn six hours of credit for a completed approved thesis. Students who write a thesis will defend the thesis early in their final semester and complete their oral exam in a separate examination.

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3. Retake any core course in which grades below B- are earned.

Exit

In order to graduate from the program, students must:

1. Complete the required course of study for a total of, at least, 33 credit hours of course work. Credit hours with grades below B- and courses taken PASS/FAIL are not included in the 33 credit hour total;
2. Submit a program electronic portfolio;
3. Pass an oral comprehensive examination;
4. Fulfill all university exit requirements.

Master of Arts

Applied Linguistics with a Concentration in Teaching of English to Speakers of Other Languages (TESOL) (MA)

Staci Defibaugh, Graduate Program Director

The Master of Arts in Applied Linguistics prepares students to pursue advanced graduate study in fields like linguistics, applied linguistics, law, psychology, and education; for careers in government and industry; to teach in colleges, adult education programs, businesses, private schools, or institutions in the U.S. or abroad, and for other professions requiring good analytical, linguistic, discourse, and writing skills. The program has two concentrations: Teaching English to Speakers of Other Languages (TESOL) and Language, Society, and Social Justice. Students may elect to pursue a concentration area by taking the required 9 credits of specialized coursework for each concentration or they may complete a general MA degree in Applied Linguistics without a concentration. Students in the program can complete their degree in-person on the main campus in Norfolk as well as by taking select courses synchronously online or asynchronously online. They may also earn a graduate certificate in TESOL and/or use appropriate courses in the program as requirements toward obtaining the Commonwealth of Virginia Endorsement for English as a Second Language.

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ENGL 673	Discourse Analysis	3
or ENGL 763	Seminar in Discourse Analysis	
ENGL 679	First and Second Language Acquisition	3
ENGL 770	Research Methods in Language Analysis	3
or ENGL 780	Corpus Use, Research, and Material Design	
Total Credit Hours for Concentration or Electives		15
Total Credit Hours		33

TESOL Concentration

TESOL Concentration		
ENGL 670	Methods and Materials in TESOL	3
ENGL 675	Practicum in TESOL	3
Select one of the following:		3
ENGL 542	English Grammar	
ENGL 544	History of the English Language	
ENGL 550	American English	
ENGL 595	Topics in English (Linguistics)	
ENGL 664	Teaching College Composition	
ENGL 674	Internship in Applied Linguistics	
ENGL 677	Language and Communication Across Cultures	
ENGL 678	Sociolinguistics	
ENGL 695	Topics (Linguistics)	
ENGL 705	Discourse and Rhetoric Across Cultures	
ENGL 722	Multilingualism and Writing Instruction	
ENGL 778	Seminar in Sociolinguistics	
Electives *		
Complete Electives		6
Total Credit Hours		15

* Or a thesis approved by the graduate program director. The elective requirement can be satisfied by selecting from the list of electives in each of the concentrations or from courses offered by other graduate programs at the University if they are language oriented. Elective courses can be at the 500, 600, or 700 level and they should be pre-approved by the Graduate Program Director.

Additional Requirements

Master of Arts - Applied Linguistics, Thesis Option

Writing a thesis may benefit those who contemplate further graduate work, as well as those who have a desire to pursue a single topic in depth. Under the guidance of a member of the graduate faculty, a student may earn six hours of credit for a completed approved thesis. Students who write a thesis will defend the thesis early in their final semester and complete their oral exam in a separate examination.

Master of Arts - Applied Linguistics, Oral Comprehensive Examination

At the end of the program, all students must complete an oral comprehensive examination that covers each student's program of study and, where applicable, the thesis. Students who fail the oral comprehensive examination may re-take it one more time in a different semester. Students who fail a second time will no longer be eligible to receive the Master of Arts degree in applied linguistics from Old Dominion University. During their final semester, students must submit an electronic portfolio that will include course syllabi, a selection of assignments for each course, along with a reflection on their experiences in the MA program.

Continuance

Students must:

1. Meet all university and program requirements;
2. Maintain a 3.0 grade point average or better;
3. Retake any core course in which grades below B- are earned.

Exit

In order to graduate from the program, students must:

1. Complete the required course of study for a total of, at least, 33 credit hours of course work. Credit hours with grades below B- and courses taken PASS/FAIL are not included in the 33 credit hour total;
2. Submit a program electronic portfolio;
3. Pass an oral comprehensive examination;
4. Fulfill all university exit requirements.

Master of Fine Arts

Creative Writing with a Concentration in Fiction (MFA)

Kent Wascom, Graduate Program Director
kwascom@odu.edu

The Master of Fine Arts in creative writing is widely regarded as a terminal degree. It is designed to prepare students for careers as published writers in fiction, poetry, or creative nonfiction. A secondary goal is to emphasize not only preparation for college-level teaching (the practical vocational goal of most M.F.A. programs in creative writing), but also includes preparation of graduates for careers in literary editing and publishing, or as free-lance writers (magazines, newspapers, reviews, and features).

Admission

Applicants must have completed a bachelor's degree from an accredited institution with at least a 3.0 G.P.A. Candidates must also submit writing samples in their genre (candidates should note genre on title page of submission), three letters of recommendation, academic transcripts, and a personal statement.

Curriculum Requirements

Students in the M.F.A. program must complete 54 total credit hours (39 hours of required courses and 15 hours of approved electives). In addition, students must also maintain a 3.00 GPA overall, satisfy a mid-program review at the end of the third semester in the program, and complete all work within three years (full-time students) or six years (part-time students). Students choose courses based upon their genre of study, and should consult the graduate program director or their advisor when selecting a schedule.

Students must take at least 12 credit hours of ENGL 650 (CREATIVE WRITING WORKSHOP), most of these in the genre area of concentration, to count toward core requirements for the degree.

ENGL 650	Creative Writing	
ENGL 660	Craft of Literary Forms	
Literature (select four of the following): **		12
ENGL 507	Chaucer's Canterbury Tales	
ENGL 516	English Renaissance Drama	
ENGL 521	British Literature 1660-1800	
ENGL 523	The Romantic Movement in Britain	
ENGL 533	Victorian Literature	
ENGL 538	The Twentieth-Century British Novel	
ENGL 547	The American Novel to 1920	
ENGL 548	The American Novel 1920 to Present	
ENGL 559	New Literatures in English	

ENGL 561	American Poetry of the Early Twentieth Century	
ENGL 565	African-American Literature	
ENGL 566	Asian American Literature	
ENGL 592	Modern World Drama	
ENGL 593	Contemporary World Literature	
ENGL 595	Topics in English	
ENGL 615	Shakespeare	
ENGL 659	American Literature 1945-Present	
ENGL 681	Contemporary Classics: The Thesis Reading List	
ENGL 682	Literature for Writers (This course is specifically recommended for MFA Creative Writing students.)	
ENGL 695	Topics	
ENGL 727	London Calling: 20th and 21st Century British Literature	
ENGL 728	Eighteenth Century British Literature	
ENGL 735	Postcolonial Literature and Theory	
ENGL 741	Nineteenth Century British Literature	
ENGL 751	American Literature to 1810	
ENGL 756	Pocahontas Unplugged: Jamestown, Pocahontas and the Forging of American Identity	
ENGL 757	American Literature 1810-1870	
ENGL 758	American Literature 1870-1946	
ENGL 791	Seminar in Literary Studies	
ENGL 694	Thesis Colloquium ***	3
Students must complete 3-9 Thesis Hours to complete curricular requirements in the program		9
ENGL 698	Thesis Research	
ENGL 699	Thesis	
Electives+		15
ENGL 664	Teaching College Composition	
ENGL 683	Literary Editing and Publishing	
Total Credit Hours		54

*	These are the Graduate Creative Writing Workshops in Fiction, Poetry, and Nonfiction; course may be repeated up to 6 times with 3 different topics. Cross-genre experience is recommended (taking ENGL 650 Creative Writing Workshops in a concentration other than the student's major), but ONLY after the first year in the program. Instructor approval must be sought.
**	No more than 12 hours of courses at the 500 level may be counted toward the degree.
***	Should be taken in the last semester of the second year, or the first semester of the third year.
+	Additional Creative Writing Workshops, additional American, British, or World Literature Courses, or courses in other fields (approved in advance by GPD) that may count toward Electives ~ MFA Creative Writing students may also elect to take ENGL 596 Topics: Writing Tutorial (1 credit), which offers the opportunity to work in tutorials with the program's Visiting Writer in Residence. Three (3) of these 1-credit ENGL 596 Writing Tutorial courses are equivalent to one Elective (3 credits) in the MFA Creative Writing curriculum. Students <i>in their first year</i> of the program, especially those with GTAs/GAAs/RAAs, are strongly encouraged to take as one of their Electives, ENGL 664 The Teaching of College Composition; this course is typically a

requirement for any teaching assistantship assignments in the classroom.

Additional Requirements

Master of Fine Arts in Creative Writing Thesis

All candidates for the M.F.A. in creative writing must complete a thesis manuscript of publishable quality in their chosen genre (poetry, fiction, or creative nonfiction). Each student will select an advisor from the graduate faculty and work with that advisor and a committee of readers to prepare the manuscript. At the completion of the thesis, students will schedule an oral defense with the advisor and the committee, at which point the thesis will be adjudged as to its readiness for final acceptance.

For more information relating to this program and its requirements, please visit <https://www.odu.edu/englishdept/mfa-creative-writing> (<https://www.odu.edu/englishdept/mfa-creative-writing/>)

Master of Fine Arts Creative Writing with a Concentration in Non-Fiction (MFA)

Kent Wascom, Graduate Program Director
kwascow@odu.edu

The Master of Fine Arts in creative writing is widely regarded as a terminal degree. It is designed to prepare students for careers as published writers in fiction, poetry, or creative nonfiction. A secondary goal is to emphasize not only preparation for college-level teaching (the practical vocational goal of most M.F.A. programs in creative writing), but also includes preparation of graduates for careers in literary editing and publishing, or as free-lance writers (magazines, newspapers, reviews, and features).

Admission

Applicants must have completed a bachelor's degree from an accredited institution with at least a 3.0 G.P.A. Candidates must also submit writing samples in their genre (candidates should note genre on title page of submission), three letters of recommendation, academic transcripts, and a personal statement.

Curriculum Requirements

Students in the M.F.A. program must complete 54 total credit hours (39 hours of required courses and 15 hours of approved electives). In addition, students must also maintain a 3.00 GPA overall, satisfy a mid-program review at the end of the third semester in the program, and complete all work within three years (full-time students) or six years (part-time students). Students choose courses based upon their genre of study, and should consult the graduate program director or their advisor when selecting a schedule.

Students must take at least 12 credit hours of ENGL 650 (CREATIVE WRITING WORKSHOP), most of these in the genre area of concentration, to count toward core requirements for the degree.

ENGL 650	Creative Writing	
ENGL 660	Craft of Literary Forms	
Literature (select four of the following): **		12
ENGL 507	Chaucer's Canterbury Tales	
ENGL 516	English Renaissance Drama	
ENGL 521	British Literature 1660-1800	
ENGL 523	The Romantic Movement in Britain	
ENGL 533	Victorian Literature	
ENGL 538	The Twentieth-Century British Novel	
ENGL 547	The American Novel to 1920	
ENGL 548	The American Novel 1920 to Present	

ENGL 559	New Literatures in English	
ENGL 561	American Poetry of the Early Twentieth Century	
ENGL 565	African-American Literature	
ENGL 566	Asian American Literature	
ENGL 592	Modern World Drama	
ENGL 593	Contemporary World Literature	
ENGL 595	Topics in English	
ENGL 615	Shakespeare	
ENGL 659	American Literature 1945-Present	
ENGL 681	Contemporary Classics: The Thesis Reading List	
ENGL 682	Literature for Writers (This course is specifically recommended for MFA Creative Writing students.)	
ENGL 695	Topics	
ENGL 727	London Calling: 20th and 21st Century British Literature	
ENGL 728	Eighteenth Century British Literature	
ENGL 735	Postcolonial Literature and Theory	
ENGL 741	Nineteenth Century British Literature	
ENGL 751	American Literature to 1810	
ENGL 756	Pocahontas Unplugged: Jamestown, Pocahontas and the Forging of American Identity	
ENGL 757	American Literature 1810-1870	
ENGL 758	American Literature 1870-1946	
ENGL 791	Seminar in Literary Studies	
ENGL 694	Thesis Colloquium ***	3
Students must complete 3-9 Thesis Hours to complete curricular requirements in the program		9
ENGL 698	Thesis Research	
ENGL 699	Thesis	
Electives+		15
ENGL 664	Teaching College Composition	
ENGL 683	Literary Editing and Publishing	
Total Credit Hours		54

*	These are the Graduate Creative Writing Workshops in Fiction, Poetry, and Nonfiction; course may be repeated up to 6 times with 3 different topics. Cross-genre experience is recommended (taking ENGL 650 Creative Writing Workshops in a concentration other than the student's major), but ONLY after the first year in the program. Instructor approval must be sought.
**	No more than 12 hours of courses at the 500 level may be counted toward the degree.
***	Should be taken in the last semester of the second year, or the first semester of the third year.
+	Additional Creative Writing Workshops, additional American, British, or World Literature Courses, or courses in other fields (approved in advance by GPD) that may count toward Electives ~ MFA Creative Writing students may also elect to take ENGL 596 Topics: Writing Tutorial (1 credit), which offers the opportunity to work in tutorials with the program's Visiting Writer in Residence. Three (3) of these 1-credit ENGL 596 Writing Tutorial courses are equivalent to one Elective (3 credits) in the MFA Creative Writing curriculum. Students <i>in their first year</i> of the program, especially those with GTAs/GAAs/RAAs, are strongly encouraged to take as one of their Electives, ENGL 664 The Teaching of College Composition; this course is typically a

requirement for any teaching assistantship assignments in the classroom.

Additional Requirements

Master of Fine Arts in Creative Writing Thesis

All candidates for the M.F.A. in creative writing must complete a thesis manuscript of publishable quality in their chosen genre (poetry, fiction, or creative nonfiction). Each student will select an advisor from the graduate faculty and work with that advisor and a committee of readers to prepare the manuscript. At the completion of the thesis, students will schedule an oral defense with the advisor and the committee, at which point the thesis will be adjudged as to its readiness for final acceptance.

For more information relating to this program and its requirements, please visit <https://www.odu.edu/englishdept/mfa-creative-writing> (<https://www.odu.edu/englishdept/mfa-creative-writing/>)

Master of Fine Arts Creative Writing with a Concentration in Poetry (MFA)

Kent Wascom, Graduate Program Director
kwascom@odu.edu

The Master of Fine Arts in creative writing is widely regarded as a terminal degree. It is designed to prepare students for careers as published writers in fiction, poetry, or creative nonfiction. A secondary goal is to emphasize not only preparation for college-level teaching (the practical vocational goal of most M.F.A. programs in creative writing), but also includes preparation of graduates for careers in literary editing and publishing, or as free-lance writers (magazines, newspapers, reviews, and features).

Admission

Applicants must have completed a bachelor's degree from an accredited institution with at least a 3.0 G.P.A. Candidates must also submit writing samples in their genre (candidates should note genre on title page of submission), three letters of recommendation, academic transcripts, and a personal statement.

Curriculum Requirements

Students in the M.F.A. program must complete 54 total credit hours (39 hours of required courses and 15 hours of approved electives). In addition, students must also maintain a 3.00 GPA overall, satisfy a mid-program review at the end of the third semester in the program, and complete all work within three years (full-time students) or six years (part-time students). Students choose courses based upon their genre of study, and should consult the graduate program director or their advisor when selecting a schedule.

Students must take at least 12 credit hours of ENGL 650 (CREATIVE WRITING WORKSHOP), most of these in the genre area of concentration, to count toward core requirements for the degree.

ENGL 650	Creative Writing	
ENGL 660	Craft of Literary Forms	
Literature (select four of the following): **		12
ENGL 507	Chaucer's Canterbury Tales	
ENGL 516	English Renaissance Drama	
ENGL 521	British Literature 1660-1800	
ENGL 523	The Romantic Movement in Britain	
ENGL 533	Victorian Literature	
ENGL 538	The Twentieth-Century British Novel	
ENGL 547	The American Novel to 1920	
ENGL 548	The American Novel 1920 to Present	
ENGL 559	New Literatures in English	

requirement for any teaching assistantship assignments in the classroom.

Additional Requirements

Master of Fine Arts in Creative Writing Thesis

All candidates for the M.F.A. in creative writing must complete a thesis manuscript of publishable quality in their chosen genre (poetry, fiction, or creative nonfiction). Each student will select an advisor from the graduate faculty and work with that advisor and a committee of readers to prepare the manuscript. At the completion of the thesis, students will schedule an oral defense with the advisor and the committee, at which point the thesis will be adjudged as to its readiness for final acceptance.

For more information relating to this program and its requirements, please visit <https://www.odu.edu/englishdept/mfa-creative-writing> (<https://www.odu.edu/englishdept/mfa-creative-writing/>)

Master of Arts English with a Concentration in Literature (MA)

Ruth Osorio, Graduate Program Director
rosorio@odu.edu

The Master of Arts program in English presents a full array of opportunities in literary studies, technical writing, composition and rhetoric, and the teaching of English. Our faculty, due to their varied areas of expertise, offer unique learning experiences in areas such as gaming, web design, environmental sustainability, Indigenous studies, digital humanities, postcolonialism, and ethnic and gender diversity. Faculty take a hands-on approach to teaching with manageable classroom sizes allowing for personalized instruction and a dynamic culture of learning. Whether you are looking for a professional leg up or simply wish to continue your education, a Master's Degree at ODU promises in-depth exploration of critical discourses that harness the force of language, technology, and literature. The program prepares students for further graduate study in English; for technical writing and editing; for teaching in secondary schools and colleges; for careers in publishing, grant writing, medical writing, social media managing, and community building; for further study in such fields as anthropology, law, psychology, and philosophy; for careers in government and industry; and for other professions requiring analytical, literary, linguistic, digital media, or writing skills.

Admission Information

The student must initially meet all general University admission requirements. For regular admission, students must generally have at least 24 undergraduate hours in English, or a closely related field, with a grade point average of 3.0 or better. However, students applying to the technical writing concentration (see technical writing concentration) may have little or no undergraduate course work relating to English, provided that they have an average of 3.0 or better in their undergraduate major.

Students applying to all concentrations must also, in addition to other admissions materials, provide: a 1-2 page single-spaced statement of purpose outlining the applicant's research interests and goals for the program and past relevant academic and/or work experience that has prepared the applicant for graduate work in English studies and an 8-12 page writing sample that demonstrates the applicant's writing ability, analytical skills, and engagement with scholarly sources.

International students must submit scores from the TOEFL examination, a sample of scholarly writing, and three recommendations, at least one of which evaluates ability in English. For regular admission, students must score 230 on the computer-based TOEFL (the equivalent of 570 in the older, paper-based score scale or 80 on the TOEFL iBT). Students may be admitted provisionally with a TOEFL score of 213 (550 in the paper-based scale), but must attain the scores required for regular admission after 12 hours of graduate work.

ENGL 561	American Poetry of the Early Twentieth Century	
ENGL 565	African-American Literature	
ENGL 566	Asian American Literature	
ENGL 592	Modern World Drama	
ENGL 593	Contemporary World Literature	
ENGL 595	Topics in English	
ENGL 615	Shakespeare	
ENGL 659	American Literature 1945-Present	
ENGL 681	Contemporary Classics: The Thesis Reading List	
ENGL 682	Literature for Writers (This course is specifically recommended for MFA Creative Writing students.)	
ENGL 695	Topics	
ENGL 727	London Calling: 20th and 21st Century British Literature	
ENGL 728	Eighteenth Century British Literature	
ENGL 735	Postcolonial Literature and Theory	
ENGL 741	Nineteenth Century British Literature	
ENGL 751	American Literature to 1810	
ENGL 756	Pocahontas Unplugged: Jamestown, Pocahontas and the Forging of American Identity	
ENGL 757	American Literature 1810-1870	
ENGL 758	American Literature 1870-1946	
ENGL 791	Seminar in Literary Studies	
ENGL 694	Thesis Colloquium ***	3
Students must complete 3-9 Thesis Hours to complete curricular requirements in the program		9
ENGL 698	Thesis Research	
ENGL 699	Thesis	
Electives+		15
ENGL 664	Teaching College Composition	
ENGL 683	Literary Editing and Publishing	
Total Credit Hours		54

* These are the Graduate Creative Writing Workshops in Fiction, Poetry, and Nonfiction; course may be repeated up to 6 times with 3 different topics.

** Cross-genre experience is recommended (taking ENGL 650 Creative Writing Workshops in a concentration other than the student's major), but ONLY after the first year in the program. Instructor approval must be sought.

*** No more than 12 hours of courses at the 500 level may be counted toward the degree.

Should be taken in the last semester of the second year, or the first semester of the third year.

+ Additional Creative Writing Workshops, additional American, British, or World Literature Courses, or courses in other fields (approved in advance by GPD) that may count toward Electives ~

MFA Creative Writing students may also elect to take ENGL 596 Topics: Writing Tutorial (1 credit), which offers the opportunity to work in tutorials with the program's Visiting Writer in Residence. Three (3) of these 1-credit ENGL 596 Writing Tutorial courses are equivalent to one Elective (3 credits) in the MFA Creative Writing curriculum.

Students in their first year of the program, especially those with GTAs/GAAs/RAAs, are strongly encouraged to take as one of their Electives, ENGL 664 The Teaching of College Composition; this course is typically a

Curriculum Requirements

The Master of Arts degree in English requires 30 credit hours and the passing of one of the three examination options below. No more than 12 credit hours on the 500 level may be counted toward a degree. An identifiable unifying principle is required for each student’s program.

Literature Concentration

This concentration, which offers a comprehensive grounding in literary and cultural studies and critical theory, prepares students for careers in community college and four-year university teaching, public media, and a variety of jobs in the public sphere. It also prepares students for advanced literary and cultural studies at the Ph.D. level. For students in other programs, this concentration offers as well a Certificate in Literature, which helps to qualify them for secondary school teaching.

This concentration requires:

ENGL 600	Introduction to Research and Criticism	3
This course is to be taken in the student's first fall semester		

Controlled Electives (18 hours)

British Literature before 1800

One course from:		3
ENGL 507	Chaucer's Canterbury Tales	
ENGL 516	English Renaissance Drama	
ENGL 521	British Literature 1660-1800	
ENGL 532	Origins and Early Development of the British Novel to 1800	
ENGL 595	Topics in English (when topic is appropriate as approved by the Literature Coordinator)	
ENGL 596	Topics in English (when topic is approved by the Literature Coordinator)	
ENGL 615	Shakespeare	
ENGL 695	Topics (when topic is appropriate as approved by the Literature Coordinator)	
ENGL 728	Eighteenth Century British Literature	
ENGL 790	Seminar in Textual Studies (Seminar in Textual Studies [when topic is appropriate as approved by the Literature Coordinator])	
ENGL 791	Seminar in Literary Studies (Seminar in Literary Studies [when topic is appropriate as approved by the Literature Coordinator])	
ENGL 795	Topics (when topic is appropriate as approved by the Literature Coordinator)	

British Literature after 1800

One course from:		3
ENGL 523	The Romantic Movement in Britain	
ENGL 533	Victorian Literature	
ENGL 538	The Twentieth-Century British Novel	
ENGL 559	New Literatures in English	
ENGL 595	Topics in English (when topic is appropriate as approved by the Literature Coordinator)	
ENGL 596	Topics in English (when topic is appropriate as approved by the Literature Coordinator)	
ENGL 642	Nineteenth-Century British Novel	
ENGL 695	Topics (when topic is appropriate as approved by the Literature Coordinator)	
ENGL 727	London Calling: 20th and 21st Century British Literature	
ENGL 741	Nineteenth Century British Literature	
ENGL 735	Postcolonial Literature and Theory	

ENGL 790	Seminar in Textual Studies (Seminar in Textual Studies [when topic is appropriate as approved by the Literature Coordinator])
ENGL 791	Seminar in Literary Studies (Seminar in Literary Studies [when topic is appropriate as approved by the Literature Coordinator])
ENGL 795	Topics (when topic is appropriate as approved by the Literature Coordinator)

American Literature before 1870

One course from:		3
ENGL 595	Topics in English (when topic is appropriate as approved by the Literature Coordinator)	
ENGL 596	Topics in English (when topic is appropriate as approved by the Literature Coordinator)	
ENGL 695	Topics (when topic is appropriate as approved by the Literature Coordinator)	
ENGL 751	American Literature to 1810	
ENGL 756	Pocahontas Unplugged: Jamestown, Pocahontas and the Forging of American Identity	
ENGL 757	American Literature 1810-1870	
ENGL 790	Seminar in Textual Studies (when topic is appropriate as approved by the Literature Coordinator)	
ENGL 791	Seminar in Literary Studies (Seminar in Literary Studies [when topic is appropriate as approved by the Literature Coordinator])	
ENGL 795	Topics (when topic is appropriate as approved by the Literature Coordinator)	

American Literature after 1870

One course from:		3
ENGL 541	American Travel Literature	
ENGL 547	The American Novel to 1920	
ENGL 548	The American Novel 1920 to Present	
ENGL 564	Native American Literature	
ENGL 565	African-American Literature	
ENGL 566	Asian American Literature	
ENGL 595	Topics in English (when topic is appropriate as approved by the Literature Coordinator)	
ENGL 596	Topics in English (when topic is appropriate as approved by the Literature Coordinator)	
ENGL 659	American Literature 1945-Present	
ENGL 695	Topics (when topic is appropriate as approved by the Literature Coordinator)	
ENGL 758	American Literature 1870-1946	
ENGL 790	Seminar in Textual Studies (when topic is appropriate as approved by the Literature Coordinator)	
ENGL 791	Seminar in Literary Studies (when topic is appropriate as approved by the Literature Coordinator)	
ENGL 795	Topics (when topic is appropriate as approved by the Literature Coordinator)	

Methodology

One course from:		3
ENGL 672	Language Structure Analysis	
ENGL 725	Scholarly Editing and Textual Scholarship	
ENGL 730	The Digital Humanities	
ENGL 735	Postcolonial Literature and Theory	
ENGL 737	Narratology	

ENGL 753	Queer of Color Critique
ENGL 755	Critical Race Theory
ENGL 764	Theories of Literature
ENGL 770	Research Methods in Language Analysis
ENGL 780	Corpus Use, Research, and Material Design
ENGL 790	Seminar in Textual Studies (when topic is appropriate as approved by the Literature Coordinator)
ENGL 791	Seminar in Literary Studies (Seminar in Literary Studies [when topic is appropriate as approved by the Literature Coordinator])
ENGL 795	Topics (when topic is appropriate as approved by the Literature Coordinator)

Seminar

One course from:	3
ENGL 790	Seminar in Textual Studies
ENGL 791	Seminar in Literary Studies (Seminar in Literary Studies)

Free Electives 9

Note: Six hours must be from Literature courses

Total needed to graduate 30

Note: Of the total 30 hours needed to graduate no more than 12 hours can be at the 500 level

For any further questions regarding course offerings contact the Literature Coordinator or the Graduate Program Director for the M.A. in English.

Additional Requirements

Master of Arts Thesis Option

The opportunity to undertake a long research project or other appropriate project is available to students in the Master of Arts in English. Writing a thesis may be of particular benefit to those who contemplate further graduate work or who have a strong desire to pursue a single topic in great depth. Under the guidance of an advisor (a member of the graduate faculty), the student must earn at least six hours of credit over the course of two semesters (ENGL 698 & ENGL 699) for a completed, approved thesis. The oral defense of the thesis by a student will cover the thesis and its related areas, as well as a comprehensive oral examination of all course work taken during the degree program. Students who fail the oral comprehensive examination may retake the test only once in a different semester. Students who fail a second time will no longer be eligible to receive the Master of Arts in English from Old Dominion University.

Master of Arts Oral Comprehensive Examination Option

During the first three weeks of the semester in which they intend to graduate, students must contact the graduate program director in English to schedule their comprehensive examination. The oral comprehensive examination covers each student's particular program of study; apart from the development or defense of a thesis. Based on the courses taken by the student, the examination tests the student's mastery of materials and concepts, interpretive skills, and ability to make critical distinctions and connections. Students who fail the oral comprehensive examination may retake the test only once in a different semester. Students who fail a second time will no longer be eligible to receive the Master of Arts in English from Old Dominion University.

Master of Arts Portfolio Project Option

Students may choose to develop a portfolio as the capstone project for the MA in English for the technical writing, rhetoric and composition, or teaching of English concentrations. Students choosing the portfolio will propose the scope of their individual projects to the graduate program director and the committee chair. Portfolios are a collection of individual texts with a meta-narrative that explains the connection between these texts

and the portfolio's intellectual underpinnings. The entire portfolio should range between 10,000 and 15,000 words. Portfolios can be, but are not limited to, a collection of extensively revised course work, a collection of teaching materials, or a collection of new media texts. To help prepare the portfolio, students will be encouraged to take an independent study for up to 3 credits (ENGL 697) as one of their electives; the student's committee chair should direct this independent study. As with the oral examination, students must contact the graduate program director during the first three weeks of the semester in which they intend to graduate to schedule the defense of their portfolio project. This defense will cover the portfolio and its related areas as well as a comprehensive oral examination of all course work taken during the semester.

Master of Arts

English with a Concentration in Rhetoric and Composition (MA)

Ruth Osorio, Graduate Program Director
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The Master of Arts program in English presents a full array of opportunities in literary studies, technical writing, composition and rhetoric, and the teaching of English. Our faculty, due to their varied areas of expertise, offer unique learning experiences in areas such as gaming, web design, environmental sustainability, Indigenous studies, digital humanities, and ethnic and gender diversity. Faculty take a hands-on approach to teaching with manageable classroom sizes allowing for personalized instruction and a dynamic culture of learning. Whether you are looking for a professional leg up or simply wish to continue your education, a Master's Degree at ODU promises in-depth exploration of critical discourses that harness the force of language, technology, and literature. The program prepares students for further graduate study in English; for technical writing and editing; for teaching in secondary schools and colleges; for further study in such fields as anthropology, law, psychology, and philosophy; for careers in government and industry; and for other professions requiring analytical, literary, linguistic, digital media, or writing skills.

Admission Information

The student must initially meet all general University admission requirements. For regular admission, students must generally have at least 24 undergraduate hours in English, or a closely related field, with a grade point average of 3.0 or better. However, students applying to the technical writing concentration (see technical writing concentration) may have little or no undergraduate course work relating to English, provided that they have an average of 3.0 or better in their undergraduate major.

Students applying to all concentrations must also, in addition to other admissions materials, provide: a 1-2 page single-spaced statement of purpose outlining the applicant's research interests and goals for the program and past relevant academic and/or work experience that has prepared the applicant for graduate work in English studies and an 8-12 page writing sample that demonstrates the applicant's writing ability, analytical skills, and engagement with scholarly sources.

International students must submit scores from the TOEFL examination, a sample of scholarly writing, and three recommendations, at least one of which evaluates ability in English. For regular admission, students must score 230 on the computer-based TOEFL (the equivalent of 570 in the older, paper-based score scale or 80 on the TOEFL iBT). Students may be admitted provisionally with a TOEFL score of 213 (550 in the paper-based scale), but must attain the scores required for regular admission after 12 hours of graduate work.

Curriculum Requirements

The Master of Arts degree in English requires 30 credit hours and the passing of one of the three examination options below. No more than 12 credit hours on the 500 level may be counted toward a degree. An identifiable unifying principle is required for each student's program.

Rhetoric and Composition Concentration

Designed to prepare students to teach and administer writing in language arts, community college, or university contexts, and to prepare students for doctoral work in composition and/or rhetoric.

ENGL 539	Writing in Digital Spaces	3
ENGL 664	Teaching College Composition	3
ENGL 685	Writing Research	3
Select one of the following:		3
ENGL 686	Introduction to Rhetoric and Writing Studies	
ENGL 760	Classical Rhetoric and Theory Building	
ENGL 765	Modern Rhetoric and Theory Building	
Select one of the following:		3
ENGL 540	General Linguistics	
ENGL 550	American English	
ENGL 577	Language, Gender and Power	
ENGL 595	Topics in English	
ENGL 722	Multilingualism and Writing Instruction	
Select one of the following:		3
ENGL 721	Compositions as Applied Rhetoric	
ENGL 760	Classical Rhetoric and Theory Building	
ENGL 765	Modern Rhetoric and Theory Building	
Select two of the following:		6
ENGL 527	Writing in the Disciplines	
ENGL 586	Media Law and Ethics	
ENGL 595	Topics in English	
ENGL 662	Cybercultures and Digital Writing	
ENGL 665	Teaching Writing with Technology	
ENGL 673	Discourse Analysis	
ENGL 687	Colloquium for Teachers of English	
ENGL 695	Topics	
ENGL 697	Portfolio Preparation	
ENGL 701	Texts and Technologies	
ENGL 706	Visual Rhetoric and Document Design	
ENGL 720	Pedagogy and Instructional Design	
ENGL 721	Compositions as Applied Rhetoric	
ENGL 760	Classical Rhetoric and Theory Building	
ENGL 763	Seminar in Discourse Analysis	
ENGL 765	Modern Rhetoric and Theory Building	
ENGL 766	New Media Theory and Practice I	
ENGL 771	New Media Theory and Practice II	
ENGL 795	Topics	
Six hours of electives		6
Total Credit Hours		30

Additional Requirements

Master of Arts Thesis Option

The opportunity to undertake a long research project or other appropriate project is available to students in the Master of Arts in English. Writing a thesis may be of particular benefit to those who contemplate further graduate work or who have a strong desire to pursue a single topic in great depth. Under the guidance of an advisor (a member of the graduate faculty), the student must earn at least six hours of credit over the course of two semesters (ENGL 698 & ENGL 699) for a completed, approved thesis. The oral defense of the thesis by a student will cover the thesis and its related areas, as well as a comprehensive oral examination of all course work taken during the degree program. Students who fail the oral comprehensive examination may retake the test only once in a different semester. Students who fail a second time will no longer be eligible to receive the Master of Arts in English from Old Dominion University.

Master of Arts Oral Comprehensive Examination Option

During the first three weeks of the semester in which they intend to graduate, students must contact the graduate program director in English to schedule their comprehensive examination. The oral comprehensive examination covers each student's particular program of study; apart from the development or defense of a thesis. Based on the courses taken by the student, the examination tests the student's mastery of materials and concepts, interpretive skills, and ability to make critical distinctions and connections. Students who fail the oral comprehensive examination may retake the test only once in a different semester. Students who fail a second time will no longer be eligible to receive the Master of Arts in English from Old Dominion University.

Master of Arts Portfolio Project Option

Students may choose to develop a portfolio as the capstone project for the MA in English for the technical writing, rhetoric and composition, or teaching of English concentrations. Students choosing the portfolio will propose the scope of their individual projects to the graduate program director and the committee chair. Portfolios are a collection of individual texts with a meta-narrative that explains the connection between these texts and the portfolio's intellectual underpinnings. The entire portfolio should range between 10,000 and 15,000 words. Portfolios can be, but are not limited to, a collection of extensively revised course work, a collection of teaching materials, or a collection of new media texts. To help prepare the portfolio, students will be encouraged to take an independent study for up to 3 credits (ENGL 697) as one of their electives; the student's committee chair should direct this independent study. As with the oral examination, students must contact the graduate program director during the first three weeks of the semester in which they intend to graduate to schedule the defense of their portfolio project. This defense will cover the portfolio and its related areas as well as a comprehensive oral examination of all course work taken during the semester.

Master of Arts English with a Concentration in Teaching of English (MA)

Ruth Osorio, Graduate Program Director
rosorio@odu.edu

The Master of Arts program in English presents a full array of opportunities in literary studies, technical writing, composition and rhetoric, and the teaching of English. Our faculty, due to their varied areas of expertise, offer unique learning experiences in areas such as gaming, web design, environmental sustainability, Indigenous studies, digital humanities, and ethnic and gender diversity. Faculty take a hands-on approach to teaching with manageable classroom sizes allowing for personalized instruction and a dynamic culture of learning. Whether you are looking for a professional leg up or simply wish to continue your education, a Master's Degree at ODU promises in-depth exploration of critical discourses that harness the force of language, technology, and literature. The program prepares students for further graduate study in English; for technical writing and editing; for teaching in secondary schools and colleges; for further study in such fields as anthropology, law, psychology, and philosophy; for careers in government and industry; and for other professions requiring analytical, literary, linguistic, digital media, or writing skills.

Admission Information

The student must initially meet all general University admission requirements. For regular admission, students must generally have at least 24 undergraduate hours in English, or a closely related field, with a grade point average of 3.0 or better. However, students applying to the technical writing concentration (see technical writing concentration) may have little or no undergraduate course work relating to English, provided that they have an average of 3.0 or better in their undergraduate major.

Students applying to all concentrations must also, in addition to other admissions materials, provide: a 1-2 page single-spaced statement of purpose outlining the applicant's research interests and goals for the program and past relevant academic and/or work experience that has prepared the applicant for graduate work in English studies and an 8-12 page writing sample that demonstrates the applicant's writing ability, analytical skills, and engagement with scholarly sources.

International students must submit scores from the TOEFL examination, a sample of scholarly writing, and three recommendations, at least one of which evaluates ability in English. For regular admission, students must score 230 on the computer-based TOEFL (the equivalent of 570 in the older, paper-based score scale or 80 on the TOEFL iBT). Students may be admitted provisionally with a TOEFL score of 213 (550 in the paper-based scale), but must attain the scores required for regular admission after 12 hours of graduate work.

Curriculum Requirements

The Master of Arts degree in English requires 30 credit hours and the passing of one of the three examination options below. No more than 12 credit hours on the 500 level may be counted toward a degree. An identifiable unifying principle is required for each student's program.

Teaching of English Concentration

This concentration requires:

ENGL 600	Introduction to Research and Criticism (This course is to be taken in student's first fall semester of classes)	3
British Literature before 1800*		3
British Literature after 1800*		3
American Literature*		3
Pedagogy:		
ENGL 555 or ENGL 664	The Teaching of Composition, Grades 6-12 Teaching College Composition	3
ENGL 687	Colloquium for Teachers of English	3
Rhetoric:		
ENGL 760 or ENGL 765	Classical Rhetoric and Theory Building Modern Rhetoric and Theory Building	3
Linguistics		3
Electives		6
Total Credit Hours		30

* For a complete listing of courses to satisfy this specific concentration, see the complete course listing for the MA in Literature.

Additional Requirements

Master of Arts Thesis Option

The opportunity to undertake a long research project or other appropriate project is available to students in the Master of Arts in English. Writing a thesis may be of particular benefit to those who contemplate further graduate work or who have a strong desire to pursue a single topic in great depth. Under the guidance of an advisor (a member of the graduate faculty), the student must earn at least six hours of credit over the course of two semesters (ENGL 698 & ENGL 699) for a completed, approved thesis. The oral defense of the thesis by a student will cover the thesis and its related areas, as well as a comprehensive oral examination of all course work taken during the degree program. Students who fail the oral comprehensive examination may retake the test only once in a different semester. Students who fail a second time will no longer be eligible to receive the Master of Arts in English from Old Dominion University.

Master of Arts Oral Comprehensive Examination Option

During the first three weeks of the semester in which they intend to graduate, students must contact the graduate program director in English to schedule their comprehensive examination. The oral comprehensive examination covers each student's particular program of study; apart from the development or defense of a thesis. Based on the courses taken by the student, the examination tests the student's mastery of materials and concepts, interpretive skills, and ability to make critical distinctions and connections. Students who fail the oral comprehensive examination may retake the test only once in a different semester. Students who fail a second time will no longer be eligible to receive the Master of Arts in English from Old Dominion University.

Master of Arts Portfolio Project Option

Students may choose to develop a portfolio as the capstone project for the MA in English for the technical writing, rhetoric and composition, or teaching of English concentrations. Students choosing the portfolio will propose the scope of their individual projects to the graduate program director and the committee chair. Portfolios are a collection of individual texts with a meta-narrative that explains the connection between these texts and the portfolio's intellectual underpinnings. The entire portfolio should range between 10,000 and 15,000 words. Portfolios can be, but are not limited to, a collection of extensively revised course work, a collection of teaching materials, or a collection of new media texts. To help prepare the portfolio, students will be encouraged to take an independent study for up to 3 credits (ENGL 697) as one of their electives; the student's committee chair should direct this independent study. As with the oral examination, students must contact the graduate program director during the first three weeks of the semester in which they intend to graduate to schedule the defense of their portfolio project. This defense will cover the portfolio and its related areas as well as a comprehensive oral examination of all course work taken during the semester.

Master of Arts English with a Concentration in Technical Writing (MA)

Ruth Osorio, Graduate Program Director
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The Master of Arts program in English presents a full array of opportunities in literary studies, technical writing, rhetoric and composition, and the teaching of English. Our faculty, due to their varied areas of expertise, offer unique learning experiences in areas such as gaming, web design, environmental sustainability, Indigenous studies, digital humanities, and ethnic and gender diversity. Faculty take a hands-on approach to teaching with manageable classroom sizes allowing for personalized instruction and a dynamic culture of learning. Whether you are looking for a professional leg up or simply wish to continue your education, a Master's Degree at ODU promises in-depth exploration of critical discourses that harness the force of language, technology, and literature. The program prepares students for further graduate study in English; for technical writing and editing; for teaching in secondary schools and colleges; for further study in such fields as anthropology, law, psychology, and philosophy; for careers in government and industry; and for other professions requiring analytical, literary, linguistic, digital media, or writing skills.

Admission Information

The student must initially meet all general University admission requirements. For regular admission, students must generally have at least 24 undergraduate hours in English, or a closely related field, with a grade point average of 3.0 or better. However, students applying to the technical writing concentration (see technical writing concentration) may have little or no undergraduate course work relating to English, provided that they have an average of 3.0 or better in their undergraduate major.

Students applying to all concentrations must also, in addition to other admissions materials, provide: a 1-2 page single-spaced statement of purpose outlining the applicant's research interests and goals for the program and past relevant academic and/or work experience that has prepared the applicant for graduate work in English studies and an 8-12 page writing sample that demonstrates the applicant's writing ability, analytical skills, and engagement with scholarly sources.

International students must submit scores from the TOEFL examination, a sample of scholarly writing, and three recommendations, at least one of which evaluates ability in English. For regular admission, students must score 230 on the computer-based TOEFL (the equivalent of 570 in the older, paper-based score scale or 80 on the TOEFL iBT). Students may be admitted provisionally with a TOEFL score of 213 (550 in the paper-based scale), but must attain the scores required for regular admission after 12 hours of graduate work.

Curriculum Requirements

The Master of Arts degree in English requires 30 credit hours and the passing of one of the three examination options below. No more than 12 credit hours on the 500 level may be counted toward a degree. An identifiable unifying principle is required for each student's program.

Technical Writing Concentration

Designed to prepare students to expand and theorize their practices of workplace writing and to prepare students for doctoral work in the field. *This is available on-campus and online.* This concentration requires:

ENGL 539	Writing in Digital Spaces	3
ENGL 685	Writing Research	3
ENGL 706	Visual Rhetoric and Document Design	3
ENGL 715	Technical Communication Theories and Practices	3
Select one of the following:		3
ENGL 760	Classical Rhetoric and Theory Building	
ENGL 765	Modern Rhetoric and Theory Building	
Select one of the following:		3
ENGL 540	General Linguistics	
ENGL 550	American English	
ENGL 577	Language, Gender and Power	
ENGL 595	Topics in English	
ENGL 672	Language Structure Analysis	
Select one of the following:		3
ENGL 664	Teaching College Composition	
ENGL 665	Teaching Writing with Technology	
ENGL 717	Teaching Professional and Technical Writing	
ENGL 720	Pedagogy and Instructional Design	
Select one of the following:		3
ENGL 527	Writing in the Disciplines	
ENGL 535	Management Writing	
ENGL 536	Writing for the Government	
ENGL 595	Topics in English	
ENGL 664	Teaching College Composition	
ENGL 665	Teaching Writing with Technology	
ENGL 668	Graduate Internship and Project in Professional Writing	
ENGL 673	Discourse Analysis	
ENGL 695	Topics	
ENGL 697	Portfolio Preparation	
ENGL 701	Texts and Technologies	
ENGL 720	Pedagogy and Instructional Design	
ENGL 734	Theories of Networks	
ENGL 760	Classical Rhetoric and Theory Building	

ENGL 765	Modern Rhetoric and Theory Building
ENGL 770	Research Methods in Language Analysis
ENGL 780	Corpus Use, Research, and Material Design
Six hours of electives	6
Total Credit Hours	30

Additional Requirements

Master of Arts Thesis Option

The opportunity to undertake a long research project or other appropriate project is available to students in the Master of Arts in English. Writing a thesis may be of particular benefit to those who contemplate further graduate work or who have a strong desire to pursue a single topic in great depth. Under the guidance of an advisor (a member of the graduate faculty), the student must earn at least six hours of credit over the course of two semesters (ENGL 698 & ENGL 699) for a completed, approved thesis. The oral defense of the thesis by a student will cover the thesis and its related areas, as well as a comprehensive oral examination of all course work taken during the degree program. Students who fail the oral comprehensive examination may retake the test only once in a different semester. Students who fail a second time will no longer be eligible to receive the Master of Arts in English from Old Dominion University.

Master of Arts Oral Comprehensive Examination Option

During the first three weeks of the semester in which they intend to graduate, students must contact the graduate program director in English to schedule their comprehensive examination. The oral comprehensive examination covers each student's particular program of study; apart from the development or defense of a thesis. Based on the courses taken by the student, the examination tests the student's mastery of materials and concepts, interpretive skills, and ability to make critical distinctions and connections. Students who fail the oral comprehensive examination may retake the test only once in a different semester. Students who fail a second time will no longer be eligible to receive the Master of Arts in English from Old Dominion University.

Master of Arts Portfolio Project Option

Students may choose to develop a portfolio as the capstone project for the MA in English for the technical writing, rhetoric and composition, or teaching of English concentrations. Students choosing the portfolio will propose the scope of their individual projects to the graduate program director and the committee chair. Portfolios are a collection of individual texts with a meta-narrative that explains the connection between these texts and the portfolio's intellectual underpinnings. The entire portfolio should range between 10,000 and 15,000 words. Portfolios can be, but are not limited to, a collection of extensively revised course work, a collection of teaching materials, or a collection of new media texts. To help prepare the portfolio, students will be encouraged to take an independent study for up to 3 credits (ENGL 697) as one of their electives; the student's committee chair should direct this independent study. As with the oral examination, students must contact the graduate program director during the first three weeks of the semester in which they intend to graduate to schedule the defense of their portfolio project. This defense will cover the portfolio and its related areas as well as a comprehensive oral examination of all course work taken during the semester.

Doctor of Philosophy English (PhD)

Julia Romberger, Graduate Program Director
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The PhD in English is an innovative program that integrates writing, rhetoric, discourse, technology, literary, and textual studies. Offering opportunities for creative reinterpretation of these areas within the field of English, the program emphasizes research that examines texts in a variety of overlapping and sometimes competing language-based worlds. Our focus is

on how the creation and reception of texts and media are affected by form, purpose, technology of composition, audience, cultural location, social practices, and communities of discourse. Students may pursue full- or part-time study through a combination of on-campus and online. There are four concentrations:

- 1. Writing, Rhetoric, and Discourse Studies
- 2. Literary and Cultural Studies
- 3. Technology and Media Studies
- 4. Student Designed Concentration (must be approved by the graduate program director)

Each concentration prepares students for academic careers, as well as other careers in which reading and writing figure prominently; the program also helps students professionalize within their current careers.

Admission Information

Applications are accepted for entrance in fall semester only and all documents must be submitted no later than January 15. All required forms and documents should be sent directly to the Office of Graduate Admissions. Applications packets are available online at the Office of Graduate Admissions website. The following should be submitted along with the appropriate applications forms: 1) a 1500-word statement of the applicant’s research interests, academic and professional goals and discussion of how the PhD in English will contribute to the achievement of those goals; 2) three letters of reference from sources capable of commenting on the applicant’s readiness for advanced graduate study in English; 3) a 15-20 double-spaced-page writing sample demonstrating applicant’s scholarly abilities; and 4) a résumé or curriculum vitae.

Admission standards include the following, which are required, unless otherwise stated: 1) A completed master’s degree (or its equivalent) in English or in an appropriate field (such as rhetoric, composition, English education, communications, journalism, linguistics, philosophy, or science and technology studies) from a regionally accredited institution of higher education; 2) A minimum grade point average (GPA) of 3.5 (on a 4.0 scale) overall for the master’s degree. For students whose first language is not English, a current score for the Test of English as a Foreign Language (TOEFL) of at least 600 on the paper version, 250 on the computer-based version, or 80 on the iBT version. Students without at least some significant background in an English-related field are encouraged to take master’s level coursework in English before applying. Applicants may be contacted for additional information.

Curriculum Requirements

The Doctor of Philosophy degree in English requires 48 credit hours (39 credit hours of course work and 9 credit hours of dissertation), completion of a research competency, and the passing of a candidacy examination and an oral defense of the dissertation. An identifiable unifying principle is required for each student’s program.

ENGL 810	Major Debates in English Studies	3
ENGL 840	Empirical Research Methods and Project Design	3
ENGL 892	Dissertation Seminar	3
Concentration 1 *		9
Concentration 2 *		9
Electives **		12
ENGL 899	Dissertation	9
Total Credit Hours		48

* Students are allowed to take only one ENGL 897 per emphasis with a total of two different sections of English 897 for the entire course of study.

** Students are allowed to take one course at the 600-level towards their course of study. The remaining four courses are electives, which may include additional courses in the student’s chosen concentrations, course in other concentrations, or other 800-level courses from other

programs. Students are encouraged to select electives that contribute to defining a coherent area of specialization or subfield. Note: Students and advisors should select a pedagogy course when students’ previous work experience or course work does not prepare them for instructional activities related to their field.

Concentrations

(18 credit hours)

Students will choose two nine-hour concentrations from those described below. NOTES:

- 1. Some courses appear in multiple concentrations, but the same course cannot be counted toward the required nine hours in multiple concentrations. (No “double-dipping” is allowed.)
- 2. A concentration is defined by a minimum of three courses, but students are free to select additional courses from their concentration areas as electives (see below, ELECTIVES).
- 3. Students who choose the “Student-Designed Concentration” as one of their two concentrations MUST follow the process for defining it specified in the description below in order for courses they take to constitute a concentration.
- 4. Students may count only one “Student-Designed Concentration” toward the requirement to complete two concentrations. That is, all students must select as least one of the pre-defined disciplinary concentrations, but all students may also design their own concentrations according to the process stipulated below.

Literary and Cultural Studies Concentration

The Literary and Cultural Studies concentration will teach students to apply a range of methodologies to the study of literature and other textually informed cultural practices. By the conclusion of their studies in this concentration, students will be proficient in interpreting texts and cultural practices by critically employing methodologies that include:

- Theories of Form, such as the technical protocols of scholarly editing and the physical description of manuscript and printed texts.
- Critical Theories such as New Historicism, Feminism, Queer Theory, and Poststructuralism.
- Cultural Theories such as Critical Race Theory, Disability Studies, New Materialism, Mass/Popular Culture Theory, Posthumanism, and Postcolonial and Decolonial Studies.

Select three of the following: 9

ENGL 801	Texts and Technologies
ENGL 803	Technologies of the Book
ENGL 805	Discourse and Rhetoric Across Cultures
ENGL 822	Multilingualism and Writing Instruction
ENGL 825	Scholarly Editing and Textual Scholarship
ENGL 826	The British Periodical Press
ENGL 827	London Calling: 20th and 21st Century British Literature
ENGL 828	Eighteenth Century British Literature
ENGL 830	The Digital Humanities
ENGL 832	Digital Activisms
ENGL 835	Postcolonial Literature and Theory
ENGL 836	(Against) World Literature
ENGL 837	Narratology
ENGL 841	Nineteenth Century British Literature
ENGL 851	American Literature to 1810
ENGL 853	Queer of Color Critique
ENGL 854	Cultural Studies
ENGL 855	Critical Race Theory

ENGL 856	Pocahontas Unplugged: Jamestown, Pocahontas and the Forging of American Identity
ENGL 857	American Literature 1810-1870
ENGL 858	American Literature 1870-1945
ENGL 864	Theories of Literature
ENGL 890	Seminar in Textual Studies
ENGL 891	Seminar in Literary Studies
ENGL 895	Topics (when appropriate for emphasis)

Total Credit Hours 9

Rhetoric, Writing, and Discourse Studies Concentration

This concentration prepares students for placement and advancement in careers centered on the history and theory of rhetoric, composition studies, technical communication, writing program administration, workplace studies, and/or rhetorical and linguistic approaches to discourse and culture.

It emphasizes how communications are composed, constructed, and produced as well as how they affect (inter) personal, social, cultural, and political situations. Possible areas of inquiry include:

- Institutional assessment procedures for writing and critical thinking.
- Writing practices and language use in a variety of educational, public, professional, scientific, and workplace settings.
- The influence of institutional, cultural, and disciplinary assumptions about language and language users upon rhetorical and linguistic choices.
- The rhetorical constraints and strategies of underrepresented groups.
- The historical development of rhetoric and composition and professional and technical communication in terms of theory, practice, and instruction.

Select three of the following: 9

ENGL 805	Discourse and Rhetoric Across Cultures
ENGL 806	Visual Rhetoric and Document Design
ENGL 815	Technical Communication Theories and Practices
ENGL 817	Teaching Professional and Technical Writing
ENGL 820	Pedagogy and Instructional Design
ENGL 821	Compositions as Applied Rhetoric
ENGL 822	Multilingualism and Writing Instruction
ENGL 824	Online Writing Instruction
ENGL 834	Theories of Networks
ENGL 860	Classical Rhetoric and Theory Building
ENGL 863	Seminar in Discourse Analysis
ENGL 865	Modern Rhetoric and Theory Building
ENGL 870	Research Methods in Language Analysis
ENGL 875	Seminar in English Studies - Pedagogy and Curriculum Design
ENGL 878	Seminar in Sociolinguistics
ENGL 880	Corpus Use, Research, and Material Design
ENGL 883	Seminar in Professional Writing
ENGL 893	Seminar in Rhetoric
ENGL 895	Topics (when appropriate for this emphasis)

Total Credit Hours 9

Technology and Media Studies Concentration

The study of technology as a political, cultural, economic, systematic, and aesthetic force is a crucial area of analysis in contemporary scholarship. This concentration prepares students for interdisciplinary work with a focus on domains of technological complexity with foundations in the materiality of rhetorical work. A major tenet of this concentration is that in addition to studying issues of technology, society, communication, and media design, we also develop practical solutions for the situations we confront. This concentration prepares students for both academic and industry positions

where they can use their skills as researchers and strategists. Possible areas of research and application include:

- Ethical, social, and political dimensions of information, technology, and networked communication
- Copyright and intellectual property, including the legal implications of technological regulation and change
- Privacy issues in information technologies and media
- Implications of digital methods in the humanities
- Design and development of digital humanities tools
- Technologically mediated communication such as experience design, usability studies, and information architecture
- Visual and participatory cultures

Select three of the following: 9

ENGL 801	Texts and Technologies
ENGL 803	Technologies of the Book
ENGL 806	Visual Rhetoric and Document Design
ENGL 815	Technical Communication Theories and Practices
ENGL 824	Online Writing Instruction
ENGL 830	The Digital Humanities
ENGL 832	Digital Activisms
ENGL 834	Theories of Networks
ENGL 866	New Media Theory and Practice I
ENGL 871	New Media Theory and Practice II
ENGL 880	Corpus Use, Research, and Material Design
ENGL 894	Seminar in New Media
ENGL 895	Topics (when appropriate to emphasis)

Total Credit Hours 9

Student Designed Concentration

A student-designed concentration is a coherent cluster of at least three courses that are not included in the other concentration chosen by the student. The courses selected must define a cross-curricular focus that is clearly different from the foci of the predefined disciplinary concentrations listed above and may include classes from other units in the College or across the University. Students should construct concentrations under the guidance of an advisor, with advice from other mentors as needed. Students must submit a proposal for the concentration that includes a title, a description of the focus, and a tentative or exemplary selection of at least three courses. Both the advisor and the GPD must approve the proposal and place a signed approval letter in the student's advising file. Because course offerings may change, a final description of the concentration (including a title, a description of the focus, and a justification of how courses taken support the focus) must be approved by the student's advisor (in a signed letter) and submitted with the letter to the GPD before the student enrolls in Dissertation Seminar.

Additional Requirements

Dissertation Seminar

(3 credit hours)

Taken in the semester of the student's candidacy examination, this course (ENGL 892) supports students in preparing their dissertation prospectus. It sets up writing groups for cohorts of students entering the dissertation stage of their graduate studies.

Dissertation Credits

(minimum of 9 credit hours)

A dissertation is required of all PhD students. A dissertation prospectus will be submitted after the student's successful completion of the candidacy exam. If the student's proposed dissertation committee approves the prospectus, the student will proceed to research and write the dissertation (ENGL 899). An oral defense of the dissertation will be scheduled after a

draft of the completed dissertation is approved by the student's dissertation committee.

Research Competency

Because the PhD is a research degree, all students are expected to present evidence of mastery of a basic research competency over and above the usual course work. Students select one of the following three options to meet this requirement:

Foreign Language

To enter candidacy for the doctoral degree, students may present evidence of mastery of a foreign language equivalent to second-year undergraduate facility. This can be done by transcript, by demonstration of native language proficiency (for those who speak English as a second language), by taking coursework at Old Dominion or elsewhere equivalent to second-year language facility (at Old Dominion University, through language courses numbered 202), by passing a standardized test at the appropriate level, or by passing an examination administered by the Department of Foreign Languages geared to second-year language mastery. A grade of B or above in both semesters of second-year instruction will demonstrate competency in that language. Evidence of completion of the foreign language requirement should be presented to the GPD as soon as possible in the student's career and certainly before enrolling in the Dissertation Seminar.

New Media Application

Students may choose the option of presenting evidence of mastery of computer and new media applications beyond the usual knowledge of word processing, spread sheets, projection applications (e.g., PowerPoint), portable document format (pdf), and similar, common applications and software. This would include programming languages such as:

- C, C++, or C#
- Java or JavaScript
- Go
- PHP
- Python
- Ruby
- Scala
- Shell
- TypeScript

In lieu of standardized examinations to test such knowledge, students choosing this option must submit a multimodal digital project in which demonstration of one of the allowed programming languages is paramount. The project should include:

- a project proposal for approval,
- a project log,
- 3 versions (revisions) of a portfolio of self-produced material,
- a statement of which applications or programs one is presenting and level of expertise,
- and, if needed, a demonstration of facility before members of the PhD Advisory Council, which shall have final say on whether the option has been satisfied.

Projects should be multimodal and interactive. As with seeking credit in a foreign language, students should submit evidence of completion of the requirement to the GPD as soon as possible in their careers and certainly before enrolling in the Dissertation Seminar.

Statistics

Students whose research requires advanced knowledge of quantitative research design and statistics may show mastery of statistical methods through the following:

- Successful completion of one graduate-level course in statistics with a grade of B or higher (courses completed as part of the student's master's degree may count for this requirement). Courses offered at ODU that may fulfill this requirement include:

- STAT 613
- FOUN 722

OR

- Successful completion of two undergraduate-level courses in quantitative research design and statistics with a grade of B or higher in both courses.

AND

- Providing evidence to the GPD that they designed and completed a project using statistical methods (e.g., a course project, conference paper, or journal article).

Candidacy Exams

After students have completed all course requirements and research requirements, they must pass a written and an oral examination related to their chosen field. Students who fail either exam will not be allowed to submit their dissertation proposal or to begin work on their dissertation.

Grade Requirements

All PhD students will be graded on the traditional A, B, C, F scale (with pluses and minuses) in all courses. Pass/Fail evaluations will be used only in the case of registration for internships or for thesis or dissertation research, or when specifically approved by the director. Graduate students whose grade point averages fall below 3.00 (B) will be placed on a probationary status. After two consecutive semesters below this average or the accumulation of two grades of "C" or below, the graduate program director may dismiss the student from the doctoral program.

Time Limit and Continuance

Students will be required to complete and successfully defend a dissertation prospectus two years after the student passes the Dissertation Seminar, ENGL 892. Students who take/pass the candidacy exam the spring after ENGL 892 will have two years from the last day of the exam. Students, however, can appeal for an extension by submitting to the PhD GPD 1) a letter that explains the reasons for needing an extension, the length of the extension, and what the student will do during this time to complete and successfully defend the prospectus, and 2) a letter from the dissertation director supporting or dismissing the appeal. The PhD program will consider the student's appeal and make a decision. If the program does not accept the appeal, the student may be dismissed; this decision is final. If the student does not complete the work according to the approved plan, the student will be dismissed from the program.

Similarly, students will be required to complete, successfully defend, and deposit a dissertation eight years after entering the program. Students, however, can appeal for an extension. For this form to be approved, students will need to submit to the PhD GPD 1) a letter that explains the reasons for needing an extension, the length of the extension, and what the student will do during this time to complete, successfully defend, and deposit the dissertation and 2) a letter from the dissertation director supporting or dismissing the appeal. The PhD program will consider the student's appeal and make a decision. If the PhD program does not accept the appeal, the student may be dismissed; this decision is final. If the appeal is approved, the student will need to re-validate courses that had been taken eight years prior in accordance with ODU policy and this should be reflected in the student's proposed plan. If the student does not complete the work according to the approved plan, the student may be dismissed from the program.

Transfer Credit

Twelve graduate hours not used to fulfill the requirements of a degree at other institutions or at Old Dominion University may be applied toward the fulfillment of degree requirements. Transfer credit is accepted as degree credit at the discretion of the graduate program director.

Financial Aid

Full-time students are eligible to apply for university fellowships and teaching and research assistantships, which are awarded on a competitive basis.

For more information relating to this program and its requirements, please visit website (<https://odu.edu/englishdept/graduate/phd-english/>).

Certificate Literature Certificate

Easily completed in one calendar year, this certificate gives students who already hold at least a master's degree in a different field the 18 hours of graduate study in literature that are the minimum requirement for teaching that subject at the post-secondary level in Virginia.

Curriculum Requirements

British Literature before 1800	3
British Literature after 1800 *	3
American Literature	3
Electives in Literature **	9
Total Credit Hours	18

* Or Post-colonial Literature and Theory.
** which may include ENGL 600 and ENGL 764.

NOTE: at least nine of the 18 hours must be at the 600-level.

Certificate Professional Writing Certificate

Easily completed in 12-16 months, this certificate is designed for:

- professionals who want to supplement their degrees and stay updated on the most recent scholarship in the field
- students interested in graduate education but wanting to start a bit smaller (note: courses can be applied toward an MA or PhD after the completion of the certificate)
- anyone looking to sharpen their writing and communication skills

To apply for the certificate, contact the coordinator of Technical and Professional Writing.

Daniel P. Richards, Certificate Coordinator
dprichar@odu.edu

Curriculum Requirements

Select four of the following:	12
ENGL 527	Writing in the Disciplines
ENGL 535	Management Writing
ENGL 536	Writing for the Government
ENGL 539	Writing in Digital Spaces
ENGL 590	Professionalization in English
ENGL 595	Topics in English (if relevant to the field of professional writing)
ENGL 668	Graduate Internship and Project in Professional Writing
ENGL 715	Technical Communication Theories and Practices
ENGL 717	Teaching Professional and Technical Writing
ENGL 760	Classical Rhetoric and Theory Building
ENGL 765	Modern Rhetoric and Theory Building
Total Credit Hours	12

Certificate Teaching English to Speakers of other Languages (TESOL) Certificate

This certificate would be of interest to students who want to teach English to speakers of other languages. There are two concentrations for this certificate. The first one is the Adult Learner concentration which can be used for teaching English to adult learners or for teaching English as an additional language abroad. The second concentration is designed for teachers in K-12 who may want to pursue an added endorsement in ESL. Each concentration is a total of 15 credit hours, with the option of being completed online or traditionally.

Curriculum Requirements

Core Course		
ENGL 679	First and Second Language Acquisition	3
Concentrations		
Select one of the following:		12
<i>Adult Learner Concentration</i>		
ENGL 540 or ENGL 672	General Linguistics Language Structure Analysis	
ENGL 670 or TLED 775	Methods and Materials in TESOL English Language Learners in the PK-12 Classroom	
ENGL 675 or ENGL 722/822	Practicum in TESOL Multilingualism and Writing Instruction	
ENGL 677 or ENGL 705/805	Language and Communication Across Cultures Discourse and Rhetoric Across Cultures	
<i>Post-Baccalaureate K-12 Endorsement Concentration</i>		
READ 619	Word Study, Phonics, and Linguistics	
READ 622	Culturally Responsive Literacy for All Learners	
READ 686	Advanced Language Development and Reading	
TLED 775	English Language Learners in the PK-12 Classroom	
Total Credit Hours		15

The certificate may be taken independently of the degree, but students must be either admitted to the graduate program or as non-degree graduate certificate seeking students. A maximum of 6 semester hours of graduate credit may be transferred into the TESOL certificate program.

Certificate Teaching of Writing Certificate

Easily completed in one calendar year, this certificate gives students who already hold at least a master's degree in a different field the 18 hours of graduate study in the teaching of writing that are the minimum requirement for teaching that subject at the post-secondary level in Virginia.

Curriculum Requirements

Pedagogy:		
ENGL 664	Teaching College Composition	3
Rhetoric:		3
Select one of the following:		3
ENGL 686	Introduction to Rhetoric and Writing Studies	
ENGL 760	Classical Rhetoric and Theory Building	

ENGL 765	Modern Rhetoric and Theory Building	
Technology:		
Select one of the following:		3
ENGL 539	Writing in Digital Spaces	
ENGL 665	Teaching Writing with Technology	
ENGL 717	Teaching Professional and Technical Writing	
Language:		
Select one of the following:		3
ENGL 540	General Linguistics (Language)	
ENGL 542	English Grammar	
ENGL 550	American English	
ENGL 577	Language, Gender and Power	
ENGL 722	Multilingualism and Writing Instruction	
English electives in Rhetoric, Professional Writing, Journalism, Linguistics, or Creative Writing		6
Total Credit Hours		21

NOTE: At least nine of the 18 hours must be at the 600-level.

Department of History

Web Site: <http://www.odu.edu/historydept> (<http://www.odu.edu/historydept/>)

Ingo Heidbrink, Chair

8000 Batten Arts and Letters Building

757-683-3949

The Department of History offers two programs: the Master of Arts in History and a Graduate Certificate in Maritime History.

The Master of Arts degree that prepares competent graduates for modern careers in business, government, teaching, non-profit work, and further graduate study in history, law, library science, or business. The program offers an introduction to the major debates and cutting-edge topics in the field while also providing education in most regions and periods in global history.

The Graduate Certificate in Maritime History is designed to provide history graduate students the opportunity to develop a special emphasis in maritime history as part of their graduate education. Students earn certification following the successful completion of twelve hours of maritime history.

Programs

Master of Arts Program

- History (MA) (p. 86)

Certificate

- Maritime History Certificate (p. 87)

Master of Arts History (MA)

Web Site: <https://ww1.odu.edu/historydept/graduate> (<https://ww1.odu.edu/historydept/graduate/>)

For details, contact the Graduate Program Director
Email Address: graduatehistory@odu.edu

The Department of History offers a Master of Arts degree that prepares competent graduates for modern careers in business, government, teaching, non-profit work, and further graduate study in history, law, library science, or business. The program offers an introduction to the major debates and cutting-edge topics in the field while also providing education in most regions and periods in global history.

Students select from a broad variety of courses with the ability to emphasize a particular geographic region or time period through electives. Completion of the degree requires choosing from one of three options: examinations to ensure mastery in the field, a written thesis to demonstrate the student's research expertise, or a portfolio of projects to prepare for a future career in history. The degree requires a minimum of 30 credit hours.

The Department's academic offerings reflect the diversity of the faculty. Students are encouraged to sample the course offerings that investigate the histories of societies and cultures from across the globe. The M.A. program offers many varied options to expand one's horizons beyond the required number of classroom courses, including individualized independent studies on focused topics, original thesis research, and practical hands-on work experience.

Admissions

Applicants must meet all University requirements and regulations for admission. Applications must include a short essay of 500 words or less addressing academic interests and goals and two letters of recommendation attesting to academic achievement and potential. A writing sample of 10 or more pages, preferably showing an applicant's work with primary sources, is also required.

An undergraduate major or minor in history is desirable but is not required for admission. Generally, 24 semester credit hours in history and closely related cognates are required for regular admission. Applicants with 18 semester credit hours may be considered for admission on a provisional basis. These credit hours should include survey and upper-level courses. The Graduate Program Director may prescribe certain undergraduate courses to be completed before recommending admission to the program. Under certain circumstances, students can be admitted to graduate courses while simultaneously completing an undergraduate prerequisite.

The requirement for admission to full standing (regular status) is 24 semester credit hours with a grade point average (GPA) of at least 3.00 in history and a general GPA of 3.00. Provisional admission requires a minimum of 18 credits (as described above) with a GPA of 3.00 in history and a GPA of 2.70. Students with averages below these minimums can attempt to improve their standing in undergraduate courses approved by the Graduate Program Director. However, they cannot be admitted to graduate courses until they have achieved acceptable averages in history. Applicants who are denied admission to the M.A. program in history are not permitted to enroll in history graduate courses as non-degree students.

Prospective applicants with questions about their admission credentials and preparedness should contact the Graduate Program Director in the Department of History. Those certain of their qualifications should apply through the Office of Admissions.

Admissions forms should reach Old Dominion University well in advance of the intended term of entry, but no later than November 1 for spring admission and June 1 for fall. All required forms and documents must be sent directly to the Admissions Office, which creates a central file for each applicant. Those seeking a graduate assistantship should file the Application for Institutional Graduate Financial Assistance (available from the Office of Graduate Admissions) and send a letter of application for fellowship consideration to the Graduate Program Director.

Graduate Financial Aid

Old Dominion University offers financial assistance to qualified graduate students. Types of aid include research and teaching assistantships, fellowships, grants, scholarships, and part-time employment. Nearly all forms of aid require that the student be engaged in full-time graduate study or nine semester credit hours.

Fellowships, assistantships, tuition grants, and small research grants may be available. Departmental funds may affect fellowship and assistantship amounts. The establishment of student need and academic promise also affect some grant amounts. The application deadline is February 15. International students must pass the SPEAK test (or an equivalent) of spoken English to become eligible for teaching assistantships.

Curriculum Requirements

Three courses of study are available. The examination option is a 30-credit program capped by written comprehensive examinations in two general fields and an oral examination. The thesis option is a 30-credit program capped by a thesis for which students earn six credits (HIST 698-HIST 699) on a pass/fail basis, and an oral defense. The portfolio option is a 30-credit program capped by two portfolio components and an oral defense. Completion of any of the three options leads to an M.A. in history.

All candidates for the M.A. in history must meet the general graduate degree requirements established for the University. In addition, all students must complete HIST 600 during their first year in the program. No more than nine of the required 30 hours may be earned in 500-level courses. Students are permitted a maximum of six credits in other departments offering graduate courses if the work is germane to their historical studies; prior approval of the Graduate Program Director is required. Students who have received two grades of C+ or below will be indefinitely suspended from the program. Those students whose grade point average falls below 3.00 will be subject to the University's probation/suspension policy.

Examination Option

Students pursuing the examination option must take course work as follows:

HIST 600	Historical Theory and Practice	3
Electives *		
American History		6
Non-American History		6
Other Electives		12
HIST 675	M.A. Exam Preparation and Research	3
Total Credit Hours		30

* Elective courses can be at the 500, 600, or 700 level.

Students choose two fields of concentration for the Examination Option, which will conform to the expertise of two of the three committee members who constitute the student's exam committee. The fields can be tailored to the geographical areas, topical interests, or other fields of study in consultation with the exam committee.

Students pursuing the examination option must complete HIST 675 during their last year in the program. Written comprehensive field examinations may be taken in conjunction with HIST 675. The two field exams are taken during a department designated time each Fall and Spring semester. Within a two-week period following the successful completion of written exams, the student will take a two-hour oral examination. Exams are individualized by the student's examining committee but competence in the entire field is essential. Examinations are completed no later than 30 days before the end of a semester, and thus are normally scheduled in April and November. A field exam is judged in its entirety and is rated Pass or Fail by the examining committee; the same is true of the oral examination. Students who fail an exam can be re-examined in the next scheduled round of exams. Only one re-examination is permitted.

Thesis Option

Students pursuing the thesis option must take course work as follows:

HIST 600	Historical Theory and Practice	3
Electives *		
American History		6
Non-American History		6
Other Electives		9
HIST 698	Thesis	3
HIST 699	Thesis	3-9
Total Credit Hours		30-36

* Elective courses can be at the 500, 600, or 700 level.

The thesis option will be recommended for those students who have maintained a high GPA and have the support of a faculty thesis advisor. The master's thesis is written under the direction of the thesis advisor selected by the candidate in consultation with the Graduate Program Director. The thesis is reviewed and the candidate examined by a faculty committee chaired by the thesis advisor. The thesis defense—normally a two-hour oral examination—focuses on the thesis, the historical context, and related aspects of the student's concentration. Final approval of the thesis is the responsibility of the thesis advisor, the Graduate Program Director, and ultimately of the dean of the College of Arts and Letters, who certify the candidate for graduation.

Portfolio Option

Students pursuing the portfolio option must take course work as follows:

HIST 600	Historical Theory and Practice	3
Electives*		
American History		6
Non-American History		6
Other Electives		12
HIST 677	Portfolio Option Preparation	3
Total Credit Hours		30

* Elective courses can be at the 500, 600, or 700 level.

Students choose two components for the Portfolio Option: one or two research papers, a single examination field, a teaching preparation component, or a public history project. The portfolio is reviewed and the candidate examined by a faculty committee composed of three faculty members, each of whose fields of expertise relate to components of the portfolio. The defense of the portfolio is scheduled during a department-designated time each Fall and Spring semester, normally scheduled in November and April.

Students pursuing the portfolio option must complete HIST 677 during their last year in the program. Students may submit their materials and/or sit for the oral defense for the components in conjunction with HIST 677. The portfolio is judged in its entirety and is rated Pass or Fail by the examining committee. Students who fail the oral defense can defend again in the next scheduled period. Only one additional defense is permitted.

Certificate Maritime History Certificate

The Department of History offers a Graduate Certificate in Maritime History. The certificate program is open to current MA candidates, students already possessing an MA in History, or other graduate students who seek to complete the certificate alone. Current MA candidates should apply to the Graduate Program Director for permission to pursue the course of study for the certificate. Students already possessing an MA in History or graduate students who seek to pursue the certificate should contact the Graduate Program Director in the Department of History to be advised on admissions and applications procedures.

The Graduate Certificate in Maritime History is designed to provide history graduate students the opportunity to develop a special emphasis in maritime history as part of their graduate education. Courses offer perspectives of the history of maritime developments throughout the centuries. The Certificate may be of interest to those who seek to develop expertise in maritime studies, maritime museums, or to enhance their career opportunities in maritime business or interdisciplinary studies of marine communities and environments. The department develops interdisciplinary coursework on historical and contemporary maritime and coastal environments and their many interdependencies: landscapes, seascapes and ports. Topics covered include oceanic and naval history, history of the use of marine resources,

maritime environmental history, and other topics like the history of maritime trade and technology and the trans-atlantic slave trade. These courses explore the past and present of the world's waterways and the human and natural environments of maritime and marine locales, and offers students an introduction to maritime history and its global dynamic.

Curriculum Requirements

HIST 600	Historical Theory and Practice *	3
HIST 668	Internships in History **	3
Electives:		
Select two of the following:		6
HIST 611	The Military in America	
HIST 622	The Atlantic Slave Trade	
HIST 636	The British Empire	
HIST 641	Individual & Society in Ancient Greece	
HIST 647	Studies in Maritime History	
HIST 662	North Atlantic Resources	
HIST 696	Tutorial in Maritime History	
Other 600-level course with a focus on maritime history as approved by the Graduate Program Director		
Total Credit Hours		12

- * Ideally taken in the first semester of enrollment.
- ** Internship must be in a maritime field, as determined by the Graduate Program Director.

For current MA candidates, the certificate will be awarded at the time of graduation on certification of the completion of requirements by the Graduate Program Director in accordance with the policies of the University Registrar. For those already holding the MA in History or other graduate students seeking the certificate, the certificate will be awarded on completion of the 12 hours of required coursework as certified by the Graduate Program Director in accordance with the policies and procedures of the University Registrar.

Students pursuing the Graduate Certificate are subject to all GPA and other requirements and policies of the department, college and university applicable to students pursuing a degree in the MA in History program.

Institute for the Humanities

Web Site: <https://ww1.odu.edu/al/institutes/humanities> (<https://ww1.odu.edu/al/institutes/humanities/>)

Overview

Dr. Anne H. Muraoka, Director
3042 Batten Arts & Letters
Norfolk, VA 23529
757-683-4678
E-mail: amuraoka@odu.edu

The Institute for the Humanities at Old Dominion University offers an interdisciplinary Master of Arts degree in the Humanities. The program allows students to pursue individualized programs of study that incorporate classes from across the College of Arts and Letters. As humanists, we are stewards of the value of the human experience to transform the world and improve the lives of our students.

Programs

- Humanities (MA) (p. 88)

Master of Arts Humanities (MA)

Overview

Dr. Anne H. Muraoka, Director
3042 Batten Arts & Letters
Norfolk, VA 23529
757-683-4678
E-mail: amuraoka@odu.edu

Department website: <https://ww1.odu.edu/al/institutes/humanities> (<https://ww1.odu.edu/al/institutes/humanities/>)

The Master of Arts in Humanities program is interdisciplinary in focus. Students in the Humanities may choose to design a program to meet their own intellectual and professional objectives comprised of graduate-level courses from across the disciplines in the College of Arts and Letters or they may focus within a specific academic discipline. This individualized program of study will encourage critical thinking, independence of thought, solid scholarship, and visionary solutions to real-world issues.

Admission

The Master of Arts in Humanities program is open to all qualified holders of a BA or BS degree and is designed for full-time or part-time students, students who have recently completed their bachelor's degree, as well as nontraditional or adult students. Although admission is selective, the Humanities program recognizes that everyone has unique qualifications that should be taken into consideration.

In addition to meeting general University requirements, an applicant must:

- Possess an overall undergraduate grade point average of 3.25
- Have earned at least 24 credit hours in liberal arts disciplines

To be considered, applicants must:

- Submit an academic writing sample reflecting their ability to do research and write effectively
- Submit two recommendation letters
- Submit a statement of purpose that proposes an interdisciplinary program of study, discusses personal, intellectual and professional goals, and explain the relationship of those goals to the intended program of study

We accept students from all semesters (fall, spring, or summer). There is no deadline to apply (although the student may not be admitted for a semester that is already under way).

All application inquiries should be made to the Office of Graduate Admissions.

Requirements

Once students gain admission to the program, they may pursue the 36-hour thesis option or the capstone project. All students must take HUM 601 (<https://odu-preview.courseleaf.com/search/?P=HUM%20601>), HUM 602 (<https://odu-preview.courseleaf.com/search/?P=HUM%20602>), HUM 603 (<https://odu-preview.courseleaf.com/search/?P=HUM%20603>), HUM 704 (<https://odu-preview.courseleaf.com/search/?P=HUM%20704>), and HUM 698 (<https://odu-preview.courseleaf.com/search/?P=HUM%20698>).

In their final semester and under the direction of their advisor, capstone students must take HUM 693 (<https://odu-preview.courseleaf.com/search/?P=HUM%20693>), and thesis students HUM 699 (<https://odu-preview.courseleaf.com/search/?P=HUM%20699>). In either case, the Director of the Institute for the Humanities will help guide students. Students may only take 12 hours at the 500 level. Students are required to complete their graduate work within a 8-year period.

Curriculum Requirements

All students must take the following five required courses. These courses provide an introduction to humanities research (HUM 601 (<https://odu-preview.courseleaf.com/search/?P=HUM%20601>)), critical methods in humanities (HUM 602 (<https://odu-preview.courseleaf.com/search/?P=HUM%20602>)), guidance in building a strategic professional development plan, interdisciplinary research and teaching (HUM 603 (<https://odu-preview.courseleaf.com/search/?P=HUM%20603>)), familiarity with ongoing debates about the future of the humanities in a digital era (HUM 704 (<https://odu-preview.courseleaf.com/search/?P=HUM%20704>)), and a foundation for each student's individualized program of study by preparing students for their thesis or capstone project (HUM 698 (<https://odu-preview.courseleaf.com/search/?P=HUM%20698>)).

Core Requirements

HUM 601	Introduction to the Humanities	3
HUM 602	Critical Methods in Humanities	3
HUM 603	Strategic Professional Development Pro-Seminar	3
HUM 704	Technology and the Humanities	3
HUM 698	Capstone Project and Thesis Preparation Seminar	3

Electives * 18

Thesis or Thesis Option 3

Non-Thesis Option

HUM 693	Capstone Project	

Thesis Option

HUM 699	Thesis	

Total Credit Hours 36

* Elective courses are chosen under the advisement and approval of the Program Director.

Thesis Option

Students pursuing the thesis must take HUM 699 (<https://odu-preview.courseleaf.com/search/?P=HUM%20699>) Thesis (3 credits) in their final semester. The thesis must be based on original scholarly research and should reflect the interdisciplinary nature of the Humanities degree. Each student will choose a graduate-teaching certified faculty advisor who will chair a thesis committee appointed by the Director of the Institute for the Humanities. The thesis committee will direct and evaluate the student's work and must consist of graduate-teaching certified faculty members from at least two different disciplines in the College of Arts and Letters. Students must circulate the thesis to the thesis committee at least 3-4 weeks prior to the oral defense. Students must submit their thesis for style editing and upload the final thesis to ProQuest based on the College of Arts and Letters submission deadlines.

Non-Thesis Option - Capstone Project

Students pursuing the Capstone Project must take HUM 693 (<https://odu-preview.courseleaf.com/search/?P=HUM%20693>) Capstone Project (3 credits) in their final semester. Students must work with an Old Dominion University graduate-teaching certified faculty advisor who will guide and evaluate their work. It is the responsibility of the student to locate, contact, and gain the commitment of the advisor. The student in collaboration with the advisor and the Director of the Institute for the Humanities will determine the topic to ensure the interdisciplinary and humanistic scope of the project. Capstone projects must include a scholarly component combined with either a creative, experiential community event, or project. The length, content, and direction of the project will be determined by the student in coordination with the faculty advisor and the Director of the Institute for the Humanities. Students must upload their Capstone Projects to ODU Digital Commons.

F. Ludwig Diehn School of Music

2123 Diehn Center for the Performing Arts
757-683-4061

Emily Ondracek-Peterson, Executive Director
Nancy K. Klein, Director/Chair
Douglas T. Owens, Graduate Program Director

The Master of Music Education degree is designed to stress the development of advanced knowledge of broad-based principles and practices in music and music education for application in the public or private school, private studio, or higher education setting. A minimum of 34 semester hours of coursework is required to complete the degree, with the hours distributed according to the area of concentration. Virginia Department of Education teacher licensure is not included with this degree.

Programs

Master of Music Education Programs

- Music Education with a Concentration in Applied Studies (MME) (p. 89)
- Music Education with a Concentration in Pedagogy (MME) (p. 90)
- Music Education with a Concentration in Research (MME) (p. 91)

Certificates

- Music Performance Certificate (p. 91)

Master of Music Education Music Education with a Concentration in Applied Studies (MME)

Douglas T. Owens, Graduate Program Director

The College of Arts and Letters and the F. Ludwig Diehn School of Music offer the Master of Music Education degree with concentrations in Applied Studies (performance, conducting, composition), Research, and Pedagogy. The graduate degree is designed to develop advanced knowledge of broad-based principles and practices in music and music education for application in the public or private school, private studio, or higher education setting. A minimum of 34 semester hours of coursework is required to complete the degree, with the hours distributed according to the area of concentration. Virginia Department of Education teacher licensure is not included with this degree.

Admission

For admission to the Master of Music Education program, each candidate must have earned a bachelor's degree in music and have earned an overall GPA of 3.0 with a 3.0 GPA in the major field of study. Candidates seeking the concentration in Applied Studies are required to complete the music performance audition for selected Diehn School of Music graduate faculty. See the F. Ludwig Diehn School of Music Graduate Admissions page (<https://www.odu.edu/music/admission/graduate/>) for complete information.

Curriculum Requirements

The three areas of concentration for the Master of Music Education degree are:

1. Applied Concentration, requiring 34 hours of coursework and full master's recital in either performance or composition, or various conducting performances with the assigned ensembles;
2. Research Concentration, requiring 34 hours of coursework and a thesis or problems paper;
3. Pedagogy Concentration, requiring 34 semester hours of coursework and a culminating portfolio presentation.

Required credits for each concentration will include core coursework as well as coursework in the Concentration and Cognate/Elective areas.

Before the completion of 12 credits, each candidate must declare a concentration of study. Those admitted to the applied option must pass an applied jury or performance presented before the graduate faculty for continuance review during each semester of study. Students in all concentration areas must pass the graduate music theory placement test prior to or during their studies. **Note:** The graduate music theory placement test is waived for students that earned their undergraduate degree in Music at Old Dominion University. All students must pass the written comprehensive examination near the completion of their studies.

Music Education Core		
MUSC 603	Principles of Music Education	3
MUSC 604	Foundations of Music Education	3
MUSC 600	Introduction to Graduate Research (Taught concurrently with MUSC 630)	1
MUSC 630	Research in Music Education	3
Music Literature - Select one of the following:		3
MUSC 605	Literature of the Wind Ensemble	
MUSC 606	Choral Music Literature	
MUSC 609	Literature of the Orchestra	
Music History - Select one of the following:		3
MUSC 560	History of Jazz	
MUSC 561	History of Recorded Music	
MUSC 562	Hip-Hop Music and Culture	
MUSC 566	Music of the 20th Century to the Present	
MUSC 591	Music History from the Ancient to Baroque Era	
MUSC 592	Music History from the Classical through Modern Era	
Workshop - Select one of the following:		1
MUSC 613	Workshop in Music Education	
MUSC 614	Workshop in Instrumental Music	
MUSC 615	Workshop in Choral Music	
Music Education Core Total Credits:		17
Total Credit Hours for Concentration		17
Total Credit Hours		34

Each concentration will require additional courses in the concentration and from the Cognate/Elective area. The Graduate Program Director will advise each student regarding course selection.

Concentration in Applied Studies

Concentration in Applied Studies		
MUSA 651	Advanced Applied Music	3
MUSA 652	Advanced Applied Music	3
Cognate/Elective Courses *		11
Total Credit Hours		17

* Cognate/Elective courses are to be selected from available graduate music courses or courses approved by the Graduate Program Director.

Master of Music Education Music Education with a Concentration in Pedagogy (MME)

Douglas T. Owens, Graduate Program Director

The College of Arts and Letters and the F. Ludwig Diehn School of Music offer the Master of Music Education degree with concentrations in Applied

Studies (performance, conducting, composition), Research, and Pedagogy. The graduate degree is designed to develop advanced knowledge of broad-based principles and practices in music and music education for application in the public or private school, private studio, or higher education setting. A minimum of 34 semester hours of coursework is required to complete the degree, with the hours distributed according to the area of concentration. Virginia Department of Education teacher licensure is not included with this degree.

Admission

For admission to the Master of Music Education degree program, each candidate must have earned a bachelor's degree in music and have earned an overall GPA of 3.0 with a 3.0 GPA in the major field of study. The music performance audition is not required for the Concentration in Pedagogy. See the F. Ludwig Diehn School of Music Graduate Admissions page (<https://www.odu.edu/music/admission/graduate/>) for complete information.

Curriculum Requirements

The three areas of concentration for the Master of Music Education degree are:

1. Applied Concentration, requiring 34 hours of coursework and full master's recital in either performance or composition, or various conducting performances with the assigned ensembles;
2. Research Concentration, requiring 34 hours of coursework and a thesis or problems paper;
3. Pedagogy Concentration, requiring 34 semester hours of coursework and a culminating portfolio presentation.

Required credits for each concentration will include core coursework as well as coursework in the Concentration and Cognate/Elective areas.

Before the completion of 12 credits, each candidate must declare a concentration of study. Those admitted to the applied option must pass an applied jury or performance presented before the graduate faculty for continuance review during each semester of study. Students in all concentration areas must pass the graduate music theory placement test prior to or during their studies. **Note:** The graduate music theory placement test is waived for students that earned their undergraduate degree in Music at Old Dominion University. All students must pass the written comprehensive examination near the completion of their studies.

Music Education Core		
MUSC 603	Principles of Music Education	3
MUSC 604	Foundations of Music Education	3
MUSC 600	Introduction to Graduate Research (Taught concurrently with MUSC 630)	1
MUSC 630	Research in Music Education	3
Music Literature - Select one of the following:		3
MUSC 605	Literature of the Wind Ensemble	
MUSC 606	Choral Music Literature	
MUSC 609	Literature of the Orchestra	
Music History - Select one of the following:		3
MUSC 560	History of Jazz	
MUSC 561	History of Recorded Music	
MUSC 562	Hip-Hop Music and Culture	
MUSC 566	Music of the 20th Century to the Present	
MUSC 591	Music History from the Ancient to Baroque Era	
MUSC 592	Music History from the Classical through Modern Era	
Workshop - Select one of the following:		1
MUSC 613	Workshop in Music Education	
MUSC 614	Workshop in Instrumental Music	
MUSC 615	Workshop in Choral Music	
Music Education Core Total Credits:		17

Total Credit Hours for Concentration	17
Total Credit Hours	34

Each concentration will require additional courses in the concentration and from the Cognate/Elective area. The Graduate Program Director will advise each student regarding course selection.

Concentration in Pedagogy

Concentration in Pedagogy

MUSC 611	Current Trends in Elementary and Secondary Music	3
MUSC 692	Portfolio	3
Cognate/Elective Courses *		11
Total Credit Hours		17

* Cognate/Elective courses are to be selected from available graduate music courses or courses approved by the Graduate Program Director.

Master of Music Education Music Education with a Concentration in Research (MME)

Douglas T. Owens, Graduate Program Director

The College of Arts and Letters and the F. Ludwig Diehn School of Music offer the Master of Music Education degree with concentrations in Applied Studies (performance, conducting, composition), Research, and Pedagogy. The graduate degree is designed to develop advanced knowledge of broad-based principles and practices in music and music education for application in the public or private school, private studio, or higher education setting. A minimum of 34 semester hours of coursework is required to complete the degree, with the hours distributed according to the area of concentration. Virginia Department of Education teacher licensure is not included with this degree.

Admission

For admission to the Master of Music Education degree program, each candidate must have earned a bachelor's degree in music and have earned an overall GPA of 3.0 with a 3.0 GPA in the major field of study. The Concentration in Research does not require the music performance audition. See the F. Ludwig Diehn School of Music Graduate Admissions page (<https://www.odu.edu/music/admission/graduate/>) for complete information.

Curriculum Requirements

The three areas of concentration for the Master of Music Education degree are:

1. Applied Concentration, requiring 34 hours of coursework and full master's recital in either performance or composition, or various conducting performances with the assigned ensembles;
2. Research Concentration, requiring 34 hours of coursework and a thesis or problems paper;
3. Pedagogy Concentration, requiring 34 semester hours of coursework and a culminating portfolio presentation.

Required credits for each concentration will include core coursework as well as coursework in the Concentration and Cognate/Elective areas.

Before the completion of 12 credits, each candidate must declare a concentration of study. Those admitted to the applied option must pass an applied jury or performance presented before the graduate faculty for continuance review during each semester of study. Students in all concentration areas must pass the graduate music theory placement test prior to or during their studies. **Note:** The graduate music theory placement test is waived for students that earned their undergraduate degree in Music at

Old Dominion University. All students must pass the written comprehensive examination near the completion of their studies.

Music Education Core

MUSC 603	Principles of Music Education	3
MUSC 604	Foundations of Music Education	3
MUSC 600	Introduction to Graduate Research (Taught concurrently with MUSC 630)	1
MUSC 630	Research in Music Education	3

Music Literature - Select one of the following:

MUSC 605	Literature of the Wind Ensemble	3
MUSC 606	Choral Music Literature	3
MUSC 609	Literature of the Orchestra	3

Music History - Select one of the following:

MUSC 560	History of Jazz	3
MUSC 561	History of Recorded Music	3
MUSC 562	Hip-Hop Music and Culture	3
MUSC 566	Music of the 20th Century to the Present	3
MUSC 591	Music History from the Ancient to Baroque Era	3
MUSC 592	Music History from the Classical through Modern Era	3

Workshop - Select one of the following:

MUSC 613	Workshop in Music Education	1
MUSC 614	Workshop in Instrumental Music	1
MUSC 615	Workshop in Choral Music	1

Music Education Core Total Credits:

Total Credit Hours for Concentration

Total Credit Hours

Each concentration will require additional courses in the concentration and from the Cognate/Elective area. The Graduate Program Director will advise each student regarding course selection.

Concentration in Research

Concentration in Research

MUSC 698	Thesis Research	3
MUSC 699	Thesis	3
Cognate/Elective Courses		11
Total Credit Hours		17

* Cognate/Elective courses are to be selected from available graduate music courses or courses approved by the Graduate Program Director.

Certificate

Music Performance Certificate

The Graduate Certificate in Music Performance is a 12-credit program designed to strengthen the performance skills of musicians and music educators. Full-time and part-time students may enroll in the certificate program. Both non-degree seeking students, and degree seeking students may enroll. Degree seeking students may take courses in conjunction with their regular course load.

Degree seeking students can take courses any time during their program. It is anticipated that students who are enrolled full-time can complete the certificate program in one year (two semesters). Students attending part-time, maintaining a course load of three to six credit hours per semester can complete the program in two years (three to four semesters).

Non-degree seeking students who are enrolled full-time can complete the certificate program in one year (two semesters). Students attending part-

time, maintaining a course load of three to six credit hours per semester can complete the program in two years (three to four semesters).

Students have eight years from initial enrollment to complete the coursework for the certificate.

Admission

All students will be required to apply to the certificate program. The admission requirements will be based on enrollment status at ODU. The Graduate Certificate in Music Performance has the following admission requirements:

Non-degree seeking applicants will:

- Possess a graduate degree from an accredited institution with a GPA of 3.0 or better
- Submit a completed online Non-Degree admission application (<https://www.odu.edu/admission/apply/>) and application fee. See the Non-degree admission information (<https://odu.edu/admission/graduate/>) for added details. Include official transcripts of all undergraduate and graduate coursework from regionally accredited institutions.
- Complete the Graduate Performance Audition (<https://odu.edu/music/admission/auditions/graduate/>) juried by the F. Ludwig Diehn School of Music faculty.

Degree seeking applicants will:

- Gain advisor approval before applying to the program
- Submit a completed online application and application fee
- Submit official transcripts of all undergraduate and graduate coursework
- Complete the Graduate Performance Audition (<https://odu.edu/music/admission/auditions/graduate/>) juried by the F. Ludwig Diehn School of Music faculty

In addition, applicants who have earned a graduate degree outside of the United States must submit:

- Current scores on the Test of English as a Foreign Language (TOEFL), with a minimum score of 230 on the computer-based TOEFL or 80 on the TOEFL iBT.
- A sample of scholarly writing.
- Three letters of recommendation describing the candidate's musical experience and level of musicianship from previous applied lesson faculty or other music faculty.

Curriculum Requirements

Required Core Courses

MUSA 651	Advanced Applied Music	3
MUSA 652	Advanced Applied Music	3

Restricted Electives

Select 6 credits of the following: 6

MUSC 614	Workshop in Instrumental Music
MUSC 615	Workshop in Choral Music
MUSC 680	Performing Ensembles
MUSC 692	Portfolio
MUSC 695	Topics in Music
MUSC 697	Independent Study

Additional courses are available upon advising. Contact Graduate Program Director Dr. Douglas T. Owens for additional information.

Total Credit Hours 12

Department of Political Science and Geography

7000 Batten Arts and Letters Building
757-683-3841
Dr. Tom R. Allen, Chair

International Studies

7044 Batten Arts and Letters
757-683-5700
Dr. Regina Karp, Graduate Program Director

Old Dominion University offers MA and PhD degrees in international studies through the Graduate Program in International Studies (GPIS).

GPIS is an interdisciplinary unit, offering advanced research and graduate training in global problems and transnational issues. Fields of concentration include Comparative Cultural and Political Studies, Conflict and Cooperation, International Political Economy and Development, Modeling and Simulation, Strategic Leadership, and US Foreign Policy and International Relations.

Graduate Certificates

Working with other units across campus, GPIS offers interdisciplinary graduate certificates in International Development, Women's Studies, Global Health, and Modeling & Simulation. Each certificate can be earned with 12 credit hours and can be pursued independently or in conjunction with a MA or PhD. Certificates provide practical skills and insight into the organization and operation of specific challenges associated with the implementation and delivery of the products studied within each certificate.

Additional Information

Please see the GPIS Handbook and website at <http://www.odu.edu/gpis> (<http://www.odu.edu/gpis/>). For other issues concerning GPIS, please contact:

Graduate Program in International Studies (GPIS)
7044 Batten Arts and Letters Building
Old Dominion University
Norfolk, VA 23529-0086, USA
Telephone: 757-683-5700
Fax: 757-683-4763
E-mail: isgpd@odu.edu

Geography

7000 Batten Arts and Letters
757-683-3841
Dr. Jennifer Whytlaw, Geography Graduate Certificate Program Director

Graduate Certificates

The Geography program offers a graduate certificate in Geographic Information Science. The graduate certificate in Geographic Information Science provides knowledge and tools for students and professionals pursuing careers in geographic information systems (GIS) and related spatial technologies. The certificate can be earned with 18 credit hours and can be pursued independently or in conjunction with a graduate degree program.

As well, in conjunction with the Department of Earth and Ocean Sciences, the Geography program offers a graduate certificate in the Spatial Analysis of Coastal Environments. The certificate in Spatial Analysis of Coastal Environments provides an interdisciplinary program for students wishing to pursue careers in coastal management or research, remote sensing, or geographic information system (GIS) applications. The certificate can be earned with 15 credit hours and can be pursued independently or in conjunction with a graduate degree program.

Additional Information

For additional information, please see the website <https://ww1.odu.edu/pols-geog.html> or contact:
Department of Political Science and Geography
Old Dominion University
Norfolk, VA 23529-0088
Telephone: 757-683-3841

Programs

Doctor of Philosophy Programs

- International Studies (PhD) (p. 95)

Master of Arts Programs

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Certificate Programs

- Geographic Information Science Certificate (p. 98)
- International Development Certificate (p. 99)
- Modeling and Simulation - International Studies Certificate (p. 99)
- Spatial Analysis of Coastal Environments Certificate (p. 99)

Master of Arts International Studies (MA)

GPIS is an interdisciplinary unit, offering advanced research and graduate training in global problems and transnational issues. Fields of concentration include Comparative Cultural and Political Studies, Conflict and Cooperation, International Political Economy and Development, Modeling and Simulation, Strategic Leadership, and US Foreign Policy.

Dr. Regina Karp
Graduate Program Director
7044 Batten Arts & Letters
757-683-5700

Graduate Program in International Studies (<https://www.odu.edu/intlstudies/gpis.html.html>)

Admission Requirements

1. All candidates for admission into the MA must submit Graduate Record Examination (GRE) scores.
2. Official transcripts of all undergraduate or prior graduate course work submitted directly by all universities attended.
3. An essay of not more than 500 words describing interest in and capacity for advanced training in global/transnational issues.
4. One example of writing or research (a paper submitted to a seminar, a publication or report, or another comparable example).
5. Two letters of recommendation addressing the candidate's capacity to undertake graduate work on international global issues.

Any prior graduate course work taken at Old Dominion University (e.g., in nondegree status) or at another institution can be counted toward the MA degree only in accordance with the provisions governing transfer of credit and the director's approval.

Admission Standards

1. All applicants to the MA program must hold a baccalaureate degree or equivalent.
2. Candidates for the MA must attain a 3.00 cumulative GPA in all undergraduate courses. A GRE score of 146 Quantitative, and 156 Verbal is normally expected. (1100 Old Score).
3. Individuals whose native language is not English must submit a score of 230 on the computer-based TOEFL (the equivalent of 570 in the older, paper-based score scale) or 80 on the TOEFL iBT.

Application Deadline, MA

GPIS admits students for fall and spring semesters. We prefer applications to reach us by February 15 and October 15. Applications outside these timelines will be considered on a case-by-case basis. With the permission of the GPIS Director, individuals who want to begin graduate work but do not intend to finish their degree with GPIS or individuals who want to join GPIS at a later date, may be considered for taking graduate courses on a non-degree basis. GPIS offers a number of doctoral and master's graduate assistantships and awards them on the basis of availability and

competitiveness. Applicants who want to be considered for a graduate assistantship are advised to submit their application by the above deadlines.

Curriculum Requirements

Credits for the MA

The MA requires 33 credits, of which at least 27 must be at the 600 level or above. The required course work for all MA students includes IS 600 Research Methods in International Studies, but does not include any courses needed for demonstrating foreign language competency. MA candidates writing theses will incorporate into their 33 credit program six credits of directed research on the thesis. Students pursuing a non-thesis track will take a four and 1/2 hour comprehensive examination after the completion of the course work.

Curriculum

MA students will NOT be allowed to take more than nine credit hours per semester. Each required course must be completed with a grade of B (3.00) or above. MA students must fulfill the requirements of nine credit hours in one field of concentration.

Core Courses		
IS 600	Research Methods in International Studies	3
IS 601	Seminar in International Relations Theory	3
IS 655	International History	3
IS 708	Asian Politics	3
IS 726	American Foreign Policy and World Order	3
ECON 650	International Economics	3
Field of Concentration		
Select a Concentration		9
Electives*		
IS 698 or IS 699	Directed Research Thesis	6
Total Credit Hours		33

* If thesis option, 6 of these credits will be directed research. Up to six credits of elective coursework may be taken at the 500 level.

Fields of Concentration

Select one of the following six fields of concentration: Comparative Cultural and Political Studies, Conflict and Cooperation, International Political Economy and Development, Modeling and Simulation, Strategic Leadership or U.S. Foreign Policy. Students must choose courses from the below lists as specified. IS 795 Topics in International Studies courses may be accepted with the approval of the program director in coordination with the concentration coordinators. IS 668 Internship in International Studies, IS 697 Independent Research in International Studies, or IS 698 Directed Research may be accepted one time with the approval of the program director in coordination with the concentration coordinators. Courses not on these lists may be accepted with the approval of the program director in coordination with the concentration coordinators.

Comparative Cultural and Political Studies Concentration

Students must take IS 716 Theories of Comparative Sociopolitical Studies and IS 760 International Cultural Studies: History, Theory and Application and one additional course from the following list.

IS 716	Theories of Comparative Sociopolitical Studies	3
IS 760	International Cultural Studies: History, Theory and Application	3
Select one of the following:		3
IS 668	Internship in International Studies	
IS 697	Independent Research in International Studies	

IS 698	Directed Research
IS 703	Ethics and International Relations
IS 704	Latin American Politics
IS 722	Democracy and International Relations
IS 725	Politics of the Middle East
IS 728	Ghosts of French Colonization
IS 731	Media & Migration
IS 738	European Politics
IS 740	Political Economy of Development
IS 741	Globalization and Social Change in the World System
IS 748	Gender and Globalization
IS 770	Transnational Media Practices
IS 795	Topics in International Studies (Gender & International Migration)
HLSC 776	Global Health

Total Credit Hours 9

Conflict and Cooperation Concentration

Students must take IS 702 Approaches to Collective Security and two additional courses from the following list.

IS 702	Approaches to Collective Security	3
Select two of the following:		6
IS 668	Internship in International Studies	
IS 697	Independent Research in International Studies	
IS 698	Directed Research	
IS 707	Interdependence, Power, and Transnationalism	
IS 720	Research Seminar in Global Security	
IS 721	New World Order: Chaos and Coherence	
IS 734	U.S. Grand Strategy	
IS 735	International Relations of the Middle East	
IS 790	Advanced Seminar Conflict & Cooperation	
IS 795	Topics in International Studies	

Total Credit Hours 9

International Political Economy and Development Concentration

Students must take IS 724 International & Comparative Political Economy and IS 740 Political Economy of Development and one additional course from the following list.

IS 724	International & Comparative Political Economy	3
IS 740	Political Economy of Development	3
Select one of the following:		3
IS 668	Internship in International Studies	
IS 697	Independent Research in International Studies	
IS 698	Directed Research	
IS 707	Interdependence, Power, and Transnationalism	
IS 711	International Migration and Refugee Movement	
IS 713	Global Political Economy	
IS 716	Theories of Comparative Sociopolitical Studies	
IS 717	World Population and Development	
IS 722	Democracy and International Relations	

IS 741	Globalization and Social Change in the World System
IS 795	Topics in International Studies

Total Credit Hours 9

Modeling and Simulation Concentration

Students must take MSIM 601 Introduction to Modeling and Simulation or MSIM 602 Simulation Fundamentals and IS 723 Advanced Statistical Techniques in International Studies and one additional course from the following list.

MSIM 601	Introduction to Modeling and Simulation	3
or MSIM 602	Simulation Fundamentals	
IS 723	Advanced Statistical Techniques in International Studies	3
Select one of the following:		3
BNAL 722	Agent-Based Simulation and Modeling	
ECON 707	Econometrics II	
ECON 708	Econometrics III	
ENMA 712	Multi-Criteria Decision Analysis and Decision Support Systems	
ENMA 724	Risk Analysis	
ENMA 754	Big Data Fundamentals	
GEOG 600	Geospatial Data Analysis	
GEOG 601	Spatial Statistics and Modeling	
IDT 755	Theory and Design of Instructional Simulation	
IDT 756	Instructional Gaming: Theories and Practice	
IS 668	Internship in International Studies	
IS 697	Independent Research in International Studies	
IS 698	Directed Research	
IS 762	Game Theory	
IS 765	Agent-Based Modeling and Simulation for International Studies	
IS 772	Modeling Global Events	
IS 795	Topics in International Studies	
MSIM 673	Threat Modeling and Risk Analysis	
MSIM 725	Principles of Combat Modeling and Simulation	
PSYC 736	Multilevel Models: HLM	
STAT 625	Probability Theory for Data Science	
STAT 640	Survival Analysis	

Total Credit Hours 9

Strategic Leadership Concentration

Students must take IS 721 New World Order: Chaos and Coherence and two additional courses from the following list.

IS 721	New World Order: Chaos and Coherence	3
Select two of the following:		6
IS 668	Internship in International Studies	
IS 697	Independent Research in International Studies	
IS 698	Directed Research	
IS 701	Global Change and American Foreign Policy	
IS 702	Approaches to Collective Security	
IS 708	Asian Politics	
IS 713	Global Political Economy	
IS 720	Research Seminar in Global Security	
IS 734	U.S. Grand Strategy	

IS 741	Globalization and Social Change in the World System	
IS 795	Topics in International Studies	
COMM 600	Intercultural Communication: History, Theory and Application (MA students only)	
Total Credit Hours		9

US Foreign Policy

Students must take IS 734 U.S. Grand Strategy and two additional courses from the following list.

IS 734	U.S. Grand Strategy	3
Select two of the following:		6
IS 668	Internship in International Studies	
IS 697	Independent Research in International Studies	
IS 698	Directed Research	
IS 701	Global Change and American Foreign Policy	
IS 702	Approaches to Collective Security	
IS 703	Ethics and International Relations	
IS 714	Law in the International System	
IS 720	Research Seminar in Global Security	
IS 721	New World Order: Chaos and Coherence	
IS 740	Political Economy of Development	
IS 741	Globalization and Social Change in the World System	
IS 795	Topics in International Studies	
Total Credit Hours		9

Additional Information

Methodology Requirements

The MA requires one methodology course (IS 600). MA students are encouraged to take further methods courses as electives.

Language Requirements

MA students must demonstrate reading competence in one foreign language other than English. International students who have English as a second language fulfill this requirement.

Foreign language competence can be demonstrated in one of two ways:

1. Students may complete a third year of language instruction at Old Dominion University (students may choose to enter the third year through a University placement test) or other institutions. A grade of B or above in both semesters of third-year instruction will demonstrate competency in that language.
2. Students may take a language test. Exams are administered (for a fee) by the Department of Foreign Languages and Literatures. GPIS requirements concern reading comprehension competence. For more information about which skills will be tested and what standards of competency are required refer to the language requirements website <https://www.odu.edu/international-studies/graduate-program/language-requirements> (<https://www.odu.edu/international-studies/graduate-program/language-requirements/>).

Comprehensive Examinations

In consultation with their advisors, MA students will select either a thesis or non-thesis option. Students selecting the non-thesis track must pass a written comprehensive examination.

The MA comprehensive examination may not be scheduled before students have completed all core and methodology requirements, nor may the MA comprehensive examination be scheduled prior to the last semester in which regular course work is taken. MA examinations are scheduled twice a year. If MA students fail the written comprehensive on the first attempt, they may

retake the entire written comprehensive exam only once, no earlier than one semester later.

Theses

MA students choosing the thesis option will submit a thesis prospectus to the chair of their thesis committee for approval after the completion of 18 credits or at the beginning of the third semester in the program. The thesis should be submitted to the thesis committee for its approval at least two weeks before a defense is scheduled. The committee will schedule the student's oral defense of the thesis when the thesis appears to meet GPIS standards for master's theses. The oral defense will concern questions of substance and methodology. Thesis students must pass an oral defense of their thesis.

Grade Requirements

All MA students will be graded on the traditional A, B, C, F scale (with pluses and minuses) in all courses. Pass/Fail evaluations will be utilized only in the case of registration for internships, independent research, directed research or for thesis research, or when specifically approved by the director.

Graduate students for whom grade point averages fall below 3.00 (B) will be placed on a probationary status. After two consecutive semesters below this average or the accumulation of two grades of "C" or below, the director will take under consideration, in consultation with faculty, termination of the student's program.

Time Limit and Residency Requirements

The master's degree can be completed in four full-time semesters, although many MA candidates continue the degree over a longer period on a part-time basis. The MA must be completed within a six-year period.

For other issues concerning GPIS, please contact:

Graduate Program in International Studies (GPIS)
7044 Batten Arts and Letters Building
Old Dominion University
Norfolk, VA 23529-0086, USA
Telephone: 757-683-5700
Fax: 757-683-4763
E-mail: isgpd@odu.edu

Doctor of Philosophy International Studies (PhD)

GPIS is an interdisciplinary unit, offering advanced research and graduate training in global problems and transnational issues. Fields of concentration include Comparative Cultural and Political Studies, Conflict and Cooperation, International Political Economy and Development, Modeling and Simulation, Strategic Leadership, and U.S. Foreign Policy.

Dr. Regina Karp
Graduate Program Director
7044 Batten Arts & Letters
757-683-5700

Graduate Program in International Studies (<https://www.odu.edu/intlstudies/gpis.html.html>)

Admission Requirements

All candidates for admission into the PhD must submit:

1. Graduate Record Examination (GRE) scores (may be waived on a case-by-case basis for PhD applicants depending on prior qualifications at the master's level).
2. Official transcripts of all undergraduate or prior graduate course work submitted directly by all universities attended.
3. An essay of not more than 500 words describing interest in and capacity for advanced training in global/transnational issues.
4. One example of writing or research (a paper submitted to a seminar, a publication or report, or another comparable example).

- Three letters of recommendation addressing the candidate's capacity to undertake graduate work on international global issues.

Any prior graduate course work taken at Old Dominion University (e.g., in nondegree status) or at another institution can be counted toward the PhD degree only in accordance with the provisions governing transfer of credit and the director's approval.

Admission Standards

- Applicants to the PhD program must hold a master's degree in a related field of study.
- PhD candidates are generally expected to attain a GRE score of 148 Quantitative and 160 Verbal (1200 Old Score) and have at least a 3.00 cumulative GPA in undergraduate and graduate courses, with a somewhat higher GPA for courses related to international, global or transnational issues.
- Individuals whose native language is not English must submit a score of 230 on the computer-based TOEFL (the equivalent of 570 in the older, paper-based score scale) or 80 on the TOEFL iBT.
- The Admissions Committee strongly recommends prior international experience (residence, study or work) and foreign language training for all PhD applicants. Evidence of substantial international and foreign language background is highly desirable for applicants.

Application Deadline, PhD

GPIS admits students for fall and spring semesters. We prefer applications to reach us by January 15 and October 15. Applications outside these timelines will be considered on a case-by-case basis.

With the permission of the GPIS Director, individuals who want to begin graduate work but do not intend to finish their degree with GPIS or individuals who want to join GPIS at a later date, may be considered for taking graduate courses as non-degree seeking students.

GPIS offers a number of doctoral and master's graduate assistantships and awards them on the basis of availability and competitiveness. Applicants who want to be considered for a graduate assistantship are advised to submit their application by the above deadlines.

Curriculum Requirements

The PhD requires 48 credits at the post-master's level (courses at the 800 level). These 48 hours include a minimum of 12 dissertation credits. The 48 credits do not include any courses needed for demonstrating foreign language competency.

Upon completion of coursework, PhD students must pass a written and an oral candidacy examination, submit a dissertation prospectus, write a dissertation, and undergo an oral defense of the dissertation.

PhD students will NOT be allowed to take more than nine credit hours per semester. Each required course must be completed with a grade of B (3.00) or above. PhD students must take 12 credit hours of core courses, 15 credit hours in the primary field of concentration and 9 credit hours in the secondary field, totaling 36 credit hours. Twelve credit hours of dissertation preparation credits must be taken to complete the credit hour requirement of 48 hours at the post-master's level (courses at the 800 level).

Required Prerequisites

Prerequisites do not count towards degree requirement.

IS 600	Research Methods in International Studies
IS 601	Seminar in International Relations Theory
IS 655	International History
ECON 650	International Economics
Core Courses 12	
IS 814	Law in the International System
IS 820	Research Seminar in Global Security
IS 823	Advanced Statistical Techniques in International Studies

IS 824	International & Comparative Political Economy

Fields of Concentration	24
Select a Primary Concentration	
Select a Secondary Concentration	
Dissertation	12
Total Credit Hours	48

Fields of Concentration

Select two of the following six fields of concentration: Comparative Cultural and Political Studies, Conflict and Cooperation, International Political Economy and Development, Modeling and Simulation, Strategic Leadership, and US Foreign Policy. The primary concentration requires a total of five courses (15 credit hours) and the secondary requires a total of three courses (9 credit hours). Students must choose courses from the below lists as specified. IS 895 Topics in International Studies course may be accepted with the approval of the program director in coordination with the concentration coordinators. IS 868 Internship in International Studies, IS 897 Independent Research in International Studies or IS 898 Directed Research may be used only one time to satisfy an elective for primary or secondary concentration with the approval of the program director in coordination with the concentration coordinators. Courses not on these lists may be accepted with the approval of the program director in coordination with the concentration coordinators.

Comparative Cultural and Political Studies Concentration

Students must take IS 816 Theories of Comparative Sociopolitical Studies and IS 860 International Cultural Studies: History, Theory and Application and three additional courses for the primary concentration or one for the secondary concentration from the following list.

IS 816	Theories of Comparative Sociopolitical Studies	3
IS 860	International Cultural Studies: History, Theory and Application	3
Select three of the following if primary concentration, or one if secondary concentration:		3-9
IS 803	Ethics and International Relations	
IS 804	Latin American Politics	
IS 808	Asian Politics	
IS 822	Democracy and International Relations	
IS 825	Politics of the Middle East	
IS 828	Ghosts of French Colonization	
IS 831	Media & Migration	
IS 838	European Politics	
IS 840	Political Economy of Development	
IS 848	Gender and Globalization	
IS 868	Internship in International Studies	
IS 870	Transnational Media Practices	
IS 897	Independent Research in International Studies	
IS 898	Directed Research	
IS 895	Topics in International Studies (Gender & International Migration)	
HLSC 876	Global Health	

Total Credit Hours	9-15

Conflict and Cooperation Concentration

Students must take IS 802 Approaches to Collective Security and four additional courses for the primary concentration or two for the secondary concentration from the following list.

IS 802	Approaches to Collective Security	3
Select four of the following if primary concentration, or two if secondary concentration:		6-12

IS 807	Interdependence, Power, and Transnationalism	
IS 808	Asian Politics	
IS 821	New World Order: Chaos and Coherence	
IS 834	U.S. Grand Strategy	
IS 835	International Relations of the Middle East	
IS 868	Internship in International Studies	
IS 890	Advanced Seminar Conflict & Cooperation	
IS 895	Topics in International Studies	
IS 897	Independent Research in International Studies	
IS 898	Directed Research	
Total Credit Hours		9-15

International Political Economy and Development Concentration

Students must take IS 840 Political Economy of Development and four additional courses for the primary concentration or two for the secondary concentration from the following list.

IS 840	Political Economy of Development	3
Must take four other courses if primary concentration, or two if secondary concentration:		6-12
IS 807	Interdependence, Power, and Transnationalism	
IS 811	International Migration and Refugee Movement	
IS 813	Global Political Economy	
IS 816	Theories of Comparative Sociopolitical Studies	
IS 817	World Population and Development	
IS 822	Democracy and International Relations	
IS 841	Globalization and Social Change in the World System	
IS 868	Internship in International Studies	
IS 895	Topics in International Studies	
IS 897	Independent Research in International Studies	
IS 898	Directed Research	
Total Credit Hours		9-15

Modeling and Simulation Concentration

Students must take MSIM 601 Introduction to Modeling and Simulation or MSIM 602 Simulation Fundamentals and four additional courses for the primary concentration or two for the secondary concentration from the following list.

MSIM 601	Introduction to Modeling and Simulation	3
*MSIM 601/602 count at the 800-level for PhD students.		
or MSIM 602	Simulation Fundamentals	
Select four of the following if primary concentration or two of the following if secondary concentration:		6-12
BNAL 822	Agent-Based Simulation and Modeling	
ECON 807	Econometrics II	
ECON 808	Econometrics III	
ENMA 812	Multi-Criteria Decision Analysis and Decision Support Systems	
ENMA 824	Risk Analysis	
ENMA 854	Big Data Fundamentals	
IDT 855	Theory and Design of Instructional Simulation	
IDT 856	Instructional Gaming: Theories and Practice	
IS 862	Game Theory	

IS 865	Agent-Based Modeling and Simulation for International Studies	
IS 868	Internship in International Studies	
IS 872	Modeling Global Events	
IS 895	Topics in International Studies	
IS 897	Independent Research in International Studies	
IS 898	Directed Research	
MSIM 825	Principles of Combat Modeling and Simulation	
PSYC 836	Multilevel Models: HLM	
Total Credit Hours		9-15

Strategic Leadership Concentration

Students must take IS 821 New World Order: Chaos and Coherence and four additional courses for the primary concentration and two for the secondary concentration from the following list.

IS 821	New World Order: Chaos and Coherence	3
Select four of the following if primary concentration or two of the following if secondary concentration:		6-12
IS 801	Global Change and American Foreign Policy	
IS 802	Approaches to Collective Security	
IS 808	Asian Politics	
IS 813	Global Political Economy	
IS 834	U.S. Grand Strategy	
IS 841	Globalization and Social Change in the World System	
IS 868	Internship in International Studies	
IS 895	Topics in International Studies	
IS 897	Independent Research in International Studies	
IS 898	Directed Research	
Total Credit Hours		9-15

US Foreign Policy

Students must take IS 834 U.S. Grand Strategy and IS 826 American Foreign Policy and World Order and three additional courses for the primary concentration or one for the secondary concentration from the following list.

IS 826	American Foreign Policy and World Order	3
IS 834	U.S. Grand Strategy	3
Select three of the following if primary concentration, or one if secondary concentration:		3-9
IS 801	Global Change and American Foreign Policy	
IS 802	Approaches to Collective Security	
IS 803	Ethics and International Relations	
IS 821	New World Order: Chaos and Coherence	
IS 840	Political Economy of Development	
IS 841	Globalization and Social Change in the World System	
IS 868	Internship in International Studies	
IS 895	Topics in International Studies	
IS 897	Independent Research in International Studies	
IS 898	Directed Research	
Total Credit Hours		9-15

Additional Requirements

Methodology Requirements

All PhD students must complete a sequence of two basic methods courses beginning with IS 600. Students holding an MA from another institution

who enter the PhD program may present transcripts showing a B (3.00) or above, plus syllabi and other documentation, from a similar introductory methods course to be exempt from IS 600.

Language Requirements

PhD students must demonstrate reading competence in one foreign language other than English. International students who have English as a second language fulfill this requirement.

Foreign language competence can be demonstrated in one of two ways:

1. Students may complete a third year of language instruction at Old Dominion University (students may choose to enter the third year through a University placement test) or other institutions. A grade of B or above in both semesters of third-year instruction will demonstrate competency in that language.
2. Students may take a language test. Exams are administered (for a fee) by the Department of Foreign Languages and Literatures. GPIS requirements concern reading comprehension competence. For more information about which skills will be tested and what standards of competency are required refer to the language requirements website <https://www.odu.edu/international-studies/graduate-program/language-requirements> (<https://www.odu.edu/international-studies/graduate-program/language-requirements/>).

Candidacy Examinations

All PhD students must pass a written candidacy examination. Students who pass the written candidacy examination must then pass an oral candidacy examination.

The PhD candidacy examination may not be scheduled before students have completed all core and methodology requirements, nor may the PhD candidacy examination be scheduled prior to the last semester in which regular course work is taken. PhD students are also required to fulfill the foreign language requirement before taking the candidacy examination. PhD examinations are scheduled twice a year. PhD students failing the written examination on the first attempt may retake the written exam only once, no earlier than the following semester.

Dissertations

A dissertation is required of all PhD students. A dissertation prospectus will be prepared after the successful completion of the candidacy examination. If the student's graduate committee approves the prospectus, the student will proceed to research and write the dissertation. An oral defense of the dissertation will be scheduled after a draft is approved by the committee.

Grade Requirements

PhD students will be graded on the traditional A, B, C, F scale (with pluses and minuses) in all courses. Pass/Fail evaluations will be utilized only in the case of registration for internships, independent research, directed research or dissertation research, or when specifically approved by the director.

Graduate students for whom grade point averages fall below 3.00 (B) will be placed on a probationary status. After two consecutive semesters below this average or the accumulation of two grades of "C" or below, the director will take under consideration, in consultation with faculty, termination of the student's program.

Time Limit and Residency Requirements

The doctoral program must be completed within eight years of entry into PhD course work.

Transfer Credit

Twelve graduate credits earned at other institutions or at Old Dominion University may be applied toward the fulfillment of degree requirements. Transfer credit, including nondegree credit earned at Old Dominion, is accepted as degree credit at the discretion of the director.

Financial Aid

Full-time students are eligible to apply for university fellowships, graduate assistantships, and tuition grants which are awarded on a competitive basis.

Nondegree Students

Nondegree students must obtain the approval of the director before enrolling in graduate international studies classes.

Certificate Geographic Information Science Certificate

Dr. Jennifer Whytlaw, Graduate Certificate Program Director

The graduate certificate in geographic information science provides knowledge and tools for students and professionals pursuing careers in geographic information systems (GIS) and related spatial technologies. The certificate is an affidavit of academic proficiency in GIS and related areas such as remote sensing, global positioning systems, cartography, and spatial data analysis. This certificate is designed for graduate students and professionals employed in geographic information science fields. The certificate is available to postgraduate professionals who meet the requirements. Students with comparable professional experience may be able to show competence in selected courses through examination. For information regarding the undergraduate certificate in Geographic Information Science, please consult the Undergraduate Catalog.

Admission Requirements

Submission of:

- Graduate Record Examination (GRE) scores; no minimum score required—results represent one factor considered for admission;
- Official transcripts of all undergraduate and prior graduate coursework;
- Two letters of recommendation addressing the candidate's capacity to undertake graduate work in geographic information science;
- An essay of not more than 500 words describing interest in and capacity for advanced training in geographic information science; and
- One example of writing or research (a paper submitted to a seminar, a publication or report, or another comparable example).

Curriculum Requirements

Students must take 15 credit hours in the areas listed below and complete them with a cumulative GPA of 3.00 or higher and no grade below a C (2.00) for undergraduate students or B (3.00) for graduate students.

Core Courses		
GEOG 502	Geographic Information Systems	3
GEOG 504	Digital Techniques for Remote Sensing	3
GEOG 508	Cartography	3
Elective Courses		
Select two of the following:		6
GEOG 519	Spatial Analysis of Coastal Environments	
GEOG 525	Internet Geographic Information Systems	
GEOG 532	Advanced GIS	
GEOG 563	GIS Programming	
GEOG 573	Geographic Information Systems for Emergency Management	
GEOG 590	Applied Cartography/GIS	
GEOG 595	Topics in Geography	
or GEOG 596	Topics in Geography	
GEOG 697	Independent Research in Geography *	
Total Credit Hours		15

* Advanced approval required to count toward the certificate.

Certificate International Development Certificate

Careers in International Development involve working for a variety of organizations, both locally in the United States and abroad, mandated to support development efforts in lesser developed nations on topical issues such as humanitarian assistance and disaster relief, public health, poverty alleviation, debt relief, good governance, and economic development.

Prospective employers include government agencies such as the U.S. Agency for International Development (USAID); international and nongovernmental organizations such as the United Nations Development Program, United Nations Population Division, World Bank, Asian Development Bank, Inter-American Development Bank, Oxfam International and local affiliates, International Committee of the Red Cross, Physicians for Peace, and World Vision. The categories of employment often include skills such as program management, procurement, logistics, and monitoring and evaluation.

Admission

To be admitted to this program, potential students may apply online through the Office of Admissions as a non-degree, certificate/life learner student. All applicants must meet the requirements for graduate admission. Graduate degree-seeking students interested in pursuing this certificate in conjunction with a degree should consult with their graduate program director or advisor for assistance.

Curriculum Requirements

Twelve credit hours are required to complete this certificate.

IS 713	Global Political Economy	3
PPCM 727	Public Procurement and Project Management	3
Select one of the following:		3
IS 740	Political Economy of Development	
IS 741	Globalization and Social Change in the World System	
ECON 754	Economic Development	
HLSC 776	Global Health	
Select one of the following:		3
HLSC 702	Health Management	
PORT/MSCM 641	Supply Chain Management and Logistics	
PORT/MSCM 615	Maritime Security and Risk Analysis	
Total Credit Hours		12

Continuance

Students must maintain a cumulative GPA of 3.0 to be in good academic standing. Students unable to maintain good academic standing will be placed on probation and may be suspended.

Certificate Modeling and Simulation - International Studies Certificate

The Graduate Program in International Studies (GPIS) offers a certificate in modeling and simulation.

Curriculum Requirements

Twelve credit hours are required to complete the certificate.

Introductory Course(s)

MSIM 601	Introduction to Modeling and Simulation	3

Core Courses *

Select three of the following:		9
ENMA 712/812	Multi-Criteria Decision Analysis and Decision Support Systems	
ENMA 724/824	Risk Analysis	
IS 762/862	Game Theory	
IDT 755/855	Theory and Design of Instructional Simulation	
IDT 756/856	Instructional Gaming: Theories and Practice	
IS 765/865	Agent-Based Modeling and Simulation for International Studies	
IS 762/862	Game Theory	
MSIM 772/872	Modeling Global Events	

Total Credit Hours		12

* Other courses may be included from across the University's modeling and simulation programs with approval of the track coordinator.

Certificate Spatial Analysis of Coastal Environments Certificate

Jennifer Whytlaw, Graduate Certificate Program Director

The certificate in spatial analysis of coastal environments provides an interdisciplinary program for students wishing to pursue careers in coastal management or research, remote sensing, or geographic information system (GIS) applications. Rendered upon completion of the requirements, the certificate is an academic affidavit comprised of courses in geography and ocean, earth, and atmospheric sciences, and is administered by the two departments. The certificate is available to postgraduate professionals who meet the requirements. Students with comparable professional experience may be able to show competence in selected courses through examination. For information regarding the undergraduate certificate in Spatial Analysis of Coastal Environments, please consult the Undergraduate Catalog.

Curriculum Requirements

Students must take 15 credit hours in the areas listed below and complete them with a cumulative GPA of 3.00 or higher and no grade below a B (3.00).

Core courses

GEOG 504	Digital Techniques for Remote Sensing	3
GEOG 562	Advanced Spatial Analysis	3

Interpretive Analysis Courses

Select two of the following:		6
GEOG 522	Coastal Geography	
GEOG 520	Marine Geography	
BIOL 504	Conservation Biology and Sustainable Development	
GEOG 590	Applied Cartography/GIS *	
OEAS 595	Special Topics *	
GEOG 595	Topics in Geography *	

Capstone Seminar

GEOG/OEAS 519	Spatial Analysis of Coastal Environments	3
Total Credit Hours		15

* Advanced approval required to count toward the certificate.

Department of Sociology and Criminal Justice

The Department of Sociology and Criminal Justice offers one graduate degree - a Ph.D. in Criminology and Criminal Justice. The Ph.D. in Criminology and Criminal Justice is a sociological criminology program that highlights social inequality and public policy in the study of crime and justice issues. The program produces scholars with strong backgrounds in the substantive areas of criminology, criminal justice, theory, inequality, and policy as well as in research methods and statistics. Designed primarily for students who are interested in pursuing careers in higher education, the course offerings also provide students the education and skills needed to be employed as researchers in public and private agencies. Graduates are prepared as scholars able to conduct research, teach college and university courses in their areas of specialization, and to provide service to the discipline and community.

Vanessa Panfil, Graduate Program Director, vpanfil@odu.edu

Programs

Doctor of Philosophy Program

- Criminology and Criminal Justice (PhD) (p. 100)

Master of Arts Program

- Applied Sociology (MA) (p. 100)

Master of Arts Applied Sociology (MA)

Ingrid Whitaker, Graduate Program Director

This program has been recommended for closure to the State Council for Higher Education of Virginia. Pending their approval and SACSCOC approval, all degrees for the program must be earned by August 2025. New students will not be able to enter the program after August 28, 2020.

The Master of Arts degree in Applied Sociology emphasized research skills necessary in many professions. The M.A. degree served as professional training for students seeking employment in federal, state and local government agencies or in private-sector organizations. In addition, the M.A. program provided excellent training in the fundamentals of sociology for students who wished to pursue a Ph.D. in the social sciences.

Doctor of Philosophy Criminology and Criminal Justice (PhD)

Vanessa Panfil, Graduate Program Director

The Ph.D. in Criminology and Criminal Justice is a sociological criminology program that highlights social inequality and public policy in the study of crime and justice issues. The program produces scholars with strong backgrounds in the substantive areas of criminology, criminal justice, theory, inequality, and policy as well as in research methods and statistics. Designed primarily for students who are interested in pursuing careers in higher education, the course offerings also provide students the education and skills needed to be employed as researchers in public and private agencies. Graduates are prepared as scholars able to conduct research, teach college and university courses in their areas of specialization, and to provide service to the discipline and community.

Regular Admission Requirements

1. A completed master's degree (or its equivalent) in criminology, criminal justice, or in an appropriate field (e.g., administration of justice, sociology, or political science) from a regionally accredited institution of higher education – a thesis is generally expected;
2. A minimum grade point average (GPA) of 3.25 (on a 4.0 scale) overall for the master's degree;
3. The Graduate Record Examination (GRE) is required of all applicants;
4. Successful completion of prior coursework in research methods and statistics at least equivalent to that required by the ODU B.A. in sociology/criminal justice and M.A. degree in applied sociology (research methods, statistics, computer and data analysis);
5. Three letters of reference from sources capable of commenting on the applicant's readiness for advanced graduate study in criminology & criminal justice;
6. A writing sample of at least 20 double-spaced pages on a topic related to the applicant's expertise or area of interest;
7. A typed statement of approximately 1,000 words summarizing the individual's motivation for applying to the program as well as the professional contributions s/he intends to make assuming successful completion of the degree;
8. If the applicant's native language is not English, a current score for the Test of English as a Foreign Language (TOEFL) of at least 540 and/or an interview in which the applicant's comprehension and fluency in English can be assessed.

Provisional Admission

Provisional admission may be granted on rare occasions when an applicant's credentials suggest aptitude for doctoral study but do not meet the criteria outlined above. Admission under this standard requires a variable amount of preliminary coursework in addition to that which is normally required for the degree. The amount and content of additional coursework required for conditional admissions is determined by the Ph.D. Committee on a case-by-case basis.

Students who have an appropriate undergraduate degree and a law degree (J.D.) but lack graduate work in the social sciences will normally be required to complete 18 hours of graduate work as follows: 12 hours in theory, research methods, social statistics, computer statistical applications, and 6 hours of substantive courses.

International Students

Graduate international students on non-immigrant visas whose native language is not English or who have not lived in the U.S. ten years must provide evidence of English language proficiency through one of the following:

1. Submission of a minimum required TOEFL score or successful completion of Old Dominion University's Graduate Bridge Program,
2. Possession of an American Bachelor's or Master's degree equivalent from an accredited institution located in a country where English is the native language,
3. GRE verbal score of 480.

Non-degree seeking students must secure permission from the GPD prior to registering for doctoral classes in the program.

Application Deadlines

January 15 – Students applying for funding (Graduate Assistantship) and fall admission; there is no spring admission. All students must submit all original application materials directly to Old Dominion University's Graduate Admissions Office. Students requesting funding (Graduate Assistantship) must submit the Application for Graduate Financial Assistance to the Program Director.

Curriculum Requirements

The Ph.D. in Criminology & Criminal Justice requires a minimum of 48 credit hours at the post-master's level (i.e., courses at the 700 to 800 level) as detailed below. Students must maintain a cumulative GPA of at least 3.25. In addition, each of the core courses must be completed with a grade of B or better. The core courses may be taken a maximum of two times. Students who receive two grades of B- or below in any course, or whose grade point average falls below a 3.25 will be dismissed from the program.

Coursework

Core Courses

CRIM 800	Proseminar in Criminology and Criminal Justice	3
CRIM 801	Criminology and Public Policy	3
CRIM 802	Advanced Criminological Theory	3
CRIM 803	Inequality, Crime and Justice	3
CRIM 890	Professional Development and Dissertation Seminar	3

Research Skills

CRIM 805	Multivariate Statistics in Criminological Research	3
CRIM 810	Qualitative Methods in Criminology and Criminal Justice	3
CRIM 815	Advanced Quantitative Techniques in Criminology & Criminal Justice	3
CRIM 820	Advanced Research Methods in Criminology & Criminal Justice	3

Electives

Elective Hours	12

Dissertation Credits

CRIM 899	Dissertation	9

Total Credit Hours	48

Additional Requirements

Comprehensive Examinations

The comprehensive exam assesses a student's expertise of the literature in criminology and criminal justice (in terms of both breadth and depth) in theory, research methods and statistics, inequality and policy as applied to questions of criminological interest; and her/his ability to think broadly and critically and to present her/himself as a sophisticated intellectual thinker. Preparation for the comprehensive exam gives students the opportunity to organize their knowledge of the field as gained from coursework, their own independent readings, teachings, and research.

The written comprehensive exam is taken by students following completion of all coursework except the dissertation seminar; students may petition the Ph.D. Committee to take the exam prior to the completion of all coursework. The written exam will be in a take-home format distributed during August. Details about the structure of the exam will be announced to students by the end of the spring semester before the exam. Student names will be removed from the exams for grading. No more than three faculty members will grade each section of the exam as "pass" or "fail" and more than one negative vote from the exam committee will result in a failure of the section. Students may pass or fail the exam in whole or in part. Students need to retake only those sections that are failed. Students who fail any section of the exam may register for fall classes but must retake the failed section in accordance with the directions stipulated by the comprehensive exam committee, generally in late November/early December of that same year. Students who do not successfully pass the written comprehensive exam following the retake will be dismissed from the program; they may complete the classes they are enrolled in that semester for credit if they wish. Students may not defend a dissertation proposal until they have passed the written comprehensive exam.

Admission to Candidacy

Students are admitted to candidacy for the degree once the following criteria are satisfied:

- They have completed all Ph.D. coursework (excepting dissertation hours) with a GPA of at least 3.25;
- They have successfully passed the comprehensive examinations;
- They have successfully defended a dissertation prospectus.

The Dissertation

The dissertation is a scholarly work investigating a problem of significance and should constitute a meaningful contribution to the body of existing knowledge regarding matters of criminology and criminal justice policy or practice. It is the culmination of a program of advanced study leading to a doctoral degree and, as such, is expected to demonstrate a high level of scholarly competence. It must show that the candidate is capable of conceptualizing and conducting sophisticated original research, as well as analysis and reporting on an approved topic related to crime and justice by use of accepted scientific methods. Complete information about the dissertation is found on the program's website.

For more information relating to this program and its requirements, please visit <http://www.odu.edu/sociology/academics/graduate/doctoral> (<http://www.odu.edu/sociology/academics/graduate/doctoral/>)

Department of Women's and Gender Studies

Dr. Elizabeth Groeneveld, Chair
Department of Women's and Gender Studies
3041 Batten Arts and Letters
(757) 683-3823
wgs@odu.edu

Women's and Gender Studies is a multi and interdisciplinary field of study that examines gender in historical and contemporary contexts with an emphasis on women's perspectives. We value the complex intersections of gender, race, class, sexuality, ability, nation, and other identities. We are committed to a social justice-based approach and seek to bridge academic and community work. Contact the Department of Women's and Gender Studies to speak with the Graduate Certificate Director.

Programs

Certificate Program

- Women's Studies Certificate (p. 101)

Certificate

Women's Studies Certificate

Jennifer N. Fish, Ph.D., Graduate Certificate Director
jfish@odu.edu
Department of Women's and Gender Studies
3041 Batten Arts and Letters
(757) 683-3823

Women's and Gender Studies is a multi- and interdisciplinary field of study that examines gender in historical and contemporary contexts with an emphasis on women's lives and perspectives. The department values the complex intersections of gender, race, class, sexuality, ability, nation, and other identities. We are committed to a social justice-based approach and seek to bridge academic and community work.

Students who want to pursue only the Graduate Certificate in Women's Studies, must hold either a B.A. or B.S. degree with an overall GPA of 2.80 OR a graduate degree.

Those admitted to a graduate program have the option of earning a Graduate Certificate in Women's Studies in conjunction with a graduate degree from another department or college. Students must satisfy all admission

requirements for their chosen graduate program before enrolling in the courses required for the Graduate Certificate in Women's Studies. Please consult the Director of the Women's Studies Graduate Certificate and the relevant sections of the Catalog for additional information.

Students pursuing the Certificate in combination with another graduate degree will be advised by both a Women's and Gender Studies faculty member and an advisor from their graduate program.

The Certificate will be awarded upon completion of the required program of courses.

Curriculum Requirements

Students must maintain a 3.00 GPA in the 15 credit hours required for the Certificate.

Required Courses

WGS 560	Feminist and Queer Theory	3
WGS 570	Feminist Research Methods	3
Additional Courses */**		9
Total Credit Hours		15

- *

Additional courses must be approved for the Women's and Gender Studies curriculum. In addition to Women's and Gender Studies (WGS-listed) courses, students may draw from various disciplines (e.g., Art History, English, History, Humanities, International Studies, Philosophy, Political Science & Geography, Sociology & Criminal Justice). At least one of the courses must be at or above the 600 level. With the exception of Women's and Gender Studies courses, students may not take more than six credit hours in any single field.
- **

Students planning to teach Women's and Gender Studies courses at the post-secondary level in Virginia must complete an additional three credit hours, for a total of 18 credit hours, in order to meet accreditation requirements.

Strome College of Business

www.odu.edu/business (<http://www.odu.edu/business/>)

2004 Constant Hall
Old Dominion University
Norfolk, VA 23529

(757) 683-3520

Erika Marsillac, Dean
Elko Klijn, Associate Dean for Academic Programs and Student Success
Kiran Karande, Associate Dean for Faculty Affairs and Research
Martin Goossen, Interim Associate Dean for Graduate Programs

Overview

Old Dominion University's Strome College of Business has as its principal objective the preparation of problem-solving specialists who will enter the challenging world of business or public administration. All programs in the college are designed to promote the following: professional competence; facility in the communication arts; analytical skills; leadership abilities; an understanding of social, political, and economic forces; and, a strong sense of business ethics and public purpose. This foundation enables graduates of these programs to advance in a broad range of careers in the public and private sectors.

The Strome College of Business is one of approximately 469 schools in the world to have achieved accreditation for business programs on the graduate and undergraduate levels by the Association to Advance Collegiate Schools of Business - International (AACSB). The Master of Science in Accounting program has received its own accreditation through the same agency. The Master of Public Administration program is one of approximately 164 graduate programs certified as meeting the standards of the National Association of Schools of Public Affairs and Administration (NASPAA).

The college offers master's degrees in accounting, business administration, economics, and public administration. The college also offers a Ph.D. program in business administration and a Ph.D. program in public administration and urban policy.

Also housed within the college is the Department of Military Science and Leadership. The mission of this department is to provide professional instruction and leadership development for selected students who desire to serve in the active or reserve components of the U.S. Army. Additional information about this program may be obtained through the Military Science and Leadership Department.

Graduate courses are taught in person during day and evening, and online to facilitate flexible combinations of formal learning and full- or part-time employment. Students come from a variety of backgrounds with undergraduate degrees from many different colleges and universities.

All graduate students are advised to check specific program requirements before enrolling in 400/500 level courses. Nondegree graduate students must satisfy the admission index for graduate study or receive special permission from the graduate program director in the Strome College of Business in order to enroll for graduate credit.

Mission and Vision Statements

The mission of the Strome College of Business is The Business of Problem Solving. Our vision is to be the preeminent source for problem solving in business, government, and non-profit organizations.

Departments

- Department of Economics (p. 115)
- Department of Information Technology and Decision Sciences (p. 117)
- School of Accountancy (p. 113)
- School of Public Service (p. 117)

Programs

Doctor of Philosophy Programs

- Business Administration with a Concentration in Finance (PhD) (p. 105)
- Business Administration with a Concentration in Information Technology/Supply Chain Management (PhD) (p. 107)
- Business Administration with a Concentration in Marketing (PhD) (p. 109)
- Business Administration with a Concentration in Strategic Management (PhD) (p. 111)
- Public Administration and Policy (PhD) (p. 123)

Master of Arts Program

- Economics (MA) (p. 115)

Master of Business Administration Programs

- Business Administration (MBA) (p. 104)

Master of Public Administration Programs

- Master of Public Administration (MPA) (p. 117)
- Public Administration with a Concentration in Multi-Sector Public Service (MPA) (p. 119)
- Public Administration with a Concentration in Nonprofit Management and Governance (MPA) (p. 121)

Master of Science Programs

- Accounting with a Concentration in Financial Management (MS) (p. 113)
- Accounting with a Concentration in Taxation (MS) (p. 114)

Certificate Programs

- Business Analytics and Big Data Certificate (p. 117)
- Public Administration and Policy Certificate (p. 127)
- Public Procurement and Contract Management Certificate (p. 127)

Centers and Institutes

Dragas Center for Economic Analysis and Policy

Robert McNab, Director

The primary objectives of the center are to conduct research and develop a knowledge base relating to regional issues concerning Hampton Roads. In addition, via its annual *State of the Region* report, the center provides a forum for analysis and discussions of vital issues relating to the region and its cities.

Loyalty Science Lab

Yuping Liu-Thompkins, Director

The Loyalty Science Lab at the Strome College of Business its mission is to create and promote cutting-edge scientific research on brand and customer loyalty. Through collaborative efforts between marketing practitioners and academic researchers from multiple disciplines and multiple industries, the Loyalty Science Lab identifies high-priority loyalty-related issues, engages in deep, evidence-based scientific research on these issues, and disseminates the insight to benefit loyalty research and practice. The Lab aims to become the go-to place for the best insights into brand and customer loyalty.

E. V. Williams Center for Real Estate

Simon Stevenson, Director

The mission of the E.V. Williams Center for Real Estate is to connect the multi-disciplinary analyses, innovative curriculum and research underway at Old Dominion University with students, industry and the public sector interested and engaged in the real estate and economic development communities. By hosting topical seminars on key development issues and

working closely with real estate and economic development professionals, the E.V. Williams Center builds relationships throughout the community, to facilitate research, growth and development. The E.V. Williams Center publishes annual real estate market reviews on the office, industrial, retail, single family and multi-family real estate markets and sponsors the Hampton Roads Real Estate Market Review and Forecast.

Insurance & Financial Services Center

Michael McShane, Director

The Insurance and Financial Services Center supports undergraduate and graduate curricula in the disciplines of professional financial planning and risk and insurance. In addition, it provides for active involvement with the Eastern Virginia financial services community as a placement, research, consultative, and resource agency. The center further supports educational programs and seminars for the profession including a professional development program for practitioners that leads to the designation of Professional Financial Planner (PFP).

Lumsden Trading Room & Research Lab

Andrew Cohen, Lab Manager

The students who take advantage of the resources in the Gregory A. Lumsden Trading Room and Research Lab will have an appealing skill to put on their resume. They can even use the lab to earn a Bloomberg Essentials Certificate or prepare for and take the Bloomberg Aptitude Test.

Thurmond Negotiations Lab

Contact: Aaron Arndt

The Thurmond Negotiations Lab was created from the generous donation of Dick Thurmond. A core mission of the Thurmond Negotiations Lab is to provide access to negotiation skills education in underserved Hampton Roads communities. His vision is to empower women through negotiations and we have made his vision central to our core mission.

Hudgins Transitional Entrepreneurship Lab

Contacts: Anil Nair, Jay O'Toole, Robert Pidduck

The Hudgins Transitional Entrepreneurship Lab is a research-driven academic lab that specializes in both advancing understanding of, and practically helping, local people to utilize entrepreneurship as a vehicle for specifically enhancing the sustainable prospects of underserved communities.

Strome Entrepreneurial Center

Contact: Sarah Jane Kirkland

The Strome Entrepreneurial Center helps guide University students, from any discipline, through the entrepreneurial process from nurturing ideas through the first stages of operation.

Jensen Communications Lab

The lab, made possible through a gift from George '70 and Linda '72 Jensen, provides an immersive, technology-rich laboratory and classroom setting for students to learn and develop tools to empower them in the workplace. This lab contains the latest communication technology so that students, no matter their field of business, can be successful.

Strome College of Business - Dean's Office Programs

Programs

Doctor of Philosophy Programs

- Business Administration with a Concentration in Finance (PhD) (p. 105)
- Business Administration with a Concentration in Information Technology/Supply Chain Management (PhD) (p. 107)

- Business Administration with a Concentration in Marketing (PhD) (p. 109)
- Business Administration with a Concentration in Strategic Management (PhD) (p. 111)

Master of Business Administration Programs

- Business Administration (MBA) (p. 104)

Master of Business Administration Business Administration (MBA)

Overview

Erika Marsillac, Program Director
Shanna Wood, Associate Program Director
Everett Judd, Recruitment and Engagement Coordinator

The Master of Business Administration (MBA) program at Old Dominion University is designed to present broad but thorough insights into the issues relevant for effective business management. The curriculum incorporates contemporary business topics yet stresses the core competencies every business professional must possess. Throughout the program, students develop the skills needed to be successful participants in a rapidly evolving, and increasingly global, business environment.

The Old Dominion University (ODU) MBA is offered on campus and online.

The program is accredited by AACSB – International.

Admission

The Strome College of Business's MBA program welcomes applicants who have earned bachelor's degrees from regionally accredited institutions. Admission to the program is competitive and is granted only to those who show high ability and likelihood of success in graduate business education.

Criteria used for admission include the candidate's undergraduate coursework GPA, graduate coursework GPA (if available), relevant work experience (if available), scores on GMAT or GRE tests (if available), career statement, and two letters of recommendation.

To apply, submit the following to the Graduate (for domestic applicants) or International (for Visa bearing applicants) Admissions Office:

- Official transcripts of previous college work (required). Initially, unofficial transcripts can be used but official transcripts are required after admission.
- Two letters of recommendation (required).
- Career statement (required). This statement should outline career goals and how the MBA helps toward achieving it.
- Evidence of English language skills (for non-native English speakers).
- Overview of prior work experience (optional).
- Test scores for GRE or GMAT test (optional).

For further information and questions concerning applications, contact:

ODU MBA Admissions
+1 (757) 683-3585
mbainfo@odu.edu

Curriculum Requirements

Curriculum adjustments for the MBA program are pending approval by the State Council of Higher Education for Virginia (SCHEV).

Business Foundations

MGMT 500	Managing Organizations	3
ECON 510	Economics for Managers	3
MBA 520	Spreadsheet Modeling	1
BNAL 530	Probability and Statistics	3
ACCT 540	Introduction to Accounting	3
Total Hours		13

Core Courses

MBA 610	The Problem-Solving Manager	3
ECON 620	Economic Decision-Making	3
IT/BNAL 630	Intelligent Systems & Business Analytics	3
ACCT 645	Accounting for Decision Making	3
MGMT 650	Managing People and Culture	3
FIN 660	Corporate Finance: Value Management and Creation	3
OPMT 670	Operations and Supply Chain Management	3
MKTG 680	Marketing and Customer Value Management	3
INBU 685	International Business and Trade	3
Total Hours		27
Capstone		
MGMT 690	Strategic Management	3
Total Hours		3
Total Credit Hours		43

Curriculum

MBA Electives and Concentrations

The MBA Program is no longer offering this concentration and does not require electives.

Foundations

The ODU MBA program is designed with both business and non-business undergraduates in mind. All students are required to meet the program's foundational course requirements to demonstrate mastery of the fundamental business concepts related to economics, accounting, probability and statistics, spreadsheet modeling, and management in organizations.

Sequence of Course Offerings

Students are strongly encouraged to follow one of the plans outlined on the program website for the most effective learning plan that meets an individual's schedule requirements. These plans are designed to both accommodate typical student program time-to-completion needs and ensure a successful path through the coursework to program completion.

If a student is unable to follow one of the prescribed degree completion plans, that student needs to contact the MBA Program Office to request an alternative path to degree completion.

Additional Requirements

Prior Learning, Internship and Independent Study

Students may apply a maximum of 6 credit hours earned through any combination of prior learning, internship, or independent study (only 3 credit hours are allowed from any category).

- Prior learning offers students the opportunity to translate their professional work knowledge into academic credit. 1-3 credits allowed.
- Internship opportunities offer on-the-job experiences to well-qualified students and are limited to those who have already made significant progress toward the completion of their MBA degree. 1-3 credits allowed.
- Independent study courses afford students the opportunity to work with a graduate-certified SCB faculty member on a topic of mutual interest, and must be arranged in advance. Faculty are not obligated to accept a student's petition for independent study. Independent study is reserved for students whose academic accomplishment is meritorious and whose potential for successful independent study is deemed sufficiently high. 1-3 credits allowed.

Transfer Credit

A maximum of 12 credit hours may be transferred from another AACSB-I program, other ODU graduate courses outside of the Strome College of Business, and / or prior learning coursework (including 6 credit hours earned

through prior learning, internship, or independent study as noted above) and applied toward the MBA course requirements.

Transfer credit is approved at the discretion of the MBA Program Office in consultation with the corresponding department faculty in the major field of study of the coursework to be reviewed.

Continuance Policy

The MBA Program follows the University's Graduate Continuance Policy.

Non-Degree Seeking Students

Old Dominion University permits non-degree seeking students to take up to 12 credit hours (refer to the catalog section on Non-Degree Seeking Applicants). In the MBA program, a distinction is made between those who can present competitive GMAT/GRE scores or GPA and those who cannot. The MBA Program requires an evaluation of GMAT/GRE scores or GPA to qualify for enrollment in Core Courses as a non-degree seeker. Unofficial copies of all transcripts can be used for this purpose. Details are outlined on the MBA website.

Linked MBA Program

A linked MBA program is available for exceptional undergraduate students currently pursuing a degree at Old Dominion University. Students may begin taking courses toward the MBA degree while still completing their undergraduate degrees. For specific information, please contact the MBA Program Office (mbainfo@odu.edu).

Doctor of Philosophy

Business Administration with a Concentration in Finance (PhD)

Harris Wu, Graduate Program Director
Katrina Davenport, Graduate Program Manager

The Doctor of Philosophy degree in business administration (Ph.D.) is a scholarly, research-based program with a professional orientation. The objective of the program is to prepare individuals of superior promise and potential for careers in higher education as faculty members engaged in teaching and research and for high level administrative and research careers in the private and public sectors. Persons completing the degree program must have demonstrated an in-depth knowledge of international business, research methods, and high potential for making significant contributions to their field of specialization in business.

The Ph.D. degree requires competence in basic disciplines of international business, research tools, and in one of the following concentrations: finance, information technology, marketing, or strategic management.

Admission Requirements

Work for the doctoral degree is usually preceded by the successful completion of a Master's degree in a business-related field (i.e., MBA) from a recognized AACSB-accredited college or university. The applicant must submit an application, official transcripts of all college or university-level work, provide Graduate Management Admission Test scores taken within the last five years, and provide three letters of recommendation, two from academic references, which attest to the individual's academic potential and ability for achievement. The applicant must also submit a personal statement of goals, approximately two to three pages, on how the completion of the doctoral program will assist in achieving personal and professional career goals.

The completed application materials will be reviewed by the graduate program director and faculty in the major area of study. They will evaluate the individual's abilities and motivation to succeed in the doctoral program. A personal interview may be required before the admission decision can be reached. A recommendation is made by the faculty and a final decision on admission is made by the graduate program director.

Curriculum Requirements

The following are the minimum requirements for the Ph.D. degree and must be considered in preparing the student’s plan of study:

1. Satisfactory completion of at least 48 semester hours of course work . (At least 48 hours of post-master’s course work (including dissertation) is a University requirement);
2. Demonstrated competency in the following areas: international business, research methods and techniques, and the chosen functional field of business. Passage of a comprehensive examination covering international coursework is required. A student may retake the International Business comprehensive examination only one time;
3. Acceptable performance on a written and oral candidacy examination in the major field of study. A student may retake the candidacy examinations only one time;
4. Completion of a dissertation representing the candidate’s ability to conduct scholarly, original research. The quality of this research should be such that it would be worthy of publication in a refereed, scholarly journal; and,
5. Successful oral defense of the dissertation.

Finance Concentration

Course	Title	Credit Hours
First Year		
Fall		
BUSN 800	Seminar in International Business	3
ECON 806	Econometrics I	3
FIN 864	Empirical Asset Pricing	3
Credit Hours		9
Spring		
ECON 807	Econometrics II	3
FIN 861	Seminar in Investments	3
FIN 865	Financial Econometrics Methods	3
Credit Hours		9
Second Year		
Fall		
ECON 808	Econometrics III	3
FIN 860	Advanced Financial Theory	3
FIN 862	Seminar in International Finance	3
Credit Hours		9
Spring		
FIN 863	Seminar in Current Financial Topics	3
MGMT 821	International Strategic Management	3
MKTG 826	Seminar in International Marketing Problems	3
Credit Hours		9
Third Year		
Fall		
FIN 899	Dissertation	6
Credit Hours		6
Spring		
FIN 899	Dissertation	6
Credit Hours		6

Fourth Year		
Fall		
FIN 899	Dissertation	3
Credit Hours		3
Spring		
FIN 899	Dissertation	3
Credit Hours		3
Total Credit Hours		54

International Business Comprehensive Examination to be taken in May after the completion of coursework in the second year of the program.

Field Comprehensive Examination to be taken in August after the completion of coursework in the second year of the program.

Additional Requirements

Retention Standards

To remain in good standing after admission to the program, students must maintain a minimum, cumulative grade point average of 3.20 in all graduate course work completed at the University. Students who fall below this minimum standard will have nine credit hours to remedy this deficiency. Further, students may earn no more than three credit hours with the grade of C. Any student receiving a grade lower than C in a graduate course work will be dismissed from the program.

Time Limitation and Residency

The Ph.D. program assumes that a well qualified and highly motivated student can complete all degree requirements in four years of full-time work. If a student is unable to pursue the degree on a full-time basis, or if the major field is different from previous academic training, more time to complete the degree is usually required. The maximum time allowed to complete all degree requirements is eight calendar years from the date of initial enrollment in the program.

Each student is required to complete at least four regular semesters in full-time residency. These need not be consecutive. Full-time residency is defined as a minimum of nine credit hours per semester.

Transfer Credit

A maximum of 12 semester-hour credits (or equivalent) may be transferred from another university (including six hours earned through experiential learning credit options) and applied toward the Ph.D. course requirements. Transfer credit is approved at the discretion of the program director in consultation with the faculty in the student’s major field of study.

Candidacy Examination

The examination qualifying the doctoral student for candidacy for the Ph.D. in business administration is comprehensive in nature and designed to test the student’s knowledge of subject matter in the major field, international business, and the ability to engage in independent research. These examinations are given in two parts:

1. international business and
2. field of study.

The International Business Exam is a written exam scheduled for the third week of May and may be taken by a student in good standing after the student has completed BUSN 800, FIN 862, MGMT 821, and MKTG 826 . The candidacy examination in the field of study is scheduled at the beginning of fall semester classes. Students in good standing may take the Field of Study Examination after completing all courses in their field which are to be taken during the first two years of the program. See Curriculum. The Field examination contains both a written and oral component. The written portion is administered first. After successful completion of the written examination, the student sits for an oral examination, which includes topics discussed in the written examination and any additional materials that the advisory committee feels are appropriate. The student will be expected

to perform well on both the written and oral components of the examination. Rather than being merely pro forma, the oral examination is a serious and integral part of the qualifying procedure for candidacy. A student must pass both the written and oral sections. The candidacy examinations are prepared and evaluated by the examination committees composed of the graduate faculty who are primarily responsible for teaching doctoral courses in international business and the field of study. The results of all examinations are reported to the student and program director.

Dissertation

The dissertation represents the final stage in obtaining the doctoral degree and provides evidence of the student's ability to conduct independent scholarly research. To effectively initiate, conduct, and conclude the dissertation phase of the program, the candidate must:

1. form a dissertation committee;
2. develop and defend a dissertation proposal;
3. complete the dissertation research and report the results in writing; and
4. orally defend the dissertation.

Dissertation Committee

The dissertation committee is formed by the student with the approval of the program director. The committee's purpose is to supervise the selection of the dissertation topic, constructively critique the research methodology, and serve as a guidance body until its completion. The committee should have at least three members, one of whom is from outside the department of the major field of study. The chair of the committee will be from the candidate's major field and be an authority in the field of specialization chosen for the dissertation research. The proposal, dissertation, and the final oral defense of the dissertation must have the majority approval of the members of the dissertation committee and subsequent approval by the program director and dean of the college.

Dissertation Proposal Defense

A candidate will select a topic for dissertation research under the guidance of his/her committee. The candidate will defend a proposal for the dissertation demonstrating the originality of the research, requisite literature review, and the methodology that will be used in conducting the research. The committee will judge the merits of the proposal, making any suggestions and/or additions as deemed necessary, and approve the proposal in writing, providing copies to the program director.

Dissertation Research and Preparation

Progress on the dissertation should be reported on a periodic basis to the chair of the dissertation committee and the appropriate members. In most instances, research results, drafts of the manuscript, and guidance will be forthcoming between the committee and the candidate during the research phase. While preparing the dissertation, candidates must be continuously enrolled for a minimum of one credit hour per semester. The total number of credit hours for the dissertation shall be no less than 18 and no more than 24 credit hours. Advice or assistance from committee members should not be expected unless the candidate is officially enrolled. General regulations and procedures governing the submission of the doctoral dissertation are provided in the University Guide for Preparation of Theses and Dissertations available from the Office of the University Registrar.

Oral Dissertation Defense

The objective of the oral defense of the dissertation is to explore with the candidate the methodological and substantive contributions of the dissertation. Through this process, the examiners and the candidate reach a common understanding of the research area and can mutually agree upon its merits for publication. Majority approval by the examiners constitutes successful completion of the defense of the dissertation. The Doctor of Philosophy in business administration will be awarded upon successful completion of this examination and all other program requirements within the eight-year time limit.

Doctor of Philosophy Business Administration with a Concentration in Information Technology/Supply Chain Management (PhD)

Harris Wu, Graduate Program Director

Katrina Davenport, Graduate Program Manager

The Doctor of Philosophy degree in business administration (Ph.D.) is a scholarly, research-based program with a professional orientation. The objective of the program is to prepare individuals of superior promise and potential for careers in higher education as faculty members engaged in teaching and research and for high level administrative and research careers in the private and public sectors. Persons completing the degree program must have demonstrated an in-depth knowledge of international business, research methods, and high potential for making significant contributions to their field of specialization in business.

The Ph.D. degree requires competence in basic disciplines of international business, research tools, and in one of the following concentrations: finance, information technology, marketing, or strategic management.

Admission Requirements

Work for the doctoral degree is usually preceded by the successful completion of a Master's degree in a business related field (i.e., MBA) from a recognized AACSB-accredited college or university. The applicant must submit an application, official transcripts of all college or university-level work, provide scores on the Graduate Management Admission Test taken within the last five years, and provide three letters of recommendation, two from academic references, which attest to the individual's academic potential and ability for achievement. The applicant must also submit a personal statement of goals, approximately two to three pages, on how the completion of the doctoral program will assist in achieving personal and professional career goals.

The completed application materials will be reviewed by the graduate program director and faculty in the major area of study. They will evaluate the individual's abilities and motivation to succeed in the doctoral program. A personal interview may be required before the admission decision can be reached. A recommendation is made by the faculty and a final decision on admission is made by the graduate program director.

Curriculum Requirements

The following are the minimum requirements for the Ph.D. degree and must be considered in preparing the student's plan of study:

1. Satisfactory completion of at least 48 semester hours of course work . (At least 48 hours of post-master's course work (including dissertation) is a University requirement);
2. Demonstrated competency in the following areas: international business, research methods and techniques, and the chosen functional field of business. Passage of a comprehensive examination covering international coursework is required. A student may retake the International Business comprehensive examination only one time;
3. Acceptable performance on a written and oral candidacy examination in the major field of study. A student may retake the candidacy examinations only one time;
4. Completion of a dissertation representing the candidate's ability to conduct scholarly, original research. The quality of this research should be such that it would be worthy of publication in a refereed, scholarly journal; and,
5. Successful oral defense of the dissertation.

Information Technology/Supply Chain Management Concentration

Course	Title	Credit Hours
First Year		
Fall		
BNAL 711	Multivariate Statistical Methods for Business	3
BUSN 800	Seminar in International Business	3
IT 800	Theoretical Foundation in Information Technology Research	3
Credit Hours		9
Spring		
BNAL 712	Advanced Statistical Models in Business Research	3
IT 850	Enterprise Architecture and Computing Algorithms	3
MKTG 826	Seminar in International Marketing Problems	3
Credit Hours		9
Second Year		
Fall		
FIN 862	Seminar in International Finance	3
IT 890	Seminar in Business Process and Enterprise Systems	3
IT 891	Seminar in Business Intelligence	3
Credit Hours		9
Spring		
IT 892	Seminar in Knowledge Management	3
IT 893	Supply Chain in E-Business Environment	3
MGMT 821	International Strategic Management	3
Credit Hours		9
Third Year		
Fall		
IT 899	Dissertation	6
Credit Hours		6
Spring		
IT 899	Dissertation	6
Credit Hours		6
Fourth Year		
Fall		
IT 899	Dissertation	3
Credit Hours		3
Spring		
IT 899	Dissertation	3
Credit Hours		3
Total Credit Hours		54

International Business Comprehensive Examination to be taken in May after the completion of coursework in the second year of the program.

Field Comprehensive Examination to be taken in August after the completion of coursework in the second year of the program.

Additional Requirements

Retention Standards

To remain in good standing after admission to the program, students must maintain a minimum, cumulative grade point average of 3.20 in all graduate course work completed at the University. Students who fall below this minimum standard will have nine credit hours to remedy this deficiency. Further, students may earn no more than three credit hours with the grade of C. Any student receiving a grade lower than C in a graduate course work will be dismissed from the program.

Time Limitation and Residency

The Ph.D. program assumes that a well qualified and highly motivated student can complete all degree requirements in four years of full-time work. If a student is unable to pursue the degree on a full-time basis, or if the major field is different from previous academic training, more time to complete the degree is usually required. The maximum time allowed to complete all degree requirements is eight calendar years from the date of initial enrollment in the program.

Each student is required to complete at least four regular semesters in full-time residency. These need not be consecutive. Full-time residency is defined as a minimum of nine credit hours per semester.

Transfer Credit

A maximum of 12 semester-hour credits (or equivalent) may be transferred from another university (including six hours earned through experiential learning credit options) and applied toward the Ph.D. course requirements. Transfer credit is approved at the discretion of the program director in consultation with the faculty in the student's major field of study.

Candidacy Examination

The examination qualifying the doctoral student for candidacy for the Ph.D. in business administration is comprehensive in nature and designed to test the student's knowledge of subject matter in the major field, international business, and the ability to engage in independent research. These examinations are given in two parts:

1. international business and
2. field of study.

The International Business Exam is a written exam scheduled for the third week of May and may be taken by a student in good standing after the student has completed BUSN 800, FIN 862, MGMT 821, and MKTG 826. The candidacy examination in the field of study is scheduled at the beginning of fall semester classes. Students in good standing may take the Field of Study Examination after completing all courses in their field which are to be taken during the first two years of the program. See Curriculum. The Field examination contains both a written and oral component. The written portion is administered first. After successful completion of the written examination, the student sits for an oral examination, which includes topics discussed in the written examination and any additional materials that the advisory committee feels are appropriate. The student will be expected to perform well on both the written and oral components of the examination. Rather than being merely pro forma, the oral examination is a serious and integral part of the qualifying procedure for candidacy. A student must pass both the written and oral sections. The candidacy examinations are prepared and evaluated by the examination committees composed of the graduate faculty who are primarily responsible for teaching doctoral courses in international business and the field of study. The results of all examinations are reported to the student and program director.

Dissertation

The dissertation represents the final stage in obtaining the doctoral degree and provides evidence of the student's ability to conduct independent scholarly research. To effectively initiate, conduct, and conclude the dissertation phase of the program, the candidate must:

1. form a dissertation committee;
2. develop and defend a dissertation proposal;
3. complete the dissertation research and report the results in writing; and
4. orally defend the dissertation.

Dissertation Committee

The dissertation committee is formed by the student with the approval of the program director. The committee's purpose is to supervise the selection of the dissertation topic, constructively critique the research methodology, and serve as a guidance body until its completion. The committee should have at least three members, one of whom is from outside the department of the major field of study. The chair of the committee will be from the candidate's major field and be an authority in the field of specialization chosen for the dissertation research. The proposal, dissertation, and the final oral defense of the dissertation must have the majority approval of the members of the dissertation committee and subsequent approval by the program director and dean of the college.

Dissertation Proposal Defense

A candidate will select a topic for dissertation research under the guidance of his/her committee. The candidate will defend a proposal for the dissertation demonstrating the originality of the research, requisite literature review, and the methodology that will be used in conducting the research. The committee will judge the merits of the proposal, making any suggestions and/or additions as deemed necessary, and approve the proposal in writing, providing copies to the program director.

Dissertation Research and Preparation

Progress on the dissertation should be reported on a periodic basis to the chair of the dissertation committee and the appropriate members. In most instances, research results, drafts of the manuscript, and guidance will be forthcoming between the committee and the candidate during the research phase. While preparing the dissertation, candidates must be continuously enrolled for a minimum of one credit hour per semester. The total number of credit hours for the dissertation shall be no less than 18 and no more than 24 credit hours. Advice or assistance from committee members should not be expected unless the candidate is officially enrolled. General regulations and procedures governing the submission of the doctoral dissertation are provided in the University Guide for Preparation of Theses and Dissertations available from the Office of the University Registrar.

Oral Dissertation Defense

The objective of the oral defense of the dissertation is to explore with the candidate the methodological and substantive contributions of the dissertation. Through this process, the examiners and the candidate reach a common understanding of the research area and can mutually agree upon its merits for publication. Majority approval by the examiners constitutes successful completion of the defense of the dissertation. The Doctor of Philosophy in business administration will be awarded upon successful completion of this examination and all other program requirements within the eight-year time limit.

Doctor of Philosophy Business Administration with a Concentration in Marketing (PhD)

Harris Wu, Graduate Program Director
Katrina Davenport, Graduate Program Manager

The Doctor of Philosophy degree in business administration (Ph.D.) is a scholarly, research-based program with a professional orientation. The objective of the program is to prepare individuals of superior promise and potential for careers in higher education as faculty members engaged in teaching and research and for high level administrative and research careers in the private and public sectors. Persons completing the degree program must have demonstrated an in-depth knowledge of international business,

research methods, and high potential for making significant contributions to their field of specialization in business.

The Ph.D. degree requires competence in basic disciplines of international business, research tools, and in one of the following concentrations: finance, information technology, marketing, or strategic management.

Admission Requirements

Work for the doctoral degree is usually preceded by the successful completion of a Master's degree in a business related field (i.e., MBA) from a recognized AACSB-accredited college or university. The applicant must submit an application, official transcripts of all college or university-level work, provide scores on the Graduate Management Admission Test taken within the last five years, and provide three letters of recommendation, two from academic references, which attest to the individual's academic potential and ability for achievement. The applicant must also submit a personal statement of goals, approximately two to three pages, on how the completion of the doctoral program will assist in achieving personal and professional career goals.

The completed application materials will be reviewed by the graduate program director and faculty in the major area of study. They will evaluate the individual's abilities and motivation to succeed in the doctoral program. A personal interview may be required before the admission decision can be reached. A recommendation is made by the faculty and a final decision on admission is made by the graduate program director.

Curriculum Requirements

The following are the minimum requirements for the Ph.D. degree and must be considered in preparing the student's plan of study:

1. Satisfactory completion of at least 48 semester hours of course work . (At least 48 hours of post-master's course work (including dissertation) is a University requirement);
2. Demonstrated competency in the following areas: international business, research methods and techniques, and the chosen functional field of business. Passage of a comprehensive examination covering international coursework is required. A student may retake the International Business comprehensive examination only one time;
3. Acceptable performance on a written and oral candidacy examination in the major field of study. A student may retake the candidacy examinations only one time;
4. Completion of a dissertation representing the candidate's ability to conduct scholarly, original research. The quality of this research should be such that it would be worthy of publication in a refereed, scholarly journal; and,
5. Successful oral defense of the dissertation.

Marketing Concentration

Course	Title	Credit Hours
First Year		
Fall		
BNAL 711	Multivariate Statistical Methods for Business	3
BUSN 800	Seminar in International Business	3
MKTG 801	Seminar in Marketing Theory: History and Current Topics	3
Credit Hours		9
Spring		
BNAL 712	Advanced Statistical Models in Business Research	3
MKTG 802	Seminar in Marketing Concepts and Issues	3

MKTG 826	Seminar in International Marketing Problems	3
Credit Hours		9
Second Year		
Fall		
MKTG 803	Seminar in Consumer Behavior	3
MKTG 813	Fundamentals of Survey Research	3
FIN 862	Seminar in International Finance	3
Credit Hours		9
Spring		
MKTG 814	Seminar in Advanced Marketing Methodology	3
MGMT 821	International Strategic Management	3
MKTG 827	Seminar in Marketing Planning and Strategy	3
Credit Hours		9
Third Year		
Fall		
MKTG 899	Dissertation Research	6
Credit Hours		6
Spring		
MKTG 899	Dissertation Research	6
Credit Hours		6
Fourth Year		
Fall		
MKTG 899	Dissertation Research	3
Credit Hours		3
Spring		
MKTG 899	Dissertation Research	3
Credit Hours		3
Total Credit Hours		54

International Business Comprehensive Examination to be taken in May after the completion of coursework in the second year of the program.

Field Comprehensive Examination to be taken in August after the completion of coursework in the second year of the program.

Additional Requirements

Retention Standards

To remain in good standing after admission to the program, students must maintain a minimum, cumulative grade point average of 3.20 in all graduate course work completed at the University. Students who fall below this minimum standard will have nine credit hours to remedy this deficiency. Further, students may earn no more than three credit hours with the grade of C. Any student receiving a grade lower than C in a graduate course work will be dismissed from the program.

Time Limitation and Residency

The Ph.D. program assumes that a well qualified and highly motivated student can complete all degree requirements in four years of full-time work. If a student is unable to pursue the degree on a full-time basis, or if the major field is different from previous academic training, more time to complete the degree is usually required. The maximum time allowed to complete all degree requirements is eight calendar years from the date of initial enrollment in the program.

Each student is required to complete at least four regular semesters in full-time residency. These need not be consecutive. Full-time residency is defined as a minimum of nine credit hours per semester.

Transfer Credit

A maximum of 12 semester-hour credits (or equivalent) may be transferred from another university (including six hours earned through experiential learning credit options) and applied toward the Ph.D. course requirements. Transfer credit is approved at the discretion of the program director in consultation with the faculty in the student's major field of study.

Candidacy Examination

The examination qualifying the doctoral student for candidacy for the Ph.D. in business administration is comprehensive in nature and designed to test the student's knowledge of subject matter in the major field, international business, and the ability to engage in independent research. These examinations are given in two parts:

1. international business and
2. field of study.

The International Business Exam is a written exam scheduled for the third week of May and may be taken by a student in good standing after the student has completed BUSN 800, FIN 862, MGMT 821, and MKTG 826. The candidacy examination in the field of study is scheduled at the beginning of fall semester classes. Students in good standing may take the Field of Study Examination after completing all courses in their field which are to be taken during the first two years of the program. See Curriculum. The Field examination contains both a written and oral component. The written portion is administered first. After successful completion of the written examination, the student sits for an oral examination, which includes topics discussed in the written examination and any additional materials that the advisory committee feels are appropriate. The student will be expected to perform well on both the written and oral components of the examination. Rather than being merely pro forma, the oral examination is a serious and integral part of the qualifying procedure for candidacy. A student must pass both the written and oral sections. The candidacy examinations are prepared and evaluated by the examination committees composed of the graduate faculty who are primarily responsible for teaching doctoral courses in international business and the field of study. The results of all examinations are reported to the student and program director.

Dissertation

The dissertation represents the final stage in obtaining the doctoral degree and provides evidence of the student's ability to conduct independent scholarly research. To effectively initiate, conduct, and conclude the dissertation phase of the program, the candidate must:

1. form a dissertation committee;
2. develop and defend a dissertation proposal;
3. complete the dissertation research and report the results in writing; and
4. orally defend the dissertation.

Dissertation Committee

The dissertation committee is formed by the student with the approval of the program director. The committee's purpose is to supervise the selection of the dissertation topic, constructively critique the research methodology, and serve as a guidance body until its completion. The committee should have at least three members, one of whom is from outside the department of the major field of study. The chair of the committee will be from the candidate's major field and be an authority in the field of specialization chosen for the dissertation research. The proposal, dissertation, and the final oral defense of the dissertation must have the majority approval of the members of the dissertation committee and subsequent approval by the program director and dean of the college.

Dissertation Proposal Defense

A candidate will select a topic for dissertation research under the guidance of his/her committee. The candidate will defend a proposal for the dissertation demonstrating the originality of the research, requisite literature review,

and the methodology that will be used in conducting the research. The committee will judge the merits of the proposal, making any suggestions and/or additions as deemed necessary, and approve the proposal in writing, providing copies to the program director.

Dissertation Research and Preparation

Progress on the dissertation should be reported on a periodic basis to the chair of the dissertation committee and the appropriate members. In most instances, research results, drafts of the manuscript, and guidance will be forthcoming between the committee and the candidate during the research phase. While preparing the dissertation, candidates must be continuously enrolled for a minimum of one credit hour per semester. The total number of credit hours for the dissertation shall be no less than 18 and no more than 24 credit hours. Advice or assistance from committee members should not be expected unless the candidate is officially enrolled. General regulations and procedures governing the submission of the doctoral dissertation are provided in the University Guide for Preparation of Theses and Dissertations available from the Office of the University Registrar.

Oral Dissertation Defense

The objective of the oral defense of the dissertation is to explore with the candidate the methodological and substantive contributions of the dissertation. Through this process, the examiners and the candidate reach a common understanding of the research area and can mutually agree upon its merits for publication. Majority approval by the examiners constitutes successful completion of the defense of the dissertation. The Doctor of Philosophy in business administration will be awarded upon successful completion of this examination and all other program requirements within the eight-year time limit.

Doctor of Philosophy Business Administration with a Concentration in Strategic Management (PhD)

Harris Wu, Graduate Program Director
Katrina Davenport, Graduate Program Manager

The Doctor of Philosophy degree in business administration (Ph.D.) is a scholarly, research-based program with a professional orientation. The objective of the program is to prepare individuals of superior promise and potential for careers in higher education as faculty members engaged in teaching and research and for high level administrative and research careers in the private and public sectors. Persons completing the degree program must have demonstrated an in-depth knowledge of international business, research methods, and high potential for making significant contributions to their field of specialization in business.

The Ph.D. degree requires competence in basic disciplines of international business, research tools, and in one of the following concentrations: finance, information technology, marketing, or strategic management.

Admission Requirements

Work for the doctoral degree is usually preceded by the successful completion of a Master's degree in a business-related field (i.e., MBA) from a recognized AACSB-accredited college or university. The applicant must submit an application, official transcripts of all college or university-level work, provide Graduate Management Admission Test scores taken within the last five years, and provide three letters of recommendation, two from academic references, which attest to the individual's academic potential and ability for achievement. The applicant must also submit a personal statement of goals, approximately two to three pages, on how the completion of the doctoral program will assist in achieving personal and professional career goals.

The completed application materials will be reviewed by the graduate program director and faculty in the major area of study. They will evaluate the individual's abilities and motivation to succeed in the doctoral program. A personal interview may be required before the admission decision can be

reached. A recommendation is made by the faculty and a final decision on admission is made by the graduate program director.

Curriculum Requirements

The following are the minimum requirements for the Ph.D. degree and must be considered in preparing the student's plan of study:

1. Satisfactory completion of at least 48 semester hours of course work . (At least 48 hours of post-master's course work (including dissertation) is a University requirement);
2. Demonstrated competency in the following areas: international business, research methods and techniques, and the chosen functional field of business. Passage of a comprehensive examination covering international coursework is required. A student may retake the International Business comprehensive examination only one time;
3. Acceptable performance on a written and oral candidacy examination in the major field of study. A student may retake the candidacy examinations only one time;
4. Completion of a dissertation representing the candidate's ability to conduct scholarly, original research. The quality of this research should be such that it would be worthy of publication in a refereed, scholarly journal; and,
5. Successful oral defense of the dissertation.

Strategic Management Concentration

Course	Title	Credit Hours
First Year		
Fall		
BUSN 800	Seminar in International Business *	3
ECON 700	Economic Analytics	3
MGMT 836	Corporate Strategy Seminar	3
Credit Hours		9
Spring		
ECON 706	Econometrics I	3
MKTG 826	Seminar in International Marketing Problems *	3
MGMT 835	Organization Theory	3
Credit Hours		9
Second Year		
Fall		
ECON 708	Econometrics III	3
FIN 862	Seminar in International Finance *	3
MGMT 838	Strategic Entrepreneurship Seminar	3
Credit Hours		9
Spring		
MGMT 821	International Strategic Management *	3
MGMT 837	Business Strategy Seminar	3
MGMT 890	Advanced Topics in Strategy	3
Credit Hours		9
Third Year		
Fall		
MGMT 899	Dissertation	6
Credit Hours		6

Spring		
MGMT 899	Dissertation	6
	Credit Hours	6
Fourth Year		
Fall		
MGMT 899	Dissertation	3
	Credit Hours	3
Spring		
MGMT 899	Dissertation	3
	Credit Hours	3
	Total Credit Hours	54

International Business Comprehensive Examination to be taken in May after the completion of coursework in the second year of the program.

Field Comprehensive Examination to be taken in August after the completion of coursework in the second year of the program.

Additional Requirements

Retention Standards

To remain in good standing after admission to the program, students must maintain a minimum, cumulative grade point average of 3.20 in all graduate course work completed at the University. Students who fall below this minimum standard will have nine credit hours to remedy this deficiency. Further, students may earn no more than three credit hours with the grade of C. Any student receiving a grade lower than C in a graduate course work will be dismissed from the program.

Time Limitation and Residency

The Ph.D. program assumes that a well qualified and highly motivated student can complete all degree requirements in four years of full-time work. If a student is unable to pursue the degree on a full-time basis, or if the major field is different from previous academic training, more time to complete the degree is usually required. The maximum time allowed to complete all degree requirements is eight calendar years from the date of initial enrollment in the program.

Each student is required to complete at least four regular semesters in full-time residency. These need not be consecutive. Full-time residency is defined as a minimum of nine credit hours per semester.

Transfer Credit

A maximum of 12 semester-hour credits (or equivalent) may be transferred from another university (including six hours earned through experiential learning credit options) and applied toward the Ph.D. course requirements. Transfer credit is approved at the discretion of the program director in consultation with the faculty in the student's major field of study.

Candidacy Examination

The examination qualifying the doctoral student for candidacy for the Ph.D. in business administration is comprehensive in nature and designed to test the student's knowledge of subject matter in the major field, international business, and the ability to engage in independent research. These examinations are given in two parts:

1. international business and
2. field of study.

The International Business Exam is a written exam scheduled for the third week of May and may be taken by a student in good standing after the student has completed BUSN 800, FIN 862, MGMT 821, and MKTG 826. The candidacy examination in the field of study is scheduled at the beginning of fall semester classes. Students in good standing may take the Field of Study Examination after completing all courses in their field which are to be taken during the first two years of the program. See Curriculum. The Field examination contains both a written and oral component. The

written portion is administered first. After successful completion of the written examination, the student sits for an oral examination, which includes topics discussed in the written examination and any additional materials that the advisory committee feels are appropriate. The student will be expected to perform well on both the written and oral components of the examination. Rather than being merely pro forma, the oral examination is a serious and integral part of the qualifying procedure for candidacy. A student must pass both the written and oral sections. The candidacy examinations are prepared and evaluated by the examination committees composed of the graduate faculty who are primarily responsible for teaching doctoral courses in international business and the field of study. The results of all examinations are reported to the student and program director.

Dissertation

The dissertation represents the final stage in obtaining the doctoral degree and provides evidence of the student's ability to conduct independent scholarly research. To effectively initiate, conduct, and conclude the dissertation phase of the program, the candidate must:

1. form a dissertation committee;
2. develop and defend a dissertation proposal;
3. complete the dissertation research and report the results in writing; and
4. orally defend the dissertation.

Dissertation Committee

The dissertation committee is formed by the student with the approval of the program director. The committee's purpose is to supervise the selection of the dissertation topic, constructively critique the research methodology, and serve as a guidance body until its completion. The committee should have at least three members, one of whom is from outside the department of the major field of study. The chair of the committee will be from the candidate's major field and be an authority in the field of specialization chosen for the dissertation research. The proposal, dissertation, and the final oral defense of the dissertation must have the majority approval of the members of the dissertation committee and subsequent approval by the program director and dean of the college.

Dissertation Proposal Defense

A candidate will select a topic for dissertation research under the guidance of his/her committee. The candidate will defend a proposal for the dissertation demonstrating the originality of the research, requisite literature review, and the methodology that will be used in conducting the research. The committee will judge the merits of the proposal, making any suggestions and/or additions as deemed necessary, and approve the proposal in writing, providing copies to the program director.

Dissertation Research and Preparation

Progress on the dissertation should be reported on a periodic basis to the chair of the dissertation committee and the appropriate members. In most instances, research results, drafts of the manuscript, and guidance will be forthcoming between the committee and the candidate during the research phase. While preparing the dissertation, candidates must be continuously enrolled for a minimum of one credit hour per semester. The total number of credit hours for the dissertation shall be no less than 18 and no more than 24 credit hours. Advice or assistance from committee members should not be expected unless the candidate is officially enrolled. General regulations and procedures governing the submission of the doctoral dissertation are provided in the University Guide for Preparation of Theses and Dissertations available from the Office of the University Registrar.

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completion of this examination and all other program requirements within the eight-year time limit.

School of Accountancy

2155 Constant Hall
(757) 683-3177

Hong (Kim) Duong, Ph.D., Chair

Master of Science, Accounting

Frank Holman, Graduate Program Director

Accounting services are becoming both broader and more specialized. The major changes that have occurred in the accounting profession dictate expanded and updated educational programs. An ideal model for a professional accounting education embodies a Master of Science (MS) in Accounting program that augments a broad undergraduate education. The MS in Accounting program at Old Dominion University is designed to accommodate both full-time and part-time students with courses offered in the evenings.

Programs

Master of Science Program

- Accounting with a Concentration in Financial Management (MS) (p. 113)
- Accounting with a Concentration in Taxation (MS) (p. 114)

Linked BSBA/MS in Accounting

Undergraduate students pursuing a BSBA in accounting at Old Dominion University may complete up to nine hours toward a Master of Science, Accounting (MS) degree by choosing from ACCT 623, ACCT 626, ACCT 627, ACCT 630, and ACCT 662 while enrolled as an undergraduate BSBA student. Students in the linked BSBA/MS program must earn a minimum of 150 credit hours (120 discrete credit hours for the undergraduate degree and 30 discrete credit hours for the graduate degree).

A student may apply to the linked BSBA/MS program after completing ACCT 305 and 12 hours from ACCT 306, ACCT 307, ACCT 311, ACCT 425, or ACCT 426 with a C or better. Students must have an overall grade point average of 3.00 in all course work taken at Old Dominion University to be admitted to the linked program. Students must apply for admission to the MS program after completion of the undergraduate degree. Students should note that being in the undergraduate accounting major does not guarantee acceptance to the MS program.

Once admitted to the linked program, a student will take 600-level core graduate accounting courses, and these courses will be applied to the MS course requirements as long as the student already has 120 discrete credit hours for the undergraduate degree. By completing these nine hours, students will only have 21 hours to complete in the MS program during an additional year of study after graduating from the undergraduate program as long as the student earns 120 discrete credit hours for the undergraduate degree and 30 discrete credit hours for the graduate degree for a total of 150 credit hours.

Master of Science Accounting with a Concentration in Financial Management (MS)

Frank Holman, Graduate Program Director

Objective: To provide a curriculum that facilitates the promotion of professional judgment/skepticism and critical thinking skills that add value in decision making.

Focus: Students have the option of aligning coursework based on two areas of interest (concentrations): *Financial Management* addresses the needs of students who have an interest in operational and financial decision making,

and *Taxation* provides the requisite skills set for those interested in tax compliance and planning. Both associate with careers in Public Accounting, Industry, or Government/Not-For-Profit organizations and prepare students for the CPA and other professional designations/licenses (i.e. CMA, CIA, CFE, CISA, CGFM, etc.).

Admission Requirements

Prospective students may apply for admission to the program for the fall, spring, and summer semesters. Admission is granted to those who demonstrate the likelihood of successful completion of this graduate accounting program.

Criteria for admission include cumulative undergraduate and upper-level accounting grade-point averages (GPA), and Graduate Management Admission Test (GMAT) scores. In general: applicants should possess a cumulative undergraduate GPA of 2.8 or higher; and applicants should possess an upper-level accounting course GPA of 3.0 or higher. The sum of the GMAT score plus 200 times the upper-level accounting curriculum GPA should equal 1,000.

For students without a degree in accounting, the cumulative upper level accounting GPA of 3.0 will be based on performance in the following prerequisite courses (with no grade below a C.): ACCT 305, Essentials of Financial Accounting I; ACCT 306, Essentials of Financial Accounting II; ACCT 311, Managerial Accounting; ACCT 425, Taxation of Individuals; and **ACCT 411**, Financial Auditing.

To be considered for admission, the following must be submitted to the Office of Graduate Admissions:

- application forms (may be done on-line) for graduate study in business,
- official transcripts of all previous college work,
- one letter of recommendation,
- a brief resume,
- an one-page essay setting forth the applicant's work experience, and goals and objectives for the program, and
- scores on the Graduate Management Admission Test (GMAT) if applicable.

Applicants whose native language is not English are also required to submit an acceptable score on the Test of English as a Foreign Language (TOEFL) Exam.

The following courses are prerequisites to the MS, Accounting program:

Financial Accounting

ACCT 201	Principles of Financial Accounting *	3
ACCT 305	Essentials of Financial Accounting I	3
ACCT 306	Essentials of Financial Accounting II	3
ACCT 411	Financial Auditing	3

Management Accounting

ACCT 202	Principles of Managerial Accounting *	3
ACCT 311	Managerial Accounting (Three Hours of Taxation) *	3

Taxation

ACCT 425	Taxation of Individuals	3

Economics, Statistics/Business Analytics, Marketing, Information Technology, Finance, and Commercial Law

Select 18 credits	18

Total Credit Hours	39

* Or equivalent from an accredited institution.

Application deadlines are July 1 for fall admission, November 1 for spring admission, and April 1 for summer admission. International student deadlines are April 15 (fall semester), October 1 (spring semester), and February 15 (summer semester).

Applicants who have not obtained an acceptable GMAT score, or an acceptable TOEFL score for those applicants whose native language is not English, will not be permitted to enroll in graduate accounting courses.

GMAT Waiver

Applicants can waive taking the GMAT and disregard the GMAT-related admission requirements if any of the following are met:

- Applicant has passed all parts of the United States Uniform CPA exam;
- Applicant holds a Masters Degree with a posted GPA of 3.0 or higher;
- Applicant is a member of the Old Dominion University chapter of Beta Alpha Psi with a posted GPA of 3.0 in upper level accounting courses; or
- Applicant has a Bachelors Degree with an overall GPA of 3.0 overall and in the prerequisite accounting courses with a grade of C or better in the prerequisite accounting courses.

Curriculum Requirements

A minimum of 30 semester hours of graduate courses are required to complete the MS, Accounting program. Students must maintain a cumulative grade point average of a least 3.00 in all graduate work taken.

Accounting Core

Foundation Strengthening Courses

ACCT 623	Accounting Analytics and Operational Reviews	3
ACCT 626	Financial and Global Accounting	3
ACCT 627	Operational Cost Control	3
ACCT 630	Business Valuations using Financial Statement Analysis	3
ACCT 662	Tax Procedure and Practice	3
Total Credit Hours		15

Financial Management Concentration

Select 15 credits from the following list

ACCT 624	Information Technology Assurance Services ***	3
ACCT 625	Fraud Examination and Forensic Accounting	3
ACCT 640	Professional Ethics and Legal Issues In Accounting	3
ACCT 650	Tax Strategies for Business Decisions	3
ACCT 668	Accounting Internship *	1-3
ACCT 695	Selected Topics in Accounting *	3
ACCT 697	Independent Study in Taxation *	3
ACCT 727	Strategic Cost Management	3
ACCT 730	Financial Management Decision Making	3
ACCT 747	Seminar in Controllorship	3
ACCT 998	Master's Graduate Credit *	1
Total Credit Hours for Concentration		15
Total Program Hours		30

* Students may only take 6 hours in these courses.

*** Recommended for students wishing to pursue a career in Public Sector Finance.

Master of Science Accounting with a Concentration in Taxation (MS)

Frank Holman, Graduate Program Director

Objective: To provide a curriculum that facilitates the promotion of professional judgment/skepticism and critical thinking skills that add value in decision making.

Focus: Students have the option of aligning coursework based on two areas of interest (concentrations): *Financial Management* addresses the needs of students who have an interest in operational and financial decision making, and *Taxation* provides the requisite skills set for those interested in tax compliance and planning. Both associate with careers in Public Accounting, Industry, or Government/Not-For-Profit organizations and prepare students for the CPA and other professional designations/licenses (i.e. CMA, CIA, CFE, CISA, CGFM, etc.).

Admission Requirements

Prospective students may apply for admission to the program for the fall, spring, and summer semesters. Admission is granted to those who demonstrate the likelihood of successful completion of this graduate accounting program.

Criteria for admission include cumulative undergraduate and upper-level accounting grade-point averages (GPA), and Graduate Management Admission Test (GMAT) scores. In general: applicants should possess a cumulative undergraduate GPA of 2.8 or higher; and applicants should possess an upper-level accounting course GPA of 3.0 or higher. The sum of the GMAT score plus 200 times the upper-level accounting curriculum GPA should equal 1,000.

For students without a degree in accounting, the cumulative upper level accounting GPA of 3.0 will be based on performance in the following prerequisite courses (with no grade below a C.): ACCT 305, Essentials of Financial Accounting I; ACCT 306, Essentials of Financial Accounting II; ACCT 311, Managerial Accounting; ACCT 425, Taxation of Individuals; and **ACCT 411**, Financial Auditing.

To be considered for admission, the following must be submitted to the Office of Graduate Admissions:

1. application forms (may be done on-line) for graduate study in business,
2. official transcripts of all previous college work,
3. one letter of recommendation,
4. a brief resume,
5. an one-page essay setting forth the applicant's work experience, and goals and objectives for the program, and
6. scores on the Graduate Management Admission Test (GMAT) if applicable.

Applicants whose native language is not English are also required to submit an acceptable score on the Test of English as a Foreign Language (TOEFL) Exam.

The following courses are prerequisites to the MS, Accounting program:

Financial Accounting

ACCT 201	Principles of Financial Accounting *	3
ACCT 305	Essentials of Financial Accounting I	3
ACCT 306	Essentials of Financial Accounting II	3
ACCT 411	Financial Auditing	3

Management Accounting

ACCT 202	Principles of Managerial Accounting *	3
ACCT 311	Managerial Accounting (Three Hours of Taxation) *	3

Taxation

ACCT 425	Taxation of Individuals	3

Economics, Statistics/Business Analytics, Marketing, Information Technology, Finance, and Commercial Law

Select 18 credits	18

Total Credit Hours	39

* Or equivalent from an accredited institution.

Application deadlines are July 1 for fall admission, November 1 for spring admission, and April 1 for summer admission. International student deadlines are April 15 (fall semester), October 1 (spring semester), and February 15 (summer semester).

Applicants who have not obtained an acceptable GMAT score, or an acceptable TOEFL score for those applicants whose native language is not English, will not be permitted to enroll in graduate accounting courses.

GMAT Waiver

Applicants can waive taking the GMAT and disregard the GMAT-related admission requirements if any of the following are met:

- Applicant has passed all parts of the United States Uniform CPA exam;
- Applicant holds a Masters Degree with a posted GPA of 3.0 or higher;
- Applicant is a member of the Old Dominion University chapter of Beta Alpha Psi with a posted GPA of 3.0 in upper level accounting courses; or
- Applicant has a Bachelors Degree with an overall GPA of 3.0 overall and in the prerequisite accounting courses with a grade of C or better in the prerequisite accounting courses.

Curriculum Requirements

A minimum of 30 semester hours of graduate courses are required to complete the MS, Accounting program. Students must maintain a cumulative grade point average of a least 3.00 in all graduate work taken.

Accounting Core

Foundation Strengthening Courses

ACCT 623	Accounting Analytics and Operational Reviews	3
ACCT 626	Financial and Global Accounting	3
ACCT 627	Operational Cost Control	3
ACCT 630	Business Valuations using Financial Statement Analysis	3
ACCT 662	Tax Procedure and Practice	3
Total Credit Hours		15

Taxation Concentration

Select 15 credits from the following list

ACCT 640	Professional Ethics and Legal Issues In Accounting	3
ACCT 650	Tax Strategies for Business Decisions	3
ACCT 651	Taxation of Corporations I	3
ACCT 652	Taxation of Partners and Partnerships	3
ACCT 653	Taxation of Estates and Gifts	3
ACCT 657	State and Local Taxation	3
ACCT 658	Tax Aspects of International Business	3
ACCT 668	Accounting Internship *	1-3
ACCT 695	Selected Topics in Accounting *	3
ACCT 697	Independent Study in Taxation *	3
ACCT 998	Master's Graduate Credit	1
Total Credit Hours for Concentration		15
Total Program Hours		30

* Students may only take 6 hours in these courses.

Department of Economics

2042 Constant Hall

(757) 683-3153

Robert M. McNab, Chair

Programs

Master of Arts Program

- Economics (MA) (p. 115)

Master of Arts Economics (MA)

Dr. Jay K. Walker, Graduate Program Director
gradecon@odu.edu

Economics is “the social science concerned with how individuals, institutions, and society make optimal choices under conditions of scarcity.” This is a broad field, covering everything from unemployment and inflation to stock market crashes and depressions, from perfect competition among firms to oligopoly and monopoly. Microeconomics studies firms, consumers, goods markets, resource markets, labor markets, and the price system. Macroeconomics studies unemployment, inflation, money supplies, interest rates, exchange rates, national debt, and economic growth. Economics is generally concerned with the problems of incentives, wealth, poverty, and income distribution.

Economics provides a good background for jobs in business, banking, finance, marketing, law, government, politics, military, diplomacy, and journalism. Our graduates have typically found economics positions in banks and firms, go to work in government, teach economics at community colleges, or enter MBA or Ph.D. programs in Economics and Finance.

Attention International Students: Please note the M.A. Economics program is a STEM-designated degree according to the U.S. Department of Homeland Security. International students receiving the M.A. degree may apply for the extended OPT program which allows up to 3 years of work in the United States after program completion.

Economics is very important for the formulation of public policy, business strategies, and financial strategies and at the graduate level tends to be very quantitative. In the Master of Arts in Economics program, students will develop strong mathematical and statistical skills, as well as learn about how the economy works. Economists do economic analysis, make economic and econometric models of the economy, formulate economic policy, make business strategies, forecast economic variables, and do benefit-cost analysis. At the end of the program, an additional goal is that students will be prepared to earn the Certified Business Economist (CBE) designation from National Association for Business Economists (NABE).

The Old Dominion University Department of Economics is especially strong in regional economics, international economics, and econometrics. The department is the home of the Hampton Roads Regional Economic Forecasting Project and the State of the Region Report with our MA students often being involved in those projects.

If taken full time, the MA in Economics program can be easily completed within 21 months. At a faster pace, the program can be completed in as little as 16 months. Alternatively, the program can be completed attending part-time, but more time will be required.

If not taken as part of their prior undergraduate curriculum certain prerequisites must be completed before enrolling in MA core courses. A student must have completed courses in calculus (3 hours), statistics (3 hours), and intermediate microeconomics or intermediate macroeconomics (3 hours from at least one of the two) with a grade of B or better. If a potential student has not completed the pre-requisites, a provisional admission can be granted and these courses may be completed at Old Dominion University prior to taking the MA program core courses.

The MA program in Economics is more intensive than the Bachelor's degree (BA/BS) in Economics. The MA courses study economics at a deeper level than in the undergraduate courses, and are more mathematical. Graduate students must maintain a grade point average of 3.0 or better. All students

in the program are trained in economic theory and research methods, and take several courses emphasizing business or government policy analysis in various specialty areas. An independent research project is required, permitting students an opportunity to apply theory and empirical research techniques to real-world problems.

The Department of Economics encourages interdisciplinary training. The Master's program can be adapted for students desiring a diverse background by combining economics with graduate courses in sociology, political science, computer science, statistics, mathematics, finance, management, marketing research, or public administration.

Admission

General Admissions Requirements

In addition to the University's graduate admission requirements, applicants seeking regular admission must have at least a 3.0 grade point average in their major. Applicants are required to take either the Graduate Record Examination (GRE) or the Graduate Management Admission Test (GMAT), and they must submit at least one letter of recommendation. If the cumulative undergraduate GPA is greater than 3.3 the GRE or GMAT may be waived. If the undergraduate grade point average falls below that required for regular status, applicants may qualify for provisional admission.

Applications are considered on a rolling basis. Applications can be submitted at any point up to the initiation of courses in any semester and be considered for admission. The Department of Economics offers a limited number of graduate assistantships each semester that are competitively awarded. Priority consideration for assistantships for fall semester admits is given to those who submit applications on or before March 1. Priority consideration for assistantships for spring semester admits is given to those who submit applications on or before August 1.

Linked Undergraduate Program Option

Undergraduate students wishing to earn credit toward the M.A. Program in Economics in aspiration of completing the master's requirements in less time have the option of applying to the linked program. Undergraduate students who meet qualification criteria may take up to twelve credits from the master's program while still completing their undergraduate study. This would entail advising students into specific master's program classes to be taken for their electives. Students who complete these twelve credits prior to completion of the bachelor's degree and maintain full time status during both semesters of the subsequent academic year could feasibly complete the MA program in one additional academic year.

Undergraduate students wishing to enter the linked program must meet admission guidelines to the graduate school, have a cumulative GPA of 3.0 or greater and have completed the pre-requisite courses for admission to the master's program in economics. This requires a university level course in statistics, calculus, and a course in either intermediate macroeconomic theory or intermediate microeconomic theory (or their equivalents). Students would be eligible for application to the linked program at the end of their second year of UG study, or equivalent in hours although most students would not be likely to meet these requirements until reaching senior level status. This would entail advising students into specific master's program classes to be taken for their electives. In order for the graduate level courses which are taken to be applied toward the eventual awarding of a graduate degree, students must complete those graduate level courses with a grade of B or greater.

Potential students can contact the graduate program director at gradecon@odu.edu for full guidelines, to receive potential courses of study to participate in the program, or to begin the process of formally applying for the program.

International Student English Language Proficiency Requirements:

For students whose native language is not English, a minimum score of 550 on the paper-based TOEFL, 79 on the internet-based TOEFL, or 6.5 on the IELTS. Other tests are acceptable in meeting this requirement, for full information regarding English proficiency requirements visit here: <https://www.odu.edu/admission/proficiency>

www.odu.edu/admission/proficiency (<https://www.odu.edu/admission/proficiency/>).

For students who are unable to meet the testing requirements there are alternative methods of proving proficiency. Provisional acceptance can be granted pending successful completion of two university or college level English courses at a regionally accredited U.S. institution. Another alternative is completion of the Monarch English Transition (MET) Program where a student would matriculate at ODU and complete the English competency courses on our campus. Full information regarding the MET program is available here: <https://ww1.odu.edu/elc/courses/met> (<https://ww1.odu.edu/elc/courses/met/>).

To Apply

The Old Dominion University Graduate Application is completed online at <https://odu.edu/admission/graduate> (<https://odu.edu/admission/graduate/>). The system will prompt the applicant to complete all components needed to apply to the Master of Arts in Economics program. Applications to the MA program are accepted on a rolling basis in the Fall and Spring semesters, though Fall semester matriculation is preferred. It is recommended that prospective international students submit their applications at least three months prior to the start of their intended semester as there can be delays in the visa issuance process. Questions about the online process should be directed to the Office of Graduate Admissions with any questions regarding requirements for admission or the program curriculum directed to the program director.

Financial Assistance

Financial aid is available to graduate students at Old Dominion University. Financial aid may be available in the form of University fellowships, tuition grants, and research assistantships. The Department of Economics offers a limited number of graduate assistantships each semester that are competitively awarded. Priority consideration for assistantships for fall semester admits is given to those who submit applications on or before March 1. Priority consideration for assistantships for spring semester admits is given to those who submit applications on or before August 1. In addition to the financial aid offered by the University, graduate students may be eligible for aid and student loans administered by other agencies. For information about Work-Study programs, scholarships, and student loans, please contact the Office of Financial Aid.

Curriculum Requirements

Undergraduate prerequisites include calculus (three credit hours), statistics (three credit hours), intermediate microeconomics or intermediate macroeconomics with grades of at least a B. Students who do not yet meet the undergraduate prerequisites can choose to complete those courses at Old Dominion University before taking the advanced courses.

Thirty semester credit hours (ten courses) of approved graduate work are required for the award of the Master of Arts degree in economics. A maximum of six credit hours of 500-level courses approved for graduate credit may be applied toward the degree. The remaining courses must be taken from 600-and/or 700-level courses. Up to six credit hours (two courses) of electives (approved by the graduate program director) may be taken from courses outside the Department of Economics. Required core economics courses for the graduate program are:

Core Courses

ECON 625	Mathematical Economics	3
ECON 700	Economic Analytics	3
ECON 701	Advanced Microeconomic Analysis	3
ECON 703	Advanced Macroeconomic Analysis	3
ECON 706	Econometrics I	3
ECON 707	Econometrics II	3
ECON 708	Econometrics III	3

Restricted Electives

Select two of the following:

ECON 502	Transportation Economics

ECON 507	Labor Market Economics	
ECON 521	Public Economics	
ECON 531	Money and Banking	
ECON 535	Health Economics: A Global Perspective	
ECON 545	Urban Economics	
ECON 547	Natural Resource and Environmental Economics	
ECON 554	Economic Development	
ECON 752	International Trade	
ECON 754	Economic Development	
Capstone		
ECON 698	Economic Methodology and Research	3
Total Credit Hours		30

Writing skills commensurate with the level of this degree are also a requirement for graduation from this program. Near the completion of formal course work, candidates conduct independent research projects as part of ECON 698. All students must register for ECON 698 in their last semester, a guided research seminar where students meet to discuss, present, and critique research.

Department of Information Technology and Decision Sciences

2072 Constant Hall
(757) 683-3571

Weiyong Zhang, Chair

The Department of Information Technology and Decision Sciences is the largest academic department in the Strome College of Business. It is comprised of two separate, yet interrelated, academic disciplines - Business Analytics and Information Technology. The department offers programs at the bachelor, master, and PhD levels.

The department offers common body of knowledge courses in information technology, operations management, decision analysis, business statistics, data analysis, and management science to all of Strome's undergraduate students, as well as electives in various aspects of the disciplines.

Students from both the undergraduate and graduate programs land jobs at companies such as Oracle, Microsoft, Booz Allen Hamilton, BP (British Petroleum), Norfolk Southern, A.P. Møller, Northrop Grumman, CMA CGM, ZIM, Walmart, Dollar Tree and the federal government.

Our faculty's research has been funded by the National Science Foundation, the U.S. Federal Highway Administration and the U.S. Department of Transportation. The department's maritime research was ranked eighth in the world at 2015 by ISI Web of Science.

Programs

Certificate Programs

- Business Analytics and Big Data Certificate (p. 117)

Master of Science - Computer Science - Information Communication Technology

The Department of Information Technology and Decision Sciences offers this degree program jointly with the Department of Computer Science; please see the entry under the Department of Computer Science for degree requirements.

Certificate

Business Analytics and Big Data Certificate

The graduate certificate in Business Analytics and Big Data is designed to give the students a background in some of the basic statistical and modeling/optimization tools used in business analytics. In addition the certificate provides a working knowledge of data bases and an introduction to the analysis of "big data." This certificate program is designed for students to satisfy their elective requirements as part of the MBA program or it can be taken as a stand alone certificate program.

Admission Requirements

An appropriate undergraduate degree is required to be admitted to the Business Analytics and Big Data Certificate program.

Curriculum Requirements

The award of this certificate is based upon the student's successful completion of 15 credit hours as follows:

BNAL 530	Probability and Statistics	3
BNAL 711	Multivariate Statistical Methods for Business	3
or BNAL 503	Data Visualization and Exploration	
BNAL 515	Advanced Business Analytics/Big Data Applications	3
IT 650	Database Management Systems	3
BNAL 507	Prescriptive Analytics of Management Science	3
or BNAL 721	Simulation Modeling for Business and Supply Chain Systems	
Total Credit Hours		15

School of Public Service

2084 Constant Hall
(757) 683-3961

<http://www.odu.edu/sps> (<http://www.odu.edu/sps/>)

Bruce D. McDonald III, Director
Meg Jones, Associate Director

Programs

Doctor of Philosophy Programs

- Public Administration and Policy (PhD) (p. 123)

Master of Public Administration Programs

- Master of Public Administration (MPA) (p. 117)
- Public Administration with a Concentration in Multi-Sector Public Service (MPA) (p. 119)
- Public Administration with a Concentration in Nonprofit Management and Governance (MPA) (p. 121)

Certificate Programs

- Public Administration and Policy Certificate (p. 127)
- Public Procurement and Contract Management Certificate (p. 127)

Master of Public Administration

Master of Public Administration (MPA)

Vickie Carnegie, Graduate Program Director
Meg Jones, Associate Director

Email: mpa@odu (mpa@odu.edu).edu (mpa@odu.edu)

The mission of the Master of Public Administration (MPA) program in the School of Public Service at Old Dominion University is to develop professionals with the knowledge, skills, and abilities to lead and advance public service in a diverse, multi-sector environment. We expect our graduates to be capable of critical problem solving, effective communication, skillful implementation of policy and programs, and ethical application of management and leadership concepts. The MPA program serves the region, state, and nation; supports the professions of public administration and public service; and advances the state of knowledge through applied and scholarly research. *This program is available on-campus and online.*

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3. A resume that includes your education and any/all work experience (the GRE is no longer required);
4. Minimum of **two** letters of recommendation from academic sources and/or employment supervisors. Please do not provide letters from friends, co-workers, or family; and
5. For students whose native language is not English, a minimum score of 550 on the paper-based TOEFL, 79 on the internet-based TOEFL, or 6.5 on the IELTS.; conditional admission is not offered for applicants who have not confirmed successful completion of the University English language proficiency requirements.

Linked Master of Public Administration Program

The School of Public Service offers a linked program to high-performing Old Dominion University students from a variety of undergraduate majors. Interested students can complete up to 12 graduate-level credit hours in their senior year, and continue in the Master of Public Administration program upon receiving their bachelor's degree. These 12 credits may be applied to both the undergraduate degree as well as the MPA degree, pending admission. Students who wish to pursue this linked program should submit their application to the MPA program prior to beginning their last academic year of undergraduate study, and should apply for the semester immediately following their expected undergraduate graduation. Undergraduate students enrolling in the linked program must have completed all general education requirements and possess a cumulative GPA of at least 3.0 at the end of their junior year. Students from all majors are welcome to apply, but some undergraduate majors that relate best to this program include Criminal Justice, Human Services, Management, Political Science, and Sociology.

Financial Assistance

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Office of Financial Aid
Old Dominion University
Norfolk, VA 23529
Phone: (757) 683-3683

<https://ww1.odu.edu/tuition-aid> (<https://ww1.odu.edu/tuition-aid/>)

Curriculum Requirements

The MPA curriculum consists of 39 credit hours (13 courses). Courses are required in two categories:

1. **Core Concentration** (eight required courses)
2. **Electives** (five courses)

Core Curriculum

The following courses are required of all public administration students.

PADM 651	Administrative Theory I: The Context of Public Administration	3
PADM 671	Public Budgeting and Financial Management	3
PADM 701	Public Policy and Evaluation	3
PADM 723	Ethics in Public Administration	3
PADM 736	Diversity, Equity, & Inclusion: A Public Administration and Public Policy Perspective	3
PADM 753	Research Methods in Public Administration	3
Data Analysis		
Select one of the following:		3
FOUN 722	Introduction to Applied Statistics and Data Analysis	
PADM 752	Introduction to Data Analysis	
MPHO 605	Introduction to Biostatistics for Public Health	
PADM 746	Capstone Seminar in Public Administration	3
Core Requirements		24
Concentration Courses		15
Total Credit Hours		39

Electives

Students choose their elective courses in the general area of public administration. With the approval of the MPA Program Director, students may take graduate-level courses outside of the Department. If a student elects to do an MPA-approved concentration or certificate program, those would count as elective hours.

MPA Elective courses

Select 5 of the following:		15
PADM 634	Regional Planning	
PADM 652	Administrative Theory II: The Process of Public Administration	
PADM 653	Wicked Problems in Public Administration	
PADM 668	Internship/Field Experience *	
PADM 695	Advanced Topics **	
PADM/PPCM 704	Methods of Public Program Evaluation	
PADM 708	Urban and Regional Economic Development	
PADM 711	Tools of Government	
PADM 712	Emergency Management and Policy	

PADM 713	Fundraising for Nonprofit Organizations	
PADM/PPCM 714	Public-Private Partnerships	
PADM 715	Management and Governance of Nonprofit Organizations	
PADM 716	Introduction to Nonprofit Sector	
PADM 717	Nonprofit Financial Management	
PADM 718	Public Sector Contract Administration	
PADM/PPCM 719	Leadership	
PADM 720	Public Human Resources Management	
PADM 721	Transportation Policy	
PADM 724	Administration of Human Services	
PADM 725	Government, Society, and Business	
PADM 726	Introduction to Public Procurement	
PADM 727	Public Procurement and Project Management	
PADM 728	Public Sector Contract Planning and Formation	
PADM 731	Public Sector Procurement Law and Ethics	
PADM/PPCM 734	Negotiation and Dispute Resolution	
PADM 735	History of Race and Government Institutions	
PADM 739	Cultural Competency	
PADM 740	Community Participation and Civic Engagement	
PADM 745	Managing Development and Change in Organizations	
PADM 750	Performance Measurement and Management	
PADM 760	Collaboration in Public Administration	
PADM 772	Public Financial Management	
PADM 780	Local Government Management	
PADM/PPCM 781	Intergovernmental Management	
PADM 785	Social Marketing in the Public Sector	
PPCM/PADM 718	Public Sector Contract Administration	
PPCM/PADM 726	Introduction to Public Procurement	
PPCM/PADM 728	Public Sector Contract Planning and Formation	
PPCM/PADM 731	Public Sector Procurement Law and Ethics	
Total Credit Hours		15

- * Students are required to consult the MPA Graduate Program Director to confirm that a specific internship position or field experience role is eligible for PADM 668 course credit, and to determine if any additional requirements are necessary.
- ** From time to time, courses under the heading of PADM 695 “Advanced Topics” will be offered that students may choose to take as electives. Students may take more than one PADM 695, as long as the course is different.

Recommended Core Course Sequence

Students are required to enroll in Administrative Theory I: The Context of Public Administration (PADM 651) as early as possible in their program of study. The remaining core courses are not required to be taken in a specific order. However, the Capstone Seminar (PADM 746) must be taken after the other core courses have been completed (or in the same semester as the last of the core courses are being completed). Students should note that course offerings are limited during the summer term and should plan accordingly.

Additional Requirements

Internship/Field Experience

Practical professional experience in a public or nonprofit agency setting is an important component of the MPA curriculum. A formal internship is highly recommended for students who lack significant experience in a

public or nonprofit agency. Internships give students the opportunity to gain professional level experience and provide government or nonprofit agencies with the services of graduate students with high potential for future achievement. MPA students have the opportunity to earn up to three credits for an internship position, which will count as an elective course. PADM 668 Internship/Field Experience is the course students register for to earn credit for their public service experiences. Because the School of Public Service does not offer a comprehensive internship program within our department, these positions are most often acquired externally, though they must be approved by the MPA Graduate Program Director in order to count for course credit. Please contact the MPA Graduate Program Director with any questions you may have about internships or field experience projects: mpa@odu.edu.

For assistance in searching for and obtaining an internship position, contact the Old Dominion University Center for Career and Leadership Development.

Phone: (757) 683-4388

Email: cclld@odu.edu

For more information relating to this program and its requirements, please visit <http://www.odu.edu/mpa> (<http://www.odu.edu/mpa/>)

Master of Public Administration Public Administration with a Concentration in Multi-Sector Public Service (MPA)

Vickie Carnegie, Graduate Program Director

Meg Jones, Associate Director

Email: [mpa@odu](mailto:mpa@odu.edu) (mpa@odu.edu) (mpa@odu.edu)

The mission of the Master of Public Administration (MPA) program in the School of Public Service at Old Dominion University is to develop professionals with the knowledge, skills, and abilities to lead and advance public service in a diverse, multi-sector environment. We expect our graduates to be capable of critical problem solving, effective communication, skillful implementation of policy and programs, and ethical application of management and leadership concepts. The MPA program serves the region, state, and nation; supports the professions of public administration and public service; and advances the state of knowledge through applied and scholarly research. *This program is available on-campus and online.*

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3. A resume that includes your education and any/all work experience (the GRE is no longer required);
4. Minimum of **two** letters of recommendation from academic sources and/or employment supervisors. Please do not provide letters from friends, co-workers, or family; and

5. For students whose native language is not English, a minimum score of 550 on the paper-based TOEFL, 79 on the internet-based TOEFL, or 6.5 on the IELTS.; conditional admission is not offered for applicants who have not confirmed successful completion of the University requirements for English language proficiency.

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<https://ww1.odu.edu/tuition-aid> (<https://ww1.odu.edu/tuition-aid/>)

Curriculum Requirements

The MPA curriculum consists of 39 credit hours (13 courses). Courses are required in two categories:

1. **Core Concentration** (eight required courses)
2. **Electives** (five courses)

Core Curriculum

The following courses are required of all public administration students.

PADM 651	Administrative Theory I: The Context of Public Administration	3
PADM 671	Public Budgeting and Financial Management	3
PADM 701	Public Policy and Evaluation	3
PADM 723	Ethics in Public Administration	3
PADM 736	Diversity, Equity, & Inclusion: A Public Administration and Public Policy Perspective	3
PADM 753	Research Methods in Public Administration	3
Data Analysis		
Select one of the following:		3

FOUN 722	Introduction to Applied Statistics and Data Analysis	
PADM 752	Introduction to Data Analysis	
MPHO 605	Introduction to Biostatistics for Public Health	
PADM 746	Capstone Seminar in Public Administration	3
Core Requirements		24
Concentration Courses		15
Total Credit Hours		39

Electives

Students choose their elective courses in the general area of public administration. With the approval of the MPA Program Director, students may take graduate-level courses outside of the Department. If a student elects to do an MPA-approved concentration or certificate program, those would count as elective hours.

MPA Elective courses

Select 5 of the following:		15
PADM 634	Regional Planning	
PADM 652	Administrative Theory II: The Process of Public Administration	
PADM 653	Wicked Problems in Public Administration	
PADM 668	Internship/Field Experience *	
PADM 695	Advanced Topics **	
PADM/PPCM 704	Methods of Public Program Evaluation	
PADM 708	Urban and Regional Economic Development	
PADM 711	Tools of Government	
PADM 712	Emergency Management and Policy	
PADM 713	Fundraising for Nonprofit Organizations	
PADM/PPCM 714	Public-Private Partnerships	
PADM 715	Management and Governance of Nonprofit Organizations	
PADM 716	Introduction to Nonprofit Sector	
PADM 717	Nonprofit Financial Management	
PADM 718	Public Sector Contract Administration	
PADM/PPCM 719	Leadership	
PADM 720	Public Human Resources Management	
PADM 721	Transportation Policy	
PADM 724	Administration of Human Services	
PADM 725	Government, Society, and Business	
PADM 726	Introduction to Public Procurement	
PADM 727	Public Procurement and Project Management	
PADM 728	Public Sector Contract Planning and Formation	
PADM 731	Public Sector Procurement Law and Ethics	
PADM/PPCM 734	Negotiation and Dispute Resolution	
PADM 735	History of Race and Government Institutions	
PADM 739	Cultural Competency	
PADM 740	Community Participation and Civic Engagement	
PADM 745	Managing Development and Change in Organizations	
PADM 750	Performance Measurement and Management	
PADM 760	Collaboration in Public Administration	
PADM 772	Public Financial Management	
PADM 780	Local Government Management	
PADM/PPCM 781	Intergovernmental Management	
PADM 785	Social Marketing in the Public Sector	
PPCM/PADM 718	Public Sector Contract Administration	
PPCM/PADM 726	Introduction to Public Procurement	

Total Credit Hours 15

- * Students are required to consult the MPA Graduate Program Director to confirm that a specific internship position or field experience role is eligible for PADM 668 course credit, and to determine if any additional requirements are necessary.
- ** From time to time, courses under the heading of PADM 695 "Advanced Topics" will be offered that students may choose to take as electives. Students may take more than one PADM 695, as long as the course is different.

Recommended Core Course Sequence

Students are required to enroll in Administrative Theory I: The Context of Public Administration (PADM 651) as early as possible in their program of study. The remaining core courses are not required to be taken in a specific order. However, the Capstone Seminar (PADM 746) must be taken after the other core courses have been completed (or in the same semester as the last of the core courses are being completed). Students should note that course offerings are limited during the summer term and should plan accordingly.

Multi-Sector Public Service Concentration

The Multi-Sector Public Service concentration will consist of one (1) required concentration course PADM 725 (Government, Society, and Business) and three (3) electives.

Students will analyze, synthesize, think critically, solve problems, and make decisions from a multi-sectoral perspective. They will examine the impact of different social, economic, and political forces/phenomena on multi-sectoral management/policy issues. Students will understand how the changing public service landscape affects policy decision making, management, and governance.

The acceptable electives for the concentration are:

Required for Concentration

PADM 725	Government, Society, and Business	3

Electives

Select three of the following: 9

PADM 653	Wicked Problems in Public Administration
PADM 708	Urban and Regional Economic Development
PADM 714	Public-Private Partnerships
PADM 716	Introduction to Nonprofit Sector
PADM 721	Transportation Policy
PADM 726	Introduction to Public Procurement
PADM 734	Negotiation and Dispute Resolution
PADM 740	Community Participation and Civic Engagement
PADM 760	Collaboration in Public Administration

Total Credit Hours for Concentration	12

Additional Elective	3

Total Credit Hours	15

Additional Requirements

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Housing & Residence Life

Old Dominion University

Norfolk, VA 23529

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Email: housing@odu.edu

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Master of Public Administration Public Administration with a Concentration in Nonprofit Management and Governance (MPA)

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Meg Jones, Associate Director

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PADM 671	Public Budgeting and Financial Management	3
PADM 701	Public Policy and Evaluation	3
PADM 723	Ethics in Public Administration	3

PADM 736	Diversity, Equity, & Inclusion: A Public Administration and Public Policy Perspective	3
PADM 753	Research Methods in Public Administration	3
Data Analysis		
Select one of the following:		3
FOUN 722	Introduction to Applied Statistics and Data Analysis	
PADM 752	Introduction to Data Analysis	
MPHO 605	Introduction to Biostatistics for Public Health	
PADM 746	Capstone Seminar in Public Administration	3
Core Requirements		24
Concentration Courses		15
Total Credit Hours		39

Electives

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MPA Elective courses

Select 5 of the following:		15
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PADM 652	Administrative Theory II: The Process of Public Administration	
PADM 653	Wicked Problems in Public Administration	
PADM 668	Internship/Field Experience *	
PADM 695	Advanced Topics **	
PADM/PPCM 704	Methods of Public Program Evaluation	
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PADM 724	Administration of Human Services	
PADM 725	Government, Society, and Business	
PADM 726	Introduction to Public Procurement	
PADM 727	Public Procurement and Project Management	
PADM 728	Public Sector Contract Planning and Formation	
PADM 731	Public Sector Procurement Law and Ethics	
PADM/PPCM 734	Negotiation and Dispute Resolution	
PADM 735	History of Race and Government Institutions	
PADM 739	Cultural Competency	
PADM 740	Community Participation and Civic Engagement	
PADM 745	Managing Development and Change in Organizations	
PADM 750	Performance Measurement and Management	
PADM 760	Collaboration in Public Administration	
PADM 772	Public Financial Management	
PADM 780	Local Government Management	

PADM/PPCM 781	Intergovernmental Management
PADM 785	Social Marketing in the Public Sector
PPCM/PADM 718	Public Sector Contract Administration
PPCM/PADM 726	Introduction to Public Procurement
PPCM/PADM 728	Public Sector Contract Planning and Formation
PPCM/PADM 731	Public Sector Procurement Law and Ethics
Total Credit Hours	
15	

- * Students are required to consult the MPA Graduate Program Director to confirm that a specific internship position or field experience role is eligible for PADM 668 course credit, and to determine if any additional requirements are necessary.
- ** From time to time, courses under the heading of PADM 695 "Advanced Topics" will be offered that students may choose to take as electives. Students may take more than one PADM 695, as long as the course is different.

Recommended Core Course Sequence

Students are required to enroll in Administrative Theory I: The Context of Public Administration (PADM 651) as early as possible in their program of study. The remaining core courses are not required to be taken in a specific order. However, the Capstone Seminar (PADM 746) must be taken after the other core courses have been completed (or in the same semester as the last of the core courses are being completed). Students should note that course offerings are limited during the summer term and should plan accordingly.

Nonprofit Management and Governance Concentration

Marina Saitgalina, Program Director

The Nonprofit Management and Governance concentration will consist of 12-credit hours, covering the theory underpinning the nonprofit sector, critical issues in the nonprofit sector, the management and governance of nonprofit organizations, budgeting and financial management, and fundraising.

Students will develop knowledge and skills relevant to analysis, synthesis, and critical thinking necessary to solve problems and make recommendations regarding issues faces by nonprofit organizations. Students will be able to articulate current issues and challenges of the nonprofit sector, develop recommendations rooted in theory and research evidence, and contribute to policy and practices of nonprofit organizations by actively and effectively engaging with its administrative processes.

The required courses are:

PADM 716	Introduction to Nonprofit Sector	3
PADM 715	Management and Governance of Nonprofit Organizations	3
PADM 717	Nonprofit Financial Management	3
PADM 713	Fundraising for Nonprofit Organizations	3
Total Credit Hours for Concentration		12
Elective		3
Total Credit Hours		15

Additional Requirements

Internship/Field Experience

Practical professional experience in a public or nonprofit agency setting is an important component of the MPA curriculum. A formal internship is highly recommended for students who lack significant experience in a public or nonprofit agency. Internships give students the opportunity to gain professional level experience and provide government or nonprofit

agencies with the services of graduate students with high potential for future achievement. MPA students have the opportunity to earn up to three credits for an internship position, which will count as an elective course. PADM 668 Internship/Field Experience is the course students register for to earn credit for their public service experiences. Because the School of Public Service does not offer a comprehensive internship program within our department, these positions are most often acquired externally, though they must be approved by the MPA Graduate Program Director in order to count for course credit. Please contact the MPA Graduate Program Director with any questions you may have about internships or field experience projects: mpa@odu.edu.

For assistance in searching for and obtaining an internship position, contact the Old Dominion University Center for Career and Leadership Development.

Phone: (757) 683-4388

Email: cclcd@odu.edu

For information about on-campus housing, contact:

Housing & Residence Life

Old Dominion University

Norfolk, VA 23529

Phone: (757) 683-4283

Email: housing@odu.edu

For more information relating to this program and its requirements, please visit <http://www.odu.edu/mpa> (<http://www.odu.edu/mpa/>)

Doctor of Philosophy Public Administration and Policy (PhD)

Adam Eckerd, Graduate Program Director

Katrina Davenport, Graduate Program Manager

The mission of the Ph.D. in Public Administration & Policy program is to develop expert leaders and scholars in public and non-profit administration and policy who are capable of creating and disseminating knowledge that advances public service in a multi-sector environment with 37 hours of doctoral level course work and 12 hours of dissertation credit. This program is available on-campus and online.

Admission

Applications for admission to the program will be considered once per year in March. Students begin classes in the fall.

Prospective students will submit the following for consideration:

- An online graduate application.
- Two (2) letters of recommendation from academic sources (e.g., professors from previous degree work). If it is not possible to secure two academic references, please contact the GPD for advice on acceptable substitutes
- Transcripts from a regionally accredited institution or a comparable foreign institution showing completion of a master's degree by the time of enrollment with a minimum GPA of 3.25 on a 4.0 scale
- Aptitude scores on the GRE, or in cases of substitution, the GMAT, taken within five years prior to applying for admission. Scores from the Miller Analogies Test (MAT) are not accepted or considered for admission. The requirement for the GRE or GMAT may be waived for applicants with at least a grade of B or higher in a graduate level statistics or research methods course, or with a 3.5 or above GPA in a regionally accredited master's degree program. Applicants who wish to be exempted from the GRE or GMAT requirement should complete the "Request for GRE/GMAT Waiver" form and submit it with their application package for review by the admissions committee. The decision to waive the GRE or GMAT is the sole responsibility of the admissions committee and its decision is final
- A three- to six-page double-spaced written statement of academic and professional goals. The focus of the essay should be on how the Ph.D.

- Résumé with educational and professional experience.
- For students whose native language is not English, a minimum score of 550 on paper based TOEFL, 79 on internet based TOEFL, or 6.5 on the IELTS.

Core Courses

PADM 800	Colloquium - Public Administration and Policy	1
PADM 801	Policy Theory	3
PADM 802	Public Administration I	3
PADM 803	Public Administration II	3
PADM 804	Multi-Sector Administration	3

PADM 805	Research Design	3
FOUN 722	Introduction to Applied Statistics and Data Analysis	3
PADM 806	Multivariate Analysis in Public Administration	3
TLCI 814	Qualitative Research Design in Education	3

Select one of the following: 3

CRIM 805	Multivariate Statistics in Criminological Research
CRIM 810	Qualitative Methods in Criminology and Criminal Justice
CRIM 815	Advanced Quantitative Techniques in Criminology & Criminal Justice
CRIM 820	Advanced Research Methods in Criminology & Criminal Justice
BNAL 712	Advanced Statistical Models in Business Research
FOUN 812	Research Design and Analysis
TLCI 815	Advanced Qualitative Research
FOUN 823	Analysis of Variance Applied to Educational Research
FOUN 826	Applied Structural Equation Modeling in Educational Research
FOUN 840	Educational Measurement and Assessment
GEOG 502	Geographic Information Systems
HLSC 810	Research Design and Application
HLSC 811	Quantitative Research Methods in Health Care
HLSC 812	Qualitative Research Methods
HLSC 813	Health Outcomes Research
MKTG 813	Fundamentals of Survey Research

Electives

PADM 808	Urban and Regional Economic Development
PADM 810	Policy and Program Evaluation
PADM 814	Public-Private Partnerships
PADM 815	Management and Governance of Nonprofit Organizations
PADM 816	Introduction to Nonprofit Sector
PADM 820	Public Human Resources Management
PADM 823	Ethics in Public Administration

PADM 825	Government, Society and Business
PADM 850	Performance Measurement and Management
PADM 860	Collaboration in Public Administration
PADM 872	Public Financial Management
PADM 881	Intergovernmental Relations
PADM 895	Advanced Topics

Dissertation

PADM 899	Dissertation	12

Prerequisites

- PADM 651 Introduction to Public Administration
- PADM 671 Public Budgeting and Financial Management

Students may be able to transfer up to 6 credits—earned outside of the PhD in Public Administration and Policy program—to satisfy course credit requirements for their doctoral degree. Students may be eligible for the following:

- Contact the PhD Program Manager (<https://www.odu.edu/public-service/directory/>) to discuss a potential transfer of credit. All transfer credits must be approved by the PhD GPD, SPS Director, and SCB Dean.

Prospective students who wish to take courses prior to being formally admitted to the PhD program are considered nondegree seeking students. For more information on nondegree seeking options, see the Graduate Catalog section on Graduate Registration Requirements and Procedures (<https://catalog.odu.edu/graduate/graduateregistrationrequirementsandprocedures/>).

If a student is considering taking courses as a nondegree seeking student, they should note the limit for transfer credits earned as a nondegree student (see above section on Transfer Credits) and the SPS requirement that at least 23 of 37 course credits applied towards the doctoral degree must be from 800-level courses. Grades earned in courses taken by nondegree seeking students will not be considered by the admissions committee during an application review.

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achievement and motivation for full admission to the PhD program. If permission to take courses is granted, students should apply through Graduate Admissions (<https://www.odu.edu/admission/graduate/>) for admission as a nondegree seeking student. Nondegree seeking students are not eligible to receive financial assistance.

Student Advising

The PhD GPD (<https://www.odu.edu/public-service/directory/>) will serve as the initial academic advisor for all new students. Students are required to meet with the PhD GPD to discuss academic goals, interests, class schedules, and registration requirements prior to registering for classes. Students must also submit a completed Advising Form (<http://catalog.odu.edu/applewebdata/FCCD3F4E-98B3-4CC1-B29B-4BE35AF0A4E2>) (attached) to the PhD Program Manager (<https://www.odu.edu/public-service/directory/>) before attempting to register for their first class; students will be unable to register for classes until the Advising Form has been submitted and processed. Students may register only for courses approved by the PhD GPD and will be dropped from any course for which they registered without prior permission.

By no later than the end of a student's first nine hours of coursework in the PhD program, the student must select an advisor who is within SPS and is certified for graduate instruction at Level I or Level II. Students will be informed once per year about those eligible to serve as advisors, but students can check any time with the PhD Program Manager for the certification level of faculty members. Once a faculty member has been chosen and has agreed to serve as an advisor, the Strome College of Business – Appointment of Doctoral Faculty Advisor (<http://catalog.odu.edu/applewebdata/FCCD3F4E-98B3-4CC1-B29B-4BE35AF0A4E2>) form (attached) must be completed and submitted to the PhD Program Manager. The PhD Program Manager can provide all forms.

A doctoral student's advisor serves many purposes, including but not limited to the following:

- assist the student in developing a plan of study that fulfills course requirements and follows appropriate course sequencing
- approve registration selections for each semester while ensuring the student remains on an appropriate track to fulfill course requirements
- provide mentorship regarding expectations of performance, behavior, values, and integration into the discipline of public administration and public policy
- encourage and assist the student with preparing manuscripts for presentation at scholarly conferences and for publication
- evaluate the student's performance and progress toward the doctoral degree through an annual performance review
- provide the student with advice and counseling to ensure their success in the PhD program

Students should meet with their advisor at least once per semester. Each PhD student will also undergo a performance review by their advisor and/or the PhD GPD at the end of each academic year, as described below.

The role of the advisor is completed when the student selects a comprehensive exam committee. A student may choose to include or not include the advisor as an exam committee member. A student may also choose a new advisor at any time by submitting a new Appointment of Doctoral Faculty Advisor form to the PhD Program Manager.

Student Funding

Doctoral students may apply for a variety of need-based and merit-based financial support offered by the school, university, and outside sources, including teaching, administrative, and research assistantships; fellowships, tuition grants, and scholarships; Federal Direct Stafford Loan Programs; and part-time student employment. For general information on funding options and requirements, please see the Graduate Catalog sections on Graduate Financial Aid (<https://catalog.odu.edu/graduate/graduatefinancialaid/>) and Financial Awards for Graduate Students (<https://catalog.odu.edu/graduate/financialawardsforgraduatestudents/>), as well as information provided by the Office of Financial Aid (<https://www.odu.edu/finaidoffice/>).

SPS doctoral students may receive an assistantship, or less commonly a fellowship, or combination of both. Assistantship awards are typically \$20,000 per academic year. Additionally, tuition is waived for PhD assistants (for a maximum of 9 credit hours each semester). Please note that student funding is generally not available during the summer term.

SPS research assistantships require students to work 20 hours per week with an assigned faculty member(s).

Teaching assistantships require 20 hours per week, which may include assisting faculty in the classroom, teaching independent sections of a course in the Public Service Minor, or a combination of activities. Students with an assistantship position may not hold other full-time or part-time employment positions.

Students seeking an assistantship or tuition grant should complete the Application for Institutional Graduate Financial Assistance (<https://www.odu.edu/sites/default/files/documents/graduate-financial-assistance.pdf>) when submitting their admission packet. Offers of financial assistance are generally made at the beginning of a student's program of study, however students may apply for financial assistance at any point during their course of study.

Award decisions are made during each admissions cycle when the SPS Admissions Committee reviews applications and submits funding recommendations to the SPS Chair. Award decisions are made based on merit and the academic qualifications of the applicant, as well as the program's available financial resources. Students are not guaranteed any funding while completing their doctoral studies.

A student in good standing in the PhD program who has been granted a financial award may expect up to three years of funding. In exceptional circumstances, and pending availability of funds, students may apply for a limited amount of funding beyond the three-year limit. A student's financial award is contingent on funding being available from the college and the university, or through grant funding available within the SPS, as well as the student meeting the following requirements:

- the student maintains a GPA of 3.20, as described in the Retention Standards section of this handbook, and continues to make satisfactory progress toward completion of a doctoral degree
- the quality and quantity of the student's work as a research or teaching assistant is deemed acceptable by the faculty member(s) to whom the student is assigned, and the PhD GPD
- the student makes satisfactory progress toward completion of their dissertation (for students working on a dissertation)
- the student does not hold other full-time or part-time employment while receiving financial assistance, unless approved by the PhD GPD and SPS Chair

A student's assistantship or fellowship performance is evaluated once per year by the student's supervising faculty member and the PhD GPD. Any student whose work performance is deemed to be unsatisfactory may immediately be placed on a one semester probationary period by a majority vote of the SPS tenure-track faculty. If the student's performance is not rated to be satisfactory in all subsequent semesters, the student's funding will be discontinued, regardless of academic standing. In cases of egregious behavior, the faculty may discontinue a student's financial assistance immediately, regardless of previous ratings or performance.

Additional Requirements

Retention Standards

Students must maintain a minimum 3.00 grade point average (GPA) to remain in good standing in the Graduate School and PhD program. Students must also earn at least a B- in each course; if a student receives less than a B- grade in one course, they must repeat the course and receive a B- or higher on the second attempt. Students may not receive a B- in more than one course and may never receive an F in any course. Funded students

must maintain a minimum 3.20 GPA to retain their funding. See additional details on grade requirements and ramifications under “Retention Standards” in the School of Public Service section of the Graduate Catalog (<https://catalog.odu.edu/graduate/business/public-service/public-administration-policy-phd/>) and under “Continuance” in the Graduate Policies and Procedures section of the Graduate Catalog (<https://catalog.odu.edu/graduate/policies/graduatepolicies/>).

Time Limit for Degree Completion

All doctoral degree requirements must be completed within eight (8) calendar years of the student’s first semester in the PhD program. This time limit may be extended under exceptional circumstances but will require re-validation of any course credit that is more than eight years old at the time of graduation. Re-validation should occur after successful completion of the dissertation requirements. Students should work with their dissertation committee chair and/or the GPD to ensure re-validation. See additional details under “Re-Validation of Out-of-Date Graduate Credit” in the Graduate Policies and Procedures section of the Graduate Catalog (<https://catalog.odu.edu/graduate/graduatepoliciesandprocedures/>).

Continuous Enrollment

This policy outlines the requirements for continuous enrollment in the PhD program to ensure that students remain active in their academic pursuits and make steady progress toward the completion of their doctoral degrees.

1. **Continuous Enrollment Requirement:** All PhD students are required to maintain continuous enrollment from the time they are admitted to the program until they successfully defend their dissertation and receive their degree.
2. **Registration for Coursework:** Students are expected to register for a minimum of 1 credit hour per semester (including summer). This may include coursework, directed readings, or research/dissertation credits.
3. **Leave of Absence:** In exceptional circumstances, a student may request a leave of absence. A leave of absence can be granted for reasons such as medical issues, family emergencies, or military service. Students must submit a formal request for a leave of absence to the department, providing a clear explanation of the reason and expected duration.
4. **Readmission After Leave of Absence:** Students who have taken a leave of absence must apply for readmission to the program.
5. **Continuous Dissertation Enrollment:** After successful completion of coursework, students are required to maintain continuous enrollment in dissertation research credits until the dissertation is successfully defended.
6. **Financial Obligations:** Students must meet all financial obligations, including tuition and fees, to maintain continuous enrollment. Failure to do so may result in a hold on the student’s account, which can affect their ability to register for courses or access university resources.

Coursework

Lists and descriptions of the required and elective courses to satisfy the PhD program’s 37 hours of coursework may be found under “Doctor of Philosophy – Public Administration & Policy” in the School of Public Service section of the Graduate Catalog (<https://catalog.odu.edu/graduate/business/public-service/public-administration-policy-phd/>). When contemplating their course selection, students should keep in mind that at least 23 credit hours must be completed at the 800 level.

Core Courses (13 semester credit hours)

The core courses offer an important theoretical framework for the PhD program. These courses provide a foundation for understanding the production and application of social science knowledge in the field of public administration and public policy. As a starting point for all students in the program, these courses help to develop a common frame of reference and give focus to the program.

Research Core Courses and Research Elective Course (15 semester credit hours)

Research courses are designed to provide students with the tools and skills to conduct quality research in the

social sciences, and to apply research methodology as a problem-solving process. Students are exposed to the philosophy undergirding social inquiry, statistical techniques, qualitative methodologies, research design, and program evaluation.

Electives (9 semester credit hours)

Students are encouraged to use electives to develop their area of research interest and expertise. Electives must be at the 600 level or above and may be taken outside of the SPS with the approval of the PhD GPD or the student’s advisor. With the approval of the PhD GPD, students may also complete 3-credit hours of directed research (PADM 898) to fulfill an elective requirement.

Student Performance Review

Each PhD student undergoes a performance review by their advisor and/or the PhD GPD at the end of each academic year. In addition to certifying that the student is making satisfactory progress toward the degree (in compliance with the continuance and retention policies), the evaluation will include an examination of the following factors:

- professional integrity, professionalism, and ethical behavior, as reflected in the American Society for Public Administration (ASPA) Code of Ethics (<https://www.aspanet.org/ASPA/ASPA/Code-of-Ethics/Code-of-Ethics.aspx>)
- participation in socialization events
- collegiality and personal behavior
- non-academic performance (e.g., publication efforts, conference papers, participation in SPS and program events, etc.)
- capability and desire to pass comprehensive examinations and complete a dissertation in a timely fashion

If a student receives an unacceptable review, the student will be brought before the faculty to discuss their past performance as well as their future in the PhD program. An integral part of this meeting would be to counsel the student. In lieu of an appearance, students may elect to write a letter of explanation to the faculty. The faculty will have the ability, by majority vote of the tenure-track faculty, to place the student on probation for one semester or to dismiss the student immediately, regardless of academic standing or time in the program. If the faculty chooses to place the student on probation and the student fails to meet faculty expectations by the end of the semester following this decision, the student will be automatically dismissed.

If a student improves but then receives a second unacceptable review, they will be automatically placed on a one-semester suspension from the program; if there is a third occurrence, the student will be automatically dismissed, regardless of their academic standing or time in the program. Students may appeal the faculty decision to the Dean of the Strome College of Business (see Retention Policy).

Socialization Requirement

An integral component of successful doctoral study is the socialization of the student into the discipline and the academy. This socialization process is critical to the long-term success of any PhD student, whether they seek a career in academia or elsewhere. All PhD students are required to attend at least seven (7) designated socialization events during their PhD program. These are non-credit events, but no student will be certified for graduation until this requirement is met as determined by the PhD GPD. The SPS will designate at least 3-4 socialization events each year, and the events will be advertised in PhD classes and via email. Events may also be held during the summer term.

Students can meet some of the socialization requirement by participating in the Graduate School’s Career Pathways (<https://sites.wp.odu.edu/careerpathways/>) programs. Additional events that count as socialization events include attendance at prospectus and dissertation defenses, local ASPA chapter events, conference research presentations, and Dean’s Research Seminars. Students must maintain records and ensure documentation of these events with the PhD GPD by the end of the semester in which they occur.

Certificate Public Administration and Policy Certificate

Vickie Carnegie, Graduate Program Director

The School of Public Service in the Strome College of Business at Old Dominion University offers a Graduate Certificate in Public Administration and Policy. The objective of the program is to help working professionals upgrade their skills in the areas of policy analysis and public management, by developing analytical and management knowledge and capabilities.

Courses are available in a live or online setting, depending on semester and demand.

Curriculum Requirements

The curriculum consists of the courses listed below. Students are required to take four courses, totaling 12 credit hours, to complete the certificate program. There are three required courses and a choice of an elective.*

Required

PADM 651	Administrative Theory I: The Context of Public Administration	3
PADM 701	Public Policy and Evaluation	3
PADM 723	Ethics in Public Administration	3

Elective

Select one of the following:		3
PADM 652	Administrative Theory II: The Process of Public Administration	
PADM 671	Public Budgeting and Financial Management	
PADM 708	Urban and Regional Economic Development	
PADM 714	Public-Private Partnerships	
PADM 719	Leadership	
PADM 724	Administration of Human Services	
PADM 760	Collaboration in Public Administration	
PADM 734	Negotiation and Dispute Resolution	
PADM 781	Intergovernmental Management	

Total Credit Hours 12

* Any alteration(s) in required or elective course selection require(s) prior faculty advisor approval.

Certificate Public Procurement and Contract Management Certificate

Vickie Carnegie, Interim Program Director

The Graduate Certificate in Public Procurement & Contract Management (PPCM) can provide excellent job opportunities and career growth. This online program prepares students with the skills and tools needed to improve the effectiveness and efficiency of procurement and contract management. The Certificate is designed for Public Administration students, Business Administration students, Engineering students, and students from many other disciplines. The PPCM program consists of four required courses and one elective (15 credits total).

Admission Requirements

Admission to this Graduate Certificate program will require a bachelor's degree (or equivalent). Interested students can enroll by completing an online application using the ODU application portal.

Curriculum Requirements

The award of this certificate is based upon the student's successful completion of 15 credit hours of graduate level courses in Public Administration:

PPCM/PADM 718	Public Sector Contract Administration	3
PPCM/PADM 726	Introduction to Public Procurement	3
PPCM/PADM 728	Public Sector Contract Planning and Formation	3
PPCM/PADM 731	Public Sector Procurement Law and Ethics	3
Select one of the following:		3
PADM/PPCM 704	Methods of Public Program Evaluation	
PADM/PPCM 714	Public-Private Partnerships	
PADM/PPCM 719	Leadership	
PADM/PPCM 727	Public Procurement and Project Management	
PADM/PPCM 734	Negotiation and Dispute Resolution	
PADM/PPCM 781	Intergovernmental Management	

Total Credit Hours 15

Additional Requirements

For more information relating to this program and its requirements, please visit <http://www.odu.edu/business/departments/sps/academics/procurement> (<http://www.odu.edu/business/departments/sps/academics/procurement/>).

School of Cybersecurity

Daniel Takabi, Director

The School of Cybersecurity administers two degrees (a BS in Cybersecurity with majors in cybersecurity and cyber operations and an MS in Cybersecurity) and an interdisciplinary minor in cybersecurity. The School's strategic priority is to deliver exceptional academic programs for both on-campus and online students to cultivate the cybersecurity workforce and enhance the nation's cybersecurity talent. The School supports undergraduate and graduate students and faculty to achieve healthy and sustainable growth of the cybersecurity program. The mission of the School also includes developing high-impact, cross-disciplinary research initiatives that center on cybersecurity and conducting outreach and community engagement, being a source of cybersecurity expertise to the community, the Hampton Roads region, the Commonwealth of Virginia, and the nation.

Programs

Master of Science Programs

- Cybersecurity (MS) (p. 128)
- Cybersecurity with a Concentration in AI for Cybersecurity (MS) (p. 129)
- Cybersecurity with a Concentration in AI Security (MS) (p. 131)
- Cybersecurity with a Concentration in Cyber Conflict and Cyber Crime (MS) (p. 132)
- Cybersecurity with a Concentration in Cybersecurity Risk Management (MS) (p. 134)

Certificate Program

- Artificial Intelligence (AI) in Cyber Defense Certificate (p. 135)
- Cybersecurity Risk Management Certificate (p. 135)
- Trustworthy Artificial Intelligence Certificate (p. 136)

Master of Science Cybersecurity (MS)

Master of Science in Cybersecurity

Rafael Diaz, Graduate Program Director

The Master of Science in Cybersecurity is a 30-credit hour non-thesis degree program. It is designed to prepare cyber security technology leaders.

Graduates will develop skills and competencies in technical aspects of cyber security and will be prepared to assume responsibility for the management of cybersecurity projects and coordination of cyber operation teams. It also provides preparation for students desiring to pursue doctoral studies or teach cybersecurity courses in 2- and 4-year colleges and universities.

The program is offered in online format and with the option for local students to attend classes on campus. The required core courses focus on the fundamental knowledge of cybersecurity, covering advanced cybersecurity principles, techniques, and operations, as well as advanced topics in law, policy, management and leadership in cybersecurity. Students will have opportunities to choose five restricted electives to learn about different aspects of cybersecurity. The capstone course provides opportunities to synthesize and apply the knowledge and skills to solve real-world cybersecurity problems.

Financial Aid

Sources of financial aid available to students include

1. Research and teaching assistantships and
2. Loans.

Admission

Application Procedures

The completed application for the Master of Science Cybersecurity program will include the following items:

1. Official copies of transcripts from all colleges/universities attended.
2. Two letters of recommendation from individuals familiar with applicant's professional and/or academic background.
3. A current resume.
4. A statement of professional goals and academic objectives.
5. A completed application form.
6. Receipt of the application fee. Checks should be made payable to Old Dominion University
7. TOEFL test scores, sent directly from the ETS to ODU International Graduate Admission Office must accompany international applications for applicants with a degree issued outside of the United States.

Applications to Old Dominion University can be completed on-line at <http://www.odu.edu/admission/graduate> (<http://www.odu.edu/admission/graduate/>).

The applicant is responsible to ensure that all application materials are received and the application is complete in all respects.

Curriculum Requirements

This program consists of four core courses (12 credit hours), five electives (15 credit hours), and one capstone course (3 credit hours). The four core courses focus on the fundamental knowledge of cybersecurity, covering advanced cybersecurity principles, techniques, and operations, as well as advanced topics in law, policy, management and leadership in cybersecurity.

The five electives provide students with opportunities to learn about different aspects of cybersecurity, e.g., in information systems, network systems, mobile and wireless systems, operating systems, and cyber-physical systems. Courses are also offered to address such important cybersecurity topics as reverse software engineering, digital forensics, thread modeling, and ethical hacking and penetration testing.

The capstone course brings together students in their final semester of study to synthesize knowledge from their previous coursework and apply it to solve real-world cybersecurity problems. The faculty member who teaches the capstone course will work with industrial and academic partners who will serve as external mentors of the capstone course. Each student in the capstone course will discuss—with both faculty member and mentor—development of her/his master's project that aims to solve a cybersecurity problem in a real-world business setting.

Cybersecurity Core

Core Courses

CYSE 600	Cybersecurity Principles	3
or CYSE 625	Advanced Ethical Hacking and Penetration Testing	
CYSE 601	Advanced Cybersecurity Techniques and Operations	3
or CYSE 602	Advanced Techniques for Cyber Defense	
CYSE 603	Advanced Cybersecurity Law and Policy	3
CYSE 605	Leadership and Management in Cybersecurity	3

Total Credit Hours 12

Cybersecurity Concentration

Restricted Elective Courses

Select 15 credits of the following:		15
CS 533	Web Security	
CS 564	Networked Systems Security	
CS 565	Information Assurance for Cybersecurity	

CS 566	Principles and Practice of Cyber Defense	
CS 567	Introduction to Reverse Software Engineering	
CS 569	Data Analytics for Cybersecurity	
CS 761	Malware Analysis and Reverse Engineering	
CYSE 516	Cyber Defense Fundamentals	
CYSE 519	Cyber Physical System Security	
CYSE 520	Applied Machine Learning in Cybersecurity	
CYSE 521	Generative AI in Cybersecurity	
CYSE 525	Cybersecurity Strategy and Policy	
CYSE 526	Cyber War	
CYSE 530	Introduction to Cybersecurity Risk Management	
CYSE 531	Advanced Techniques Cybersecurity Risk Management	
CYSE 532	Cyber Risk CSF/CMMC	
CYSE 533	Cyber Risk FedRAMP/Audit	
CYSE 595	Topics in Cybersecurity *	
CYSE 597	Tutorial Work in Special Topics in Cybersecurity	
CYSE 607	Advanced Digital Forensics	
CYSE 608	Windows System for Cybersecurity	
CYSE 609	Fundamentals of Linux System for Cybersecurity	
CYSE 610	Advanced Cryptography	
CYSE 615	Mobile and Wireless Security	
CYSE 625	Advanced Ethical Hacking and Penetration Testing	
CYSE 635	AI Security and Privacy	
CYSE 695	Advanced Topics in Cybersecurity	
CYSE 697	Independent Study in Cybersecurity *	
ENMA 625	Introduction to Homeland Security Logistics	
MSIM 670	Cyber Systems Engineering	
Capstone Course		
CYSE 698	Master's Project	3
Total Credit Hours		18

Note on CYSE 595 and CYSE 697 : CYSE 595 can be taken multiple times by a student as long as the CYSE 595 courses have different titles. However, if a student has already taken a CYSE 595 course, which is converted to a regularly numbered course (generally the same title) in a future semester, the student cannot take the converted course any more. CYSE 697 can also be taken multiple times by a student, but the research topics on different CYSE 697 courses need to be different.

Recommended Plan of Study

Full-Time Students

Course	Title	Credit Hours
First Year		
Fall		
CYSE 600	Cybersecurity Principles	3
CYSE 605	Leadership and Management in Cybersecurity	3
Restricted Elective		3
Restricted Elective		3
Credit Hours		12
Spring		
CYSE 601	Advanced Cybersecurity Techniques and Operations	3

CYSE 603	Advanced Cybersecurity Law and Policy	3
Restricted Elective		3
Restricted Elective		3
Credit Hours		12
Summer		
CYSE 698	Master's Project	3
Restricted Elective		3
Credit Hours		6
Total Credit Hours		30

Part-Time Students

Course	Title	Credit Hours
First Year		
Fall		
CYSE 600	Cybersecurity Principles	3
CYSE 605	Leadership and Management in Cybersecurity	3
Credit Hours		6
Spring		
CYSE 601	Advanced Cybersecurity Techniques and Operations	3
Restricted Elective		3
Credit Hours		6
Second Year		
Fall		
CYSE 603	Advanced Cybersecurity Law and Policy	3
Restricted Elective		3
Credit Hours		6
Spring		
Restricted Elective		3
Restricted Elective		3
Credit Hours		6
Third Year		
Fall		
CYSE 698	Master's Project	3
Restricted Elective		3
Credit Hours		6
Total Credit Hours		30

Master of Science Cybersecurity with a Concentration in AI for Cybersecurity (MS)

Rafael Diaz, Graduate Program Director

The Master of Science in Cybersecurity is a 30-credit hour non-thesis degree program. It is designed to prepare cyber security technology leaders.

Graduates will develop skills and competencies in technical aspects of cyber security and will be prepared to assume responsibility for the management of cybersecurity projects and coordination of cyber operation teams. It also provides preparation for students desiring to pursue doctoral studies or teach cybersecurity courses in 2- and 4-year colleges and universities.

The program is offered in online format and with the option for local students to attend classes on campus. The required core courses focus on the fundamental knowledge of cybersecurity, covering advanced cybersecurity principles, techniques, and operations, as well as advanced topics in law, policy, management and leadership in cybersecurity. Students will have opportunities to choose five restricted electives to learn about different aspects of cybersecurity. The capstone course provides opportunities to synthesize and apply the knowledge and skills to solve real-world cybersecurity problems.

Financial Aid

Sources of financial aid available to students include

1. Research and teaching assistantships and
2. Loans.

Admission

Application Procedures

The completed application for the Master of Science Cybersecurity program will include the following items:

1. Official copies of transcripts from all colleges/universities attended.
2. Two letters of recommendation from individuals familiar with applicant's professional and/or academic background.
3. A current resume.
4. A statement of professional goals and academic objectives.
5. A completed application form.
6. Receipt of the application fee. Checks should be made payable to Old Dominion University
7. TOEFL test scores, sent directly from the ETS to ODU International Graduate Admission Office must accompany international applications for applicants with a degree issued outside of the United States.

Applications to Old Dominion University can be completed on-line at <http://www.odu.edu/admission/graduate> (<http://www.odu.edu/admission/graduate/>).

The applicant is responsible to ensure that all application materials are received and the application is complete in all respects.

Curriculum Requirements

This program consists of four core courses (12 credit hours), five electives (15 credit hours), and one capstone course (3 credit hours). The four core courses focus on the fundamental knowledge of cybersecurity, covering advanced cybersecurity principles, techniques, and operations, as well as advanced topics in law, policy, management and leadership in cybersecurity.

The five electives provide students with opportunities to learn about different aspects of cybersecurity, e.g., in information systems, network systems, mobile and wireless systems, operating systems, and cyber-physical systems. Courses are also offered to address such important cybersecurity topics as reverse software engineering, digital forensics, thread modeling, and ethical hacking and penetration testing.

The capstone course brings together students in their final semester of study to synthesize knowledge from their previous coursework and apply it to solve real-world cybersecurity problems. The faculty member who teaches the capstone course will work with industrial and academic partners who will serve as external mentors of the capstone course. Each student in the capstone course will discuss—with both faculty member and mentor—development of her/his master's project that aims to solve a cybersecurity problem in a real-world business setting.

Cybersecurity Core

CYSE 600	Cybersecurity Principles	3
CYSE 601	Advanced Cybersecurity Techniques and Operations	3
or CYSE 602	Advanced Techniques for Cyber Defense	

CYSE 603	Advanced Cybersecurity Law and Policy	3
CYSE 605	Leadership and Management in Cybersecurity	3

Total Credit Hours 12

Artificial Intelligence (AI) for Cybersecurity Concentration

The MS in Cybersecurity concentrations are designed for the students who are interested to focus on a specific area in cybersecurity. An admitted student can be accepted to a concentration upon the approval of the Graduate Program Director. The concentration will be posted on the transcript.

Artificial Intelligence (AI) for Cybersecurity is an integral part of cybersecurity. This concentration will expose students to sophisticated AI for cybersecurity principles and tools.

CS 522	Introduction to Machine Learning	3
or CS 580	Introduction to Artificial Intelligence	
CS 722	Machine Learning	3
or CS 733	Natural Language Processing	
or CS 728	Deep Learning Fundamentals and Applications	
CS 569	Data Analytics for Cybersecurity	3
CYSE 520	Applied Machine Learning in Cybersecurity	3
CYSE 521	Generative AI in Cybersecurity	3
CYSE 698	Master's Project	3

Total Credit Hours 18

Full-Time Students

Course	Title	Credit Hours
First Year		
Fall		
CYSE 600	Cybersecurity Principles	3
CYSE 605	Leadership and Management in Cybersecurity	3
Restrictive Elective		3
Restrictive Elective		3
Credit Hours		12
Spring		
CYSE 601	Advanced Cybersecurity Techniques and Operations	3
CYSE 603	Advanced Cybersecurity Law and Policy	3
Restrictive Elective		3
Restrictive Elective		3
Credit Hours		12
Summer		
CYSE 698	Master's Project	3
Restrictive Elective		3
Credit Hours		6
Total Credit Hours		30

Part-Time Students

Course	Title	Credit Hours
First Year		
Fall		
CYSE 600	Cybersecurity Principles	3

CYSE 605	Leadership and Management in Cybersecurity	3
Credit Hours		6
Spring		
CYSE 601	Advanced Cybersecurity Techniques and Operations	3
Restrictive Elective		3
Credit Hours		6
Second Year		
Fall		
CYSE 603	Advanced Cybersecurity Law and Policy	3
Restrictive Elective		3
Credit Hours		6
Spring		
Restrictive Elective		3
Restrictive Elective		3
Credit Hours		6
Third Year		
Fall		
CYSE 698	Master's Project	3
Restrictive Elective		3
Credit Hours		6
Total Credit Hours		30

Master of Science Cybersecurity with a Concentration in AI Security (MS)

Master of Science in Cybersecurity

Rafael Diaz, Graduate Program Director

The Master of Science in Cybersecurity is a 30-credit hour non-thesis degree program. It is designed to prepare cyber security technology leaders.

Graduates will develop skills and competencies in technical aspects of cyber security and will be prepared to assume responsibility for the management of cybersecurity projects and coordination of cyber operation teams. It also provides preparation for students desiring to pursue doctoral studies or teach cybersecurity courses in 2- and 4-year colleges and universities.

The program is offered in online format and with the option for local students to attend classes on campus. The required core courses focus on the fundamental knowledge of cybersecurity, covering advanced cybersecurity principles, techniques, and operations, as well as advanced topics in law, policy, management and leadership in cybersecurity. Students will have opportunities to choose five restricted electives to learn about different aspects of cybersecurity. The capstone course provides opportunities to synthesize and apply the knowledge and skills to solve real-world cybersecurity problems.

Financial Aid

Sources of financial aid available to students include

1. Research and teaching assistantships and
2. Loans.

Admission

Application Procedures

The completed application for the Master of Science Cybersecurity program will include the following items:

1. Official copies of transcripts from all colleges/universities attended.
2. Two letters of recommendation from individuals familiar with applicant's professional and/or academic background.
3. A current resume.
4. A statement of professional goals and academic objectives.
5. A completed application form.
6. Receipt of the application fee. Checks should be made payable to Old Dominion University
7. TOEFL test scores, sent directly from the ETS to ODU International Graduate Admission Office must accompany international applications for applicants with a degree issued outside of the United States.

Applications to Old Dominion University can be completed on-line at <http://www.odu.edu/admission/graduate> (<http://www.odu.edu/admission/graduate/>).

The applicant is responsible to ensure that all application materials are received and the application is complete in all respects.

Curriculum Requirements

This program consists of four core courses (12 credit hours), five electives (15 credit hours), and one capstone course (3 credit hours). The four core courses focus on the fundamental knowledge of cybersecurity, covering advanced cybersecurity principles, techniques, and operations, as well as advanced topics in law, policy, management and leadership in cybersecurity.

The five electives provide students with opportunities to learn about different aspects of cybersecurity, e.g., in information systems, network systems, mobile and wireless systems, operating systems, and cyber-physical systems. Courses are also offered to address such important cybersecurity topics as reverse software engineering, digital forensics, thread modeling, and ethical hacking and penetration testing.

The capstone course brings together students in their final semester of study to synthesize knowledge from their previous coursework and apply it to solve real-world cybersecurity problems. The faculty member who teaches the capstone course will work with industrial and academic partners who will serve as external mentors of the capstone course. Each student in the capstone course will discuss—with both faculty member and mentor—development of her/his master's project that aims to solve a cybersecurity problem in a real-world business setting.

Cybersecurity Core

Core Courses

CYSE 600	Cybersecurity Principles	3
or CYSE 625	Advanced Ethical Hacking and Penetration Testing	
CYSE 601	Advanced Cybersecurity Techniques and Operations	3
or CYSE 602	Advanced Techniques for Cyber Defense	
CYSE 603	Advanced Cybersecurity Law and Policy	3
CYSE 605	Leadership and Management in Cybersecurity	3
Total Credit Hours		12

Artificial Intelligence (AI) Security Concentration

The MS in Cybersecurity concentrations are designed for the students who are interested to focus on a specific area in cybersecurity. An admitted student can be accepted to a concentration upon the approval of the Graduate Program Director. The concentration will be posted on the transcript.

Artificial Intelligence (AI) security is an integral part of cybersecurity. This concentration will expose students to sophisticated AI security principles and tools.

Required Electives for Concentration

Select two of the following:		6
CS 522	Introduction to Machine Learning	
CS 580	Introduction to Artificial Intelligence	
CS 728	Deep Learning Fundamentals and Applications	
CS 733	Natural Language Processing	
CYSE 520	Applied Machine Learning in Cybersecurity	3
CYSE 635	AI Security and Privacy	3
CYSE 640	Trustworthy and Responsible AI	3
Capstone		
CYSE 698	Master's Project	3
Total Credit Hours		18

Recommended Plan of Study

Full-Time Students

Course	Title	Credit Hours
First Year		
Fall		
CYSE 600	Cybersecurity Principles	3
CYSE 605	Leadership and Management in Cybersecurity	3
Restricted Elective		3
Restricted Elective		3
Credit Hours		12
Spring		
CYSE 601	Advanced Cybersecurity Techniques and Operations	3
CYSE 603	Advanced Cybersecurity Law and Policy	3
Restricted Elective		3
Restricted Elective		3
Credit Hours		12
Summer		
CYSE 698	Master's Project	3
Restricted Elective		3
Credit Hours		6
Total Credit Hours		30

Part-Time Students

Course	Title	Credit Hours
First Year		
Fall		
CYSE 600	Cybersecurity Principles	3
CYSE 605	Leadership and Management in Cybersecurity	3
Credit Hours		6
Spring		
CYSE 601	Advanced Cybersecurity Techniques and Operations	3
Restricted Elective		3
Credit Hours		6

Second Year

Fall

CYSE 603	Advanced Cybersecurity Law and Policy	3
Restricted Elective		3

Credit Hours 6

Spring

Restricted Elective		3
Restricted Elective		3

Credit Hours 6

Third Year

Fall

CYSE 698	Master's Project	3
Restricted Elective		3

Credit Hours 6

Total Credit Hours 30

**Master of Science
Cybersecurity with a Concentration
in Cyber Conflict and Cyber Crime
(MS)**

Master of Science in Cybersecurity

Rafael Diaz, Graduate Program Director

The Master of Science in Cybersecurity is a 30-credit hour non-thesis degree program. It is designed to prepare cyber security technology leaders.

Graduates will develop skills and competencies in technical aspects of cyber security and will be prepared to assume responsibility for the management of cybersecurity projects and coordination of cyber operation teams. It also provides preparation for students desiring to pursue doctoral studies or teach cybersecurity courses in 2- and 4-year colleges and universities.

The program is offered in online format and with the option for local students to attend classes on campus. The required core courses focus on the fundamental knowledge of cybersecurity, covering advanced cybersecurity principles, techniques, and operations, as well as advanced topics in law, policy, management and leadership in cybersecurity. Students will have opportunities to choose five restricted electives to learn about different aspects of cybersecurity. The capstone course provides opportunities to synthesize and apply the knowledge and skills to solve real-world cybersecurity problems.

Financial Aid

Sources of financial aid available to students include

1. Research and teaching assistantships and
2. Loans.

Admission

Application Procedures

The completed application for the Master of Science Cybersecurity program will include the following items:

1. Official copies of transcripts from all colleges/universities attended.
2. Two letters of recommendation from individuals familiar with applicant's professional and/or academic background.
3. A current resume.
4. A statement of professional goals and academic objectives.
5. A completed application form.

- Receipt of the application fee. Checks should be made payable to Old Dominion University
- TOEFL test scores, sent directly from the ETS to ODU International Graduate Admission Office must accompany international applications for applicants with a degree issued outside of the United States.

Applications to Old Dominion University can be completed on-line at <http://www.odu.edu/admission/graduate> (<http://www.odu.edu/admission/graduate/>).

The applicant is responsible to ensure that all application materials are received and the application is complete in all respects.

Curriculum Requirements

This program consists of four core courses (12 credit hours), five electives (15 credit hours), and one capstone course (3 credit hours). The four core courses focus on the fundamental knowledge of cybersecurity, covering advanced cybersecurity principles, techniques, and operations, as well as advanced topics in law, policy, management and leadership in cybersecurity.

The five electives provide students with opportunities to learn about different aspects of cybersecurity, e.g., in information systems, network systems, mobile and wireless systems, operating systems, and cyber-physical systems. Courses are also offered to address such important cybersecurity topics as reverse software engineering, digital forensics, thread modeling, and ethical hacking and penetration testing.

The capstone course brings together students in their final semester of study to synthesize knowledge from their previous coursework and apply it to solve real-world cybersecurity problems. The faculty member who teaches the capstone course will work with industrial and academic partners who will serve as external mentors of the capstone course. Each student in the capstone course will discuss—with both faculty member and mentor—development of her/his master's project that aims to solve a cybersecurity problem in a real-world business setting.

Cybersecurity Core

Core Courses

CYSE 600	Cybersecurity Principles	3
or CYSE 625	Advanced Ethical Hacking and Penetration Testing	
CYSE 601	Advanced Cybersecurity Techniques and Operations	3
or CYSE 602	Advanced Techniques for Cyber Defense	
CYSE 603	Advanced Cybersecurity Law and Policy	3
CYSE 605	Leadership and Management in Cybersecurity	3
Total Credit Hours		12

Cyber Conflict and Cyber Crime Concentration

The MS in Cybersecurity concentrations are designed for the students who are interested to focus on a specific area in cybersecurity. An admitted student can be accepted to a concentration upon the approval of the Graduate Program Director. The concentration will be posted on the transcript.

Required Electives for Concentration

CYSE 525	Cybersecurity Strategy and Policy	3
CYSE 526	Cyber War	3
CYSE 595	Topics in Cybersecurity (Human Factors and Policy Management in Cybersecurity)	3
CYSE 607	Advanced Digital Forensics	3
ENMA 625	Introduction to Homeland Security Logistics	3
Capstone		
CYSE 698	Master's Project	3
Total Credit Hours		18

Recommended Plan of Study

Full-Time Students

Course	Title	Credit Hours
First Year		
Fall		
CYSE 600	Cybersecurity Principles	3
CYSE 605	Leadership and Management in Cybersecurity	3
Restricted Elective		3
Restricted Elective		3
Credit Hours		12
Spring		
CYSE 601	Advanced Cybersecurity Techniques and Operations	3
CYSE 603	Advanced Cybersecurity Law and Policy	3
Restricted Elective		3
Restricted Elective		3
Credit Hours		12
Summer		
CYSE 698	Master's Project	3
Restricted Elective		3
Credit Hours		6
Total Credit Hours		30

Part-Time Students

Course	Title	Credit Hours
First Year		
Fall		
CYSE 600	Cybersecurity Principles	3
CYSE 605	Leadership and Management in Cybersecurity	3
Credit Hours		6
Spring		
CYSE 601	Advanced Cybersecurity Techniques and Operations	3
Restricted Elective		3
Credit Hours		6
Second Year		
Fall		
CYSE 603	Advanced Cybersecurity Law and Policy	3
Restricted Elective		3
Credit Hours		6
Spring		
Restricted Elective		3
Restricted Elective		3
Credit Hours		6
Third Year		
Fall		
CYSE 698	Master's Project	3

Restricted Elective	3
Credit Hours	6
Total Credit Hours	30

Master of Science Cybersecurity with a Concentration in Cybersecurity Risk Management (MS)

Master of Science in Cybersecurity

Rafael Diaz, Graduate Program Director

The Master of Science in Cybersecurity is a 30-credit hour non-thesis degree program. It is designed to prepare cyber security technology leaders.

Graduates will develop skills and competencies in technical aspects of cyber security and will be prepared to assume responsibility for the management of cybersecurity projects and coordination of cyber operation teams. It also provides preparation for students desiring to pursue doctoral studies or teach cybersecurity courses in 2- and 4-year colleges and universities.

The program is offered in online format and with the option for local students to attend classes on campus. The required core courses focus on the fundamental knowledge of cybersecurity, covering advanced cybersecurity principles, techniques, and operations, as well as advanced topics in law, policy, management and leadership in cybersecurity. Students will have opportunities to choose five restricted electives to learn about different aspects of cybersecurity. The capstone course provides opportunities to synthesize and apply the knowledge and skills to solve real-world cybersecurity problems.

Financial Aid

Sources of financial aid available to students include

1. Research and teaching assistantships and
2. Loans.

Admission

Application Procedures

The completed application for the Master of Science Cybersecurity program will include the following items:

1. Official copies of transcripts from all colleges/universities attended.
2. Two letters of recommendation from individuals familiar with applicant's professional and/or academic background.
3. A current resume.
4. A statement of professional goals and academic objectives.
5. A completed application form.
6. Receipt of the application fee. Checks should be made payable to Old Dominion University
7. TOEFL test scores, sent directly from the ETS to ODU International Graduate Admission Office must accompany international applications for applicants with a degree issued outside of the United States.

Applications to Old Dominion University can be completed on-line at <http://www.odu.edu/admission/graduate> (<http://www.odu.edu/admission/graduate/>).

The applicant is responsible to ensure that all application materials are received and the application is complete in all respects.

Curriculum Requirements

This program consists of four core courses (12 credit hours), five electives (15 credit hours), and one capstone course (3 credit hours). The four core courses focus on the fundamental knowledge of cybersecurity, covering

advanced cybersecurity principles, techniques, and operations, as well as advanced topics in law, policy, management and leadership in cybersecurity.

The five electives provide students with opportunities to learn about different aspects of cybersecurity, e.g., in information systems, network systems, mobile and wireless systems, operating systems, and cyber-physical systems. Courses are also offered to address such important cybersecurity topics as reverse software engineering, digital forensics, thread modeling, and ethical hacking and penetration testing.

The capstone course brings together students in their final semester of study to synthesize knowledge from their previous coursework and apply it to solve real-world cybersecurity problems. The faculty member who teaches the capstone course will work with industrial and academic partners who will serve as external mentors of the capstone course. Each student in the capstone course will discuss—with both faculty member and mentor—development of her/his master's project that aims to solve a cybersecurity problem in a real-world business setting.

Cybersecurity Core

Core Courses		
CYSE 600	Cybersecurity Principles	3
or CYSE 625	Advanced Ethical Hacking and Penetration Testing	
CYSE 601	Advanced Cybersecurity Techniques and Operations	3
or CYSE 602	Advanced Techniques for Cyber Defense	
CYSE 603	Advanced Cybersecurity Law and Policy	3
CYSE 605	Leadership and Management in Cybersecurity	3
Total Credit Hours		12

Cybersecurity Risk Management Concentration

The MS in Cybersecurity concentrations are designed for the students who are interested to focus on a specific area in cybersecurity. An admitted student can be accepted to a concentration upon the approval of the Graduate Program Director. The concentration will be posted on the transcript.

The Cybersecurity Risk Management concentration is a linked concentration for the students in Cybersecurity Risk Management Certificate program. After the students complete the certificate program, if they seek to further enhance knowledge and skills in cybersecurity, they can be accepted to this concentration. When students complete the program, they will have a comprehensive understanding of cybersecurity as well as project experience in applying the NIST Risk Management Framework (RMF) to practical problems of information security and security auditing.

Required Electives for Concentration

CYSE 530	Introduction to Cybersecurity Risk Management	3
CYSE 531	Advanced Techniques Cybersecurity Risk Management	3
CYSE 532	Cyber Risk CSF/CMMC	3
CYSE 533	Cyber Risk FedRAMP/Audit	3
<i>Select one of the following:</i>		3
CYSE 608	Windows System for Cybersecurity	
CYSE 609	Fundamentals of Linux System for Cybersecurity	
MSIM 670	Cyber Systems Engineering	
ENMA 625	Introduction to Homeland Security Logistics	
ENMA 670	Cyber Systems Engineering	
ENMA 724	Risk Analysis	

Capstone

CYSE 698	Master's Project	3
Total Credit Hours		18

Recommended Plan of Study

Full-Time Students

Course	Title	Credit Hours
First Year		
Fall		
CYSE 600	Cybersecurity Principles	3
CYSE 605	Leadership and Management in Cybersecurity	3
Restricted Elective		3
Restricted Elective		3
Credit Hours		12
Spring		
CYSE 601	Advanced Cybersecurity Techniques and Operations	3
CYSE 603	Advanced Cybersecurity Law and Policy	3
Restricted Elective		3
Restricted Elective		3
Credit Hours		12
Summer		
CYSE 698	Master's Project	3
Restricted Elective		3
Credit Hours		6
Total Credit Hours		30

Part-Time Students

Course	Title	Credit Hours
First Year		
Fall		
CYSE 600	Cybersecurity Principles	3
CYSE 605	Leadership and Management in Cybersecurity	3
Credit Hours		6
Spring		
CYSE 601	Advanced Cybersecurity Techniques and Operations	3
Restricted Elective		3
Credit Hours		6
Second Year		
Fall		
CYSE 603	Advanced Cybersecurity Law and Policy	3
Restricted Elective		3
Credit Hours		6
Spring		
Restricted Elective		3
Restricted Elective		3
Credit Hours		6
Third Year		
Fall		
CYSE 698	Master's Project	3

Restricted Elective	3
Credit Hours	6
Total Credit Hours	30

Certificate Artificial Intelligence (AI) in Cyber Defense Certificate

The Graduate Certificate in Artificial Intelligence in Cyber Defense is designed to educate students in methods to prevent, detect, and responding to cyber threats in a timely manner. Cyber defense specifically focuses on defending against external threats and attacks. The application of Artificial Intelligence (AI) to Cyber Defense can assist in monitoring for abnormalities in data access and predicting potential threats to prevent compromise to information or infrastructure.

Admission Information

The following admission requirements will apply to all applicants. All students must:

- Submit a completed online application and the application fee.
- Submit transcripts of all undergraduate and graduate work from regionally accredited institutions.
- Have earned a baccalaureate degree from a regionally accredited institution of higher education, or international equivalent.

Applicants who have not earned a degree in the United States must also submit:

- Current scores on the Test of English as a Foreign Language (TOEFL), with a minimum score of 230 on the computer-based TOEFL or 80 on the TOEFL iBT.

Curriculum Requirements

The certificate is awarded based upon the student's successful completion of 12* credit hours of graduate level courses:

AI/CYSE 510	Artificial Intelligence (AI) Methods and Models	3
AI/PHIL 546	Artificial Intelligence (AI) Ethics and Policy	3
AI/CYSE 521	Generative AI in Cybersecurity	3
CYSE 520	Applied Machine Learning in Cybersecurity	3
AI Practicum *		0
Total Credit Hours		12

* AI 669/DASC 669

Certificate Cybersecurity Risk Management Certificate

A key tool for addressing the mounting cyber threats is the NIST Risk Management Framework required by the Federal Information Security Act (FISMA). When students complete the certificate program, they will have a comprehensive understanding of it as well as project experience in applying the NIST Risk Management Framework (RMF)—the foundational framework which guides information security and information security auditing.

Admission Information

The following admission requirements will apply to all applicants. All students must:

- Submit a completed online application and the application fee,
- Submit transcripts of all undergraduate and graduate work from regionally accredited institutions.

Applicants who have not earned a degree in the United States must also submit:

- Current scores on the Test of English as a Foreign Language (TOEFL),
- A sample of scholarly writing, and three recommendations, at least one of which evaluates proficiency in English.

Curriculum Requirements

Students are required to complete the following six graduate courses. The curriculum is based on standards established by the National Institute of Standards and Technology. Students are required to maintain a minimum GPA of 3.0/4.0.

Required Courses

CYSE 530	Introduction to Cybersecurity Risk Management	3
CYSE 531	Advanced Techniques Cybersecurity Risk Management	3
CYSE 532	Cyber Risk CSF/CMMC	3
CYSE 533	Cyber Risk FedRAMP/Audit	3

Electives **6**

Select two of the following:

CYSE 608	Windows System for Cybersecurity
CYSE 609	Fundamentals of Linux System for Cybersecurity
MSIM 670	Cyber Systems Engineering
ENMA 625	Introduction to Homeland Security Logistics
ENMA 670	Cyber Systems Engineering
ENMA 724	Risk Analysis

Total Credit Hours 18

Certificate

Trustworthy Artificial Intelligence Certificate

The purpose of this interdisciplinary certificate is to provide an understanding of trustworthy and responsible Artificial Intelligence (AI) concepts in the context of cybersecurity. The program includes coursework focusing on the basics of machine learning and artificial intelligence, as well as the concepts of trustworthiness and security in the domain of cybersecurity. Students will gain knowledge on the representation and simulation by computers and software of human learning and reasoning processes. Students will be able to describe the essential building blocks of trustworthiness with a focus on reliability, transparency, interpretability, fairness, and ethics. Graduates will be able to describe and understand the concepts necessary for developing AI systems in a responsible and trustworthy manner with a focus on applications related to cybersecurity.

All applicants admitted to the certificate program must meet ODU requirements for graduate admission: an earned baccalaureate degree from a regionally accredited institution or an equivalent degree from a foreign institution.

Non-degree seeking students are required to have these same credentials, though documentation is not required. Ultimately, students must apply to the certificate program in order to obtain the certificate. The courses offered under this program may be taken by current ODU students or new students.

Curriculum Requirements

This certificate requires 12 credits and a 3.0 GPA.

CS 580	Introduction to Artificial Intelligence	3
CYSE 640	Trustworthy and Responsible AI	3

Select one of the following: **3**

CS 522	Introduction to Machine Learning
CS 733	Natural Language Processing

Select one of the following: **3**

CYSE 520	Applied Machine Learning in Cybersecurity
CYSE 635	AI Security and Privacy

Total Credit Hours 12

School of Data Science

The School of Data Science is designed to organize data science academic and research activities (with degrees and certificates tailored to regional workforce needs) while leveraging research partnerships with nearby national labs (Jefferson Lab, NASA Langley, and Wallops Flight Facility) to develop a targeted scientific focus in data science. The School's objectives include developing high-impact, cross-disciplinary research initiatives that center on data science and conducting outreach and community engagement, being a sources of data science expertise to the community, the Hampton Roads region, the Commonwealth of Virginia, and the nation.

For information, contact the Graduate Program Director: dsgpd@odu.edu

Programs

Master of Science Programs

- Data Science and Analytics with a Concentration in Artificial Intelligence and Machine Learning (MS) (p. 137)
- Data Science and Analytics with a Concentration in Business Intelligence and Analytics (MS) (p. 137)
- Data Science and Analytics with a Concentration in Engineering and Big Data Analysis (MS) (p. 138)
- Data Science and Analytics with a Concentration in Full Stack (MS) (p. 139)
- Data Science and Analytics with a Concentration in Geospatial Analytics (MS) (p. 139)
- Data Science and Analytics with a Concentration in Physics (MS) (p. 140)

Certificate Programs

- Artificial Intelligence (AI) in Data Science Certificate (p. 140)
- Artificial Intelligence (AI) in Healthcare Certificate (p. 141)

Master of Science Data Science and Analytics with a Concentration in Artificial Intelligence and Machine Learning (MS)

This program will provide students with a foundation to use state-of-the-art programming tools and software packages to develop machine learning models. Students will learn how to use data for identifying trends and patterns, solving problems, communicating results, and recommending optimal solutions.

Coursework for the computational data analytics concentration focuses on teaching programming language, the use of complex statistical tools, and mathematical modeling. Graduates will be able to enter data science, analytical, and statistical fields. This program is available on-campus and online.

Artificial Intelligence & Machine Learning

In this concentration, students will prepare to enter rapidly emerging fields related to data science and analytics. The coursework addresses relevant data analytics topics such as text analytics, visualization, algorithms and data structures, and information retrieval. Students will learn computational data analysis, data visualization, and natural language processing. Students will select four courses in consultation with the faculty advisor.

Admission

The requirements for admission to the Master of Science in Data Science and Analytics are as follows:

1. A baccalaureate degree in computer science, electrical and/or computer engineering, mathematics, statistics, information system & technology,

- or a related field from a regionally-accredited institution or an equivalent institution outside the U.S.; students holding a bachelor's degree in an unrelated field will need competency in topics related to basic statistics and computer science.
2. Current scores on the Test of English as a Foreign Language (TOEFL) of at least 230 on the computer based TOEFL or 79 on the TOEFL iBT, or IELTS 6.5 overall.

Students with previously completed work at a regionally-accredited institution may submit a request for a maximum of 12 elective graduate credit hours to be transferred into the program. If approved by the admission committee, it will be added to the transcript.

Curriculum Requirements

The program requires 30 credit hours. A capstone project is required.

Data Science & Analytics Core

Core Requirements		
DASC/CS 620	Introduction to Data Science and Analytics	3
CS 624	Data Analytics and Big Data	3
CS 625	Data Visualization	3
STAT 603	Probability Models for Data Science and Analytics	3
DASC 605	Advanced Statistical Concepts in Data Science	3
Total Credit Hours for Concentration		12
Capstone Course		3
Total Credit Hours		30

Artificial Intelligence and Machine Learning Concentration

Select four of the following:		12
DASC 600	Programming for Data Science	
CS 522	Introduction to Machine Learning	
CS 532	Web Science	
CS 550	Database Concepts	
CS 569	Data Analytics for Cybersecurity	
CS 580	Introduction to Artificial Intelligence	
CS 722	Machine Learning	
CS 725	Information Visualization	
CS 733	Natural Language Processing	
CS 734	Introduction to Information Retrieval	
Total Credit Hours		12

Master of Science Data Science and Analytics with a Concentration in Business Intelligence and Analytics (MS)

This program will provide students with a foundation to use state-of-the-art programming tools and software packages to develop statistical models. Students will learn how to use data for identifying trends and patterns, solving problems, communicating results, and recommending optimal solutions.

Coursework for the business intelligence and analytics concentration focuses on providing students with the skills to gather, analyze, and use data to make informed decisions. Graduates will be prepared to enter business and organizations that need educated professionals to help make informed recommendations. This program is available on-campus and online.

Business Intelligence & Analytics Concentration

This concentration will prepare students for organizations looking for data-driven recommendations. The coursework addresses the use of tools to store, access, and analyze data to support making informed business recommendations. Students will learn how to retrieve data, gain insights, make decisions, and communicate solutions to various constituents in specific settings of data science and analytics. Students will select four courses in consultation with the faculty advisor.

Admission

1. A baccalaureate degree in computer science, electrical and/or computer engineering, mathematics, statistics, information system & technology, or a related field from a regionally-accredited institution or an equivalent institution outside the U.S.; students holding a bachelor's degree in an unrelated field will need competency in topics related to basic statistics and computer science.
2. Current scores on the Test of English as a Foreign Language (TOEFL) of at least 230 on the computer based TOEFL or 79 on the TOEFL iBT, or IELTS 6.5 overall.

Students with previously completed work at a regionally-accredited institution may submit a request for a maximum of 12 elective graduate credit hours to be transferred into the program. If approved by the admission committee, it will be added to the transcript.

Curriculum Requirements

The program requires 30 credit hours. A capstone project is required.

Data Science & Analytics Core

Core Requirements

DASC/CS 620	Introduction to Data Science and Analytics	3
CS 624	Data Analytics and Big Data	3
CS 625	Data Visualization	3
STAT 603	Probability Models for Data Science and Analytics	3
DASC 605	Advanced Statistical Concepts in Data Science	3
Total Credit Hours for Concentration		12
Capstone Course		3
Total Credit Hours		30

Business Intelligence & Analytics Concentration

Select two of the following:		6
DASC 600	Programming for Data Science	
BNAL 503	Data Visualization and Exploration	
BNAL 515	Advanced Business Analytics/Big Data Applications	
BNAL 721	Simulation Modeling for Business and Supply Chain Systems *	
Select two of the following:		6
IT 650	Database Management Systems	
IT 651	Business Intelligence	
IT 652	Information and Communications Technology for Big Data	
Total Credit Hours		12

* BNAL 576 may be substituted for BNAL 721 with permission of the concentration coordinator.

Master of Science Data Science and Analytics with a Concentration in Engineering and Big Data Analysis (MS)

Engineering & Big Data Analytics Concentration

The purpose of this concentration is to provide students with a thorough understanding of the methods and technologies to handle big data and to instill engineering problem-solving skills rooted in big data solutions. It will further prepare them to become professionals trained in advanced data analytics, with the ability to transform large streams of multiple data sources into understandable and actionable information for the purpose of making decisions. The coursework (12 credits) will enable students to learn and practice the following competencies: data collection, data storage, processing and analyzing data, reporting statistics and patterns, drawing conclusions and insights and making actionable recommendations.

Admission

The requirements for admission to the Master of Science in Data Science and Analytics are as follows:

1. A baccalaureate degree in computer science, electrical and/or computer engineering, mathematics, statistics, information system & technology, or a related field from a regionally-accredited institution or an equivalent institution outside the U.S.; students holding a bachelor's degree in an unrelated field will need competency in topics related to basic statistics and computer science.
2. Current scores on the Test of English as a Foreign Language (TOEFL) of at least 230 on the computer-based TOEFL or 79 on the TOEFL iBT, or IELTS 6.5 overall.

Students with previously completed work at a regionally-accredited institution may submit a request for a maximum of 12 elective graduate credit hours to be transferred into the program. If approved by the admission committee, it will be added to the transcript.

Curriculum Requirements

The program requires 30 credit hours. A capstone project is required.

Data Science & Analytics Core

Core Requirements

DASC/CS 620	Introduction to Data Science and Analytics	3
CS 624	Data Analytics and Big Data	3
CS 625	Data Visualization	3
STAT 603	Probability Models for Data Science and Analytics	3
DASC 605	Advanced Statistical Concepts in Data Science	3
Total Credit Hours for Concentration		12
Capstone Course		3
Total Credit Hours		30

Engineering & Big Data Analytics Concentration

Select two of the following:		6
DASC 600	Programming for Data Science	
ENMA 754	Big Data Fundamentals	
MSIM 715	High Performance Computing Simulation and Data Analytics	
ECE 607	Machine Learning I	
Select two of the following:		6

ECE 784	Computer Vision	
MSIM 695	Topics in Modeling and Simulation	
MSIM 574	Transportation Data Analytics	
MAE 740	Autonomous and Robotic Systems Analysis and Control	
CEE 722	Cluster Parallel Computing	
ECE 651	Statistical Analysis and Simulation	
ECE 780	Machine Learning II	
Total Credit Hours		12

Master of Science

Data Science and Analytics with a Concentration in Full Stack (MS)

This program will provide students with a foundation to use state-of-the-art programming tools and software packages, and includes the flexibility to explore the application of tools and methods across disciplines. Students will learn how to use data for identifying trends and patterns, solving problems, communicating results, and recommending optimal solutions.

Coursework for the full stack concentration provides the flexibility for students to take courses on a wide variety of Data Science topics, and includes electives from a variety of subject areas. Graduates will be able to enter data science, analytical, and statistical fields. This program is available on-campus and online.

Full Stack

In this concentration, students will prepare to enter rapidly emerging fields related to data science and analytics. The coursework addresses relevant data analytics topics such as text analytics, visualization, algorithms and data structures, and information retrieval. Students will learn computational data analysis, data visualization, and natural language processing. Students will select four courses in consultation with the faculty advisor.

Admission

The requirements for admission to the Master of Science in Data Science and Analytics are as follows:

1. A baccalaureate degree in computer science, electrical and/or computer engineering, mathematics, statistics, information system & technology, or a related field from a regionally-accredited institution or an equivalent institution outside the U.S.; students holding a bachelor's degree in an unrelated field will need competency in topics related to basic statistics and computer science.
2. Current scores on the Test of English as a Foreign Language (TOEFL) of at least 230 on the computer based TOEFL or 79 on the TOEFL iBT, or IELTS 6.5 overall.

Students with previously completed work at a regionally-accredited institution may submit a request for a maximum of 12 elective graduate credit hours to be transferred into the program. If approved by the admission committee, it will be added to the transcript.

Curriculum Requirements

The program requires 30 credit hours. A capstone project is required.

Data Science & Analytics Core

Core Requirements

DASC/CS 620	Introduction to Data Science and Analytics	3
CS 624	Data Analytics and Big Data	3
CS 625	Data Visualization	3
STAT 603	Probability Models for Data Science and Analytics	3
DASC 605	Advanced Statistical Concepts in Data Science	3

Total Credit Hours for Concentration	12
Capstone Course	3
Total Credit Hours	30

Full Stack Concentration

Select four of the following: 12

DASC 600	Programming for Data Science
DASC 728	Deep Learning Fundamentals and Applications
DASC 741	Data-Driven Computational Imaging
DASC 771	Fundamentals of Interpretable Machine Learning and Explainable AI
DASC 781	AI for Health Sciences
DASC 782	Generative AI
BNAL 503	Data Visualization and Exploration
BNAL 515	Advanced Business Analytics/Big Data Applications
CS 522 or ECE 607	Introduction to Machine Learning Machine Learning I
CS 532	Web Science
CS 550 or IT 650	Database Concepts Database Management Systems
CS 569	Data Analytics for Cybersecurity
CS 732	Human Computer Interaction
CS 733	Natural Language Processing
CYSE 607	Advanced Digital Forensics
CYSE 610	Advanced Cryptography
CYSE 635	AI Security and Privacy
ECE 784	Computer Vision
GEOG 600	Geospatial Data Analysis
GEOG 601	Spatial Statistics and Modeling
PHYS 520 or PHYS 711	Introductory Computational Physics Computational Physics

Total Credit Hours	12

Master of Science

Data Science and Analytics with a Concentration in Geospatial Analytics (MS)

Geospatial Analytics Concentration

This concentration enables MS Data Science students to develop advanced skills and expertise in geospatial science and technology. Incorporating Geographic Information Systems (GIS), remote sensing, and location-based data allows data scientists to uncover spatial patterns. The concentration provides a foundation across the breadth of geospatial technology to prepare data for analysis, perform suitability analysis, spatial predictive modeling, geostatistics, and space-time pattern mining and object detection. The concentration coursework (12 credits) incorporates advanced geovisualization and webmapping technology to also enhance cartography analytics and communications.

Admission

The requirements for admission to the Master of Science in Data Science and Analytics are as follows:

1. A baccalaureate degree in computer science, electrical and/or computer engineering, mathematics, statistics, information system & technology, or a related field from a regionally-accredited institution or an equivalent institution outside the U.S.; students holding a bachelor's

degree in an unrelated field will need competency in topics related to basic statistics and computer science.

2. Current scores on the Test of English as a Foreign Language (TOEFL) of at least 230 on the computer-based TOEFL or 79 on the TOEFL iBT, or IELTS 6.5 overall.

Students with previously completed work at a regionally-accredited institution may submit a request for a maximum of 12 elective graduate credit hours to be transferred into the program. If approved by the admission committee, it will be added to the transcript.

Curriculum Requirements

The program requires 30 credit hours. A capstone project is required.

Data Science & Analytics Core

Core Requirements

DASC/CS 620	Introduction to Data Science and Analytics	3
CS 624	Data Analytics and Big Data	3
CS 625	Data Visualization	3
STAT 603	Probability Models for Data Science and Analytics	3
DASC 605	Advanced Statistical Concepts in Data Science	3
Total Credit Hours for Concentration		12
Capstone Course		3
Total Credit Hours		30

Geospatial Analytics Concentration

GEOG 600	Geospatial Data Analysis	3
GEOG 601	Spatial Statistics and Modeling	3
Select two of the following:		6
DASC 600	Programming for Data Science	
GEOG 525	Internet Geographic Information Systems	
GEOG 532	Advanced GIS	
GEOG 562	Advanced Spatial Analysis	
GEOG 590	Applied Cartography/GIS	
GEOG 519	Spatial Analysis of Coastal Environments	
GEOG 520	Marine Geography	
GEOG 563	GIS Programming	
GEOG 573	Geographic Information Systems for Emergency Management	
GEOG 595	Topics in Geography	
Total Credit Hours		12

Master of Science

Data Science and Analytics with a Concentration in Physics (MS)

Physics Concentration

The purpose of this concentration is to provide students with a thorough understanding of the methods and technologies to handle big data and to instill physics problem-solving skills rooted in big data solutions. It prepares them to become professionals trained in advanced data analytics, with the ability to transform large streams of multiple data sources into understandable and actionable information for the purpose of making decisions. The coursework enables the students to achieve a comprehensive list of tasks including collecting, storing, processing, and analyzing data, reporting statistics and patterns, drawing conclusions and insights, and making actionable recommendations.

Admission

The requirements for admission to the Master of Science in Data Science and Analytics are as follows:

1. A baccalaureate degree in computer science, electrical and/or computer engineering, mathematics, statistics, information system & technology, or a related field from a regionally-accredited institution or an equivalent institution outside the U.S.; students holding a bachelor's degree in an unrelated field will need competency in topics related to basic statistics and computer science.
2. Current scores on the Test of English as a Foreign Language (TOEFL) of at least 230 on the computer-based TOEFL or 79 on the TOEFL iBT, or IELTS 6.5 overall.

Curriculum Requirements

The program requires 30 credit hours. A capstone project is required.

Data Science & Analytics Core

Core Requirements		15
DASC/CS 620	Introduction to Data Science and Analytics	
CS 624	Data Analytics and Big Data	
CS 625	Data Visualization	
STAT 603	Probability Models for Data Science and Analytics	
DASC 605	Advanced Statistical Concepts in Data Science	
Total Credit Hours for Concentration		12
Required Courses		
PHYS 556	Intermediate Quantum Mechanics	
or PHYS 621	Quantum Mechanics I	
PHYS 603	Classical Mechanics	
PHYS 604	Classical Electrodynamics I	
Elective Course *		
Select one of the following:		
DASC 600	Programming for Data Science	
PHYS 517	Introduction to Particle Accelerator Physics	
PHYS 696	Special Topics in Accelerator Physics	
PHYS 755	Experimental and Computational Techniques in Accelerator Physics	
PHYS 513	Methods of Experimental Physics	
PHYS 515	Introduction to Nuclear Particle Physics	
PHYS 871	Introduction to Quantum Field Theory I	
PHYS 595	Special Topics in Physics	
PHYS 795	Special Topics in Physics	
PHYS 520	Introductory Computational Physics	
or PHYS 711	Computational Physics	
PHYS 804	Classical Electrodynamics II	
Capstone Course		3
Total Credit Hours		30

* Other courses may be used to fulfill the elective requirement with the approval of the Graduate Program Director.

Certificate

Artificial Intelligence (AI) in Data Science Certificate

The purpose of this interdisciplinary certificate is to provide an understanding of Artificial Intelligence within the context of Data Science. The program includes coursework focusing on the principles of data science,

machine learning and artificial intelligence, as well as the role of the human in interpreting the results. Students will gain knowledge on methods to process, model and visualize different types of data utilizing machine learning techniques. Students will be able to describe the major areas of artificial intelligence, including natural language processing, machine logic and robotics. Graduates will be better able to describe and understand Artificial Intelligence created by data science processes.

Admission Information

All applicants admitted to the certificate program must meet ODU requirements for graduate admission: an earned baccalaureate degree from a regionally accredited institution or an equivalent degree from a foreign institution.

Non-degree seeking students are required to have these same credentials, though documentation is not required. Ultimately, students must apply to the certificate program in order to obtain the certificate.

Curriculum Requirements

This certificate requires 12 credits and a 3.0 GPA.

CS 522	Introduction to Machine Learning	3
CS 580	Introduction to Artificial Intelligence	3
DASC 620	Introduction to Data Science and Analytics	3
DASC 771	Fundamentals of Interpretable Machine Learning and Explainable AI	3
Total Credit Hours		12

Certificate

Artificial Intelligence (AI) in Healthcare Certificate

The Graduate Certificate in Artificial Intelligence in Healthcare is designed to educate students in methods to improve healthcare delivery and improve patient outcomes using machine learning and explainable Artificial Intelligence (AI). The application of AI systems to healthcare enhances the efficiency and effectiveness of healthcare professionals and clinical processes for patient care.

Admission Information

The following admission requirements will apply to all applicants. All students must:

- Submit a completed online application and the application fee,
- Submit transcripts of all undergraduate and graduate work from regionally accredited institutions,
- Have earned a baccalaureate degree from a regionally accredited institution of higher education, or international equivalent.

Applicants who have not earned a degree in the United States must also submit:

- Current scores on the Test of English as a Foreign Language (TOEFL), with a minimum score of 230 on the computer-based TOEFL or 80 on the TOEFL iBT.

Curriculum Requirements

The certificate is awarded based upon the student's successful completion of 12 credit hours of graduate level courses:

AI/CYSE 510	Artificial Intelligence (AI) Methods and Models	3
AI/PHIL 546	Artificial Intelligence (AI) Ethics and Policy	3
AI/CS 581	Trustworthy Health Analytics	3
AI/HLSC 583	Artificial Intelligence Applications in Health	3

AI Practicum *	0
Total Credit Hours	12

* AI 669/DASC 669

Darden College of Education and Professional Studies

Web Site: <http://www.odu.edu/education> (<http://www.odu.edu/education/>)

3200 Education Building
757-683-3938 (office)
757-683-5083 (fax)

Tammi F. Dice, Dean

Maggie Barber, Associate Dean, Academic Programs & Assessment

Petros Katsioloudis, Associate Dean, Faculty Affairs & Research

Jennifer Simmons, Assistant Dean, Student Affairs & Engagement

The Darden College of Education and Professional Studies offers the Master of Science (MS), Master of Science in Education (MSEd), Educational Specialist (EdS), and the Doctor of Philosophy (PhD) degrees in the following broad concentrations and areas. More complete information is found on the following department web pages.

Mission

The Darden College of Education and Professional Studies is committed to excellence in teaching, scholarly activities, and service. The college strives to meet the needs of the community while maintaining national and international prominence and is dedicated to preparing distinguished professionals who are leaders in their field. The college fulfills its mission through its undergraduate and graduate programs in the fields of education, counseling and human services, athletic training, sport management, training, fashion, and instructional and industrial technology, as well as its continuing education activities.

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Department of Counseling and Human Services

<http://www.odu.edu/chs> (<http://www.odu.edu/chs/>)

4301 Hampton Blvd, Suite 2101
Department of Counseling and Human Services
Darden College of Education and Professional Studies
Norfolk, VA 23529

Mark Rehfuss, Department Chair
757-683-3326

Degrees: Master of Science in Education, Education Specialist, Doctor of Philosophy in Education (Counseling)

Major: Counseling

MS.Ed. Concentrations:

- Clinical Mental Health Counseling
- School Counseling

Counseling Graduate Program

Emily Goodman-Scott, Master's Program Graduate Program Director
Gulsah Kemer, Doctoral Program Graduate Program Director

The master's degree program (including the two concentrations) and the PhD program are accredited by the Council for the Accreditation of Counseling and Related Programs (CACREP). CACREP does not accredit education specialist degree programs. Program objectives and other important information can be found in the program handbooks which are located on the department's webpages at <http://education.odu.edu/chs/academics/counseling> (<http://education.odu.edu/chs/academics/counseling/>).

As part of the program's mission, a commitment to social justice, cultural inclusivity, and reducing inequities and oppression is infused throughout coursework. The admissions process, the use of experiential and didactic learning approaches, supervision requirements, and ongoing comprehensive review and evaluation of students ensures that all graduates possess the academic and personal characteristics necessary to be effective counselors.

Master of Science in Education (MSEd)

The master's degree program offers a curriculum that emphasizes the following core components: professional orientation and ethical practice; social and cultural diversity; human growth and development; career development; helping relationships; group work; assessment; and research and program evaluation. The MSEd in counseling includes two concentration areas: Clinical Mental Health Counseling or School Counseling.

Clinical Mental Health Counseling graduates meet the educational requirements to pursue the Licensed Professional Counselor (LPC) credential in Virginia. Clinical Mental Health Counseling graduates will be prepared to work in community mental health settings, college counseling centers, hospital-based behavioral health programs, the criminal justice field, veterans' mental health, and private practice. The clinical mental health counseling concentration includes courses in substance abuse counseling, family dynamics, diagnosis and psychopathology, and clinical supervision. Additionally, evidence-based practice, assessment and diagnosis, the role of the counselor in health care, and client and population-centered advocacy are emphasized in the clinical mental health concentration.

School Counseling graduates meet requirements for the Virginia Licensed School Counselor credential. The school counseling concentration prepares graduates to act as systems-change agents throughout K-12 settings in order to address the academic and developmental needs of children, adolescents, and youth. Through the use of experiential and didactic instruction, graduates from the school counseling concentration learn to think systemically, lead effectively, and collaborate with other professionals and stakeholder groups in schools as well as communities. As advocates for children, adolescents, and youth, graduates are encouraged to embrace the belief that school counselors are a major force in closing the achievement

gap and that changes in students and programs will be observable, measurable, and impactful. The school counseling concentration includes courses in school climate and culture, counseling children and adolescents, professional issues, and program development. School Counseling students who complete electives in diagnosis, addictions, and family dynamics can also meet the educational requirements for the LPC credential in Virginia.

Education Specialist (EdS)

The Counseling Program also offers an Education Specialist degree for those seeking to re-specialize beyond their master's training in counseling or a related mental health field, and this degree can be tailored to meet the LPC or Licensed School Counselor educational requirements. The EdS degree extends counseling knowledge and skills for individuals who already hold master's degrees in counseling, and provides core master's level counseling coursework for individuals who have master's degrees in closely related fields (e.g., psychology, special education) who wish to become counselors.

Doctor of Philosophy in Education (PhD)

The PhD in Education (Counseling) prepares graduates to become counselor educators, clinical supervisors, scholars, and leaders in a variety of professional settings. Graduates are prepared for employment as counselor educator faculty members in colleges and universities and as clinicians and leaders in counseling settings in colleges, community mental health agencies, private practices, and schools or school districts. This program provides doctoral students with the skills to supervise other counselors, teach counseling skills, conduct scholarly research, lead organizations, and create new knowledge in the field of counseling. Learners in the PhD program are actively mentored to develop their competency in specific topics through presentations, extra-curricular research, and service-leadership to the counseling field.

Field Placement Experiences

The MSED and PhD programs require field placement experiences as part of students' coursework near the end of their programs. Most EdS students also complete a field placement experience. Required field placement experiences, such as practicum, internship, and observation hours, involve work in counseling settings where learners apply the knowledge, attitudes, awareness, and skills developed during their coursework. Prior to any placement in the field for observation or practicum/internship all students are required to complete a background check. Background checks are handled by the Office of Clinical Experiences. Instructions can be found on their web page (<http://www.odu.edu/success/academic/teacher-education/placement/background-checks> (<http://www.odu.edu/success/academic/teacher-education/placement/background-checks/>)). Further information about the field placement experiences can be found in the Practicum & Internship Handbooks on the department's webpages at <https://www.odu.edu/chs/internship-opportunities> (<https://www.odu.edu/chs/internship-opportunities/>).

Programs

Doctor of Philosophy Programs

- Education with a Concentration in Counseling (PhD) (p. 146)

Education Specialist Program

- Counseling (EdS) (p. 146)

Master of Science in Education Programs

- Counseling with a Concentration in Clinical Mental Health Counseling (MSED) (p. 144)
- Counseling with a Concentration in School Counseling (MSED) (p. 145)

Certificate Program

- Advanced Counseling Practice Certificate (p. 147)

Master of Science in Education Counseling with a Concentration in Clinical Mental Health Counseling (MSED)

Overview

The master's degree program offers a curriculum that emphasizes the following core components: professional orientation and ethical practice; social and cultural diversity; human growth and development; career development; helping relationships; group work; assessment; and research and program evaluation. The MSED in counseling includes two concentration areas: Clinical Mental Health Counseling or School Counseling.

Clinical Mental Health Counseling graduates meet the educational requirements to pursue the Licensed Professional Counselor (LPC) credential in Virginia. Clinical Mental Health Counseling graduates will be prepared to work in community mental health settings, college counseling centers, hospital-based behavioral health programs, the criminal justice field, veterans' mental health, and private practice. The clinical mental health counseling concentration includes courses in substance abuse counseling, family dynamics, diagnosis and psychopathology, and clinical supervision. Additionally, evidence-based practice, assessment and diagnosis, the role of the counselor in health care, and client and population-centered advocacy are emphasized in the clinical mental health concentration.

Linked Program Information

There is a linked program available to qualified students under existing university policy to link the Bachelor of Science with a major in Human Services (<http://catalog.odu.edu/undergraduate/education/counseling-human-services/human-services-bs/>) undergraduate program with the Master of Science in Education (Counseling with a Concentration in Clinical Mental Health Counseling) (p. 144) graduate program. See program director for additional details.

Admission

Applicants may hold a bachelor's degree in any field.

Deadlines for Admission

- New students are admitted twice each year and are eligible to begin during fall, spring, or summer semesters.
- Summer or Fall Semesters
 - March 1 – Deadline for completed applications
- Spring Semester
 - October 1 – Deadline for completed applications
- Application Requirements

For details regarding the application process, criteria used to select students, materials required of applicants, where to send application materials, and taking courses prior to admission as a non-degree graduate student, see the program web site at <http://www.odu.edu/chs/academics/m-s-ed-admissionsrequirements> (<http://www.odu.edu/chs/academics/m-s-ed-admissionsrequirements/>).

Curriculum Requirements

A minimum of 60 semester credits is required for the Master of Science in Education - Counseling with a concentration in clinical mental health counseling or school counseling. Toward the conclusion of the program, all students must pass a comprehensive exam. All students are required to take 30 credits of common-core course work. Additional course work in concentration areas is required. All students complete 100 hours of practicum and 600 hours of internship. Students are also required to complete the Responsible Conduct of Research Training (visit the ODU Office of Research webpage for additional information).

Core Courses

COUN 601	Principles of Professional Counseling and Ethics	3
COUN 631	Counseling for Lifespan Development	3
COUN 633	Counseling and Psychotherapy Techniques	3
COUN 634	Advanced Counseling and Psychotherapy Techniques, Crisis, and Trauma	3
FOUN 611	Introduction to Research Methods in Education	3
COUN 645	Testing and Client Assessment	3
COUN 648	Foundations of Career Development	3
COUN 650	Theories of Counseling and Psychotherapy	3
COUN 655	Social and Cultural Issues in Counseling	3
COUN 669	Practicum in Counseling (100 hrs min)	3
Concentration Credit Hours		30
Total Credit Hours		60

Clinical Mental Health Counseling Concentration

Required Coursework

COUN 644	Group Counseling and Psychotherapy	3
COUN 647	Addictive Disorders	3
COUN 670	Introduction to Counseling Supervision	3
COUN 680	Mental Health Counseling	3
COUN 685	Diagnosis and Treatment Planning in Mental Health Counseling	3
COUN 691	Family Systems and Family Development	3
COUN 667	Internship in Mental Health Counseling (600 hrs minimum)	6
COUN Electives		6
Total Credit Hours		30

Additional Requirements

For more information relating to this program and its requirements, please visit <http://www.odu.edu/chs>. (<http://www.odu.edu/chs/>)

Students must meet all University and program requirements to continue toward degree completion once they have been admitted. Students who earn three or more grades of C+ or lower will be dismissed from the Counseling Program. Students are also assessed on their interpersonal comportment and behavior. If faculty members have serious concerns about a student's satisfactory progress in the program, they may initiate a process that could lead to the student being asked to withdraw. Students have the right to appeal decisions on continuance made by faculty.

Program Completion and Exit

Students must successfully complete a multiple choice comprehensive examination covering the 8 core counseling competency areas, the required course of study for their concentration, and must have a minimum GPA of 3.00 to graduate.

Master of Science in Education Counseling with a Concentration in School Counseling (MSEd)

Overview

The master's degree program offers a curriculum that emphasizes the following core components: professional orientation and ethical practice; social and cultural diversity; human growth and development; career development; helping relationships; group work; assessment; and research and program evaluation. The MSEd in counseling includes two concentration areas: Clinical Mental Health Counseling or School Counseling.

School Counseling graduates meet requirements for the Virginia Licensed School Counselor credential. The school counseling concentration prepares graduates to act as systems-change agents throughout K-12 settings in order to address the academic and developmental needs of children, adolescents, and youth. Through the use of experiential and didactic instruction, graduates from the school counseling concentration learn to think systemically, lead effectively, and collaborate with other professionals and stakeholder groups in schools as well as communities. As advocates for children, adolescents, and youth, graduates are encouraged to embrace the belief that school counselors are a major force in closing the achievement gap and that changes in students and programs will be observable, measurable, and impactful. The school counseling concentration includes courses in school climate and culture, counseling children and adolescents, professional issues, and program development. School Counseling students who complete electives in diagnosis, addictions, and family dynamics can also meet the educational requirements for the LPC credential in Virginia.

Linked Program Information

There is a linked program available to qualified students under existing university policy to link the Bachelor of Science with a major in Human Services (<http://catalog.odu.edu/undergraduate/education/counseling-human-services/human-services-bs/>) undergraduate program with the Master of Science in Education (Counseling with a Concentration in School Counseling) (p. 145) graduate program. See program director for additional details.

Admission

Applicants may hold a bachelor's degree in any field.

Deadlines for Admission

- New students are admitted twice each year and are eligible to begin during fall, spring, or summer semesters.
- Summer or Fall Semesters
 - March 1 – Deadline for completed applications
- Spring Semester
 - October 1 – Deadline for completed applications
- Application Requirements

For details regarding the application process, criteria used to select students, materials required of applicants, where to send application materials, and taking courses prior to admission as a non-degree graduate student, see the program web site at <http://www.odu.edu/chs/academics/m-s-ed-admissionsrequirements> (<http://www.odu.edu/chs/academics/m-s-ed-admissionsrequirements/>).

Curriculum Requirements

A minimum of 60 semester credits is required for the Master of Science in Education - Counseling with a concentration in clinical mental health counseling or school counseling. Toward the conclusion of the program, all students must pass a comprehensive exam. All students are required to take 30 credits of common-core course work. Additional course work in concentration areas is required. All students complete 100 hours of practicum and 600 hours of internship. Students are also required to complete the Responsible Conduct of Research Training (visit the ODU Office of Research webpage for additional information).

Core Courses

COUN 601	Principles of Professional Counseling and Ethics	3
COUN 631	Counseling for Lifespan Development	3
COUN 633	Counseling and Psychotherapy Techniques	3
COUN 634	Advanced Counseling and Psychotherapy Techniques, Crisis, and Trauma	3
FOUN 611	Introduction to Research Methods in Education	3
COUN 645	Testing and Client Assessment	3
COUN 648	Foundations of Career Development	3

COUN 650	Theories of Counseling and Psychotherapy	3
COUN 655	Social and Cultural Issues in Counseling	3
COUN 669	Practicum in Counseling (100 hrs min)	3
Concentration Courses		30
Total Credit Hours		60

School Counseling Concentration

Required Coursework

COUN 642	Structured Counseling Groups	3
COUN 676	Professional Issues in School Counseling K-12	3
COUN 677	School Culture, Learning, and Classroom Management	3
COUN 678	Counseling Children and Adolescents in School Settings	3
COUN 679	School Counseling Program Development K-12	3
COUN 668	Internship in School Counseling (600 hrs minimum)	6
COUN Electives		9
Total Credit Hours		30

Additional Requirements

LPC Electives

Students in the school counseling specialization who wish to pursue the Licensed Professional Counselor (LPC) credential in Virginia should include the elective courses COUN 647 (Addictive Disorders), COUN 691 (Family Systems and Family Development), and COUN 685 (Diagnosis and Treatment Planning in Mental Health Counseling). A post-master's residency of 3400 supervised hours, plus the National Clinical Mental Health Counselor Exam (NCMHCE), are also required for the Virginia LPC.

For more information relating to this program and its requirements, please visit <http://www.odu.edu/chs>. (<http://www.odu.edu/chs/>)

Education Specialist Counseling (EdS)

The Education Specialist (Ed.S.) degree in counseling is designed to further develop learners' knowledge and skills in counseling and to cultivate their capacity for leadership as professionals. The Ed.S. is suitable for master's degree level counselors who wish to earn an additional graduate degree in counseling, or for individuals with master's degrees in related fields who wish to satisfy the academic portion of the state requirements for licensure as a professional counselor or a school counselor. It is considered a terminal counseling practitioner's degree.

Admission

Applicants may hold a bachelor's degree in any field. A master's degree in counseling or related field is also required.

Deadlines for Admission

- New students are admitted twice each year and are eligible to begin during fall, spring, or summer semesters.
- Summer or Fall Semesters
 - March 1 – Deadline for completed applications
- Spring Semester
 - October 1 – Deadline for completed applications

Application Requirements

For details regarding the application process, criteria used to select students, materials required of applicants, where to send application materials, and taking courses prior to admission as a non-degree graduate student, see the

program web site at <http://education.odu.edu/chs/academics/counseling> (<http://education.odu.edu/chs/academics/counseling/>).

Curriculum Requirements

The Education Specialist degree in counseling requires a minimum of 30 semester hours of course work beyond the master's degree. When licensed as a professional counselor or school counselor is an objective, more than 30 semester hours usually is required.

Required Courses

Ed.S. students select courses depending on their objectives. For required courses, see the website at http://education.odu.edu/chs/academics/counseling/counseling_eds.shtml (http://education.odu.edu/chs/academics/counseling/counseling_eds.shtml/).

Additional Requirements

Non-Matriculated or Non-Degree Status

Students may take a maximum of 12 credits beyond their master's degree as a non-matriculated or non-degree student before being admitted into the program.

Continuance

Students must meet all University and program requirements to continue toward degree completion once they have been admitted. Students who earn three or more grades of C+ or lower will be dismissed from the Counseling Program. If faculty members have serious concerns about a student's satisfactory progress in the program, they may initiate a process that could lead to the student being asked to withdraw. Students have the right to appeal decisions on continuance made by faculty.

Exit

Students must successfully complete the required course of study (a minimum of 30 credits) with a grade point average of 3.00 or better, and pass a written comprehensive examination.

Doctor of Philosophy Education with a Concentration in Counseling (PhD)

The Doctor of Philosophy in Education with a concentration in counseling prepares individuals for employment as counselor educators in higher education settings. Graduates are also prepared to act as leaders in clinical mental health counseling or school counseling settings as well as the professional counseling field including advocacy, supervision, assessment, and research.

Admission

Deadlines for Admission

- New students are admitted once each year and are eligible to begin during fall, spring, or summer semesters. Fall is the preferable start for PhD admits.
- October 1st of each year- Deadline for completed applications

For details regarding the application process, criteria used to select students, materials required of applicants, and where to send application materials, see the program website at <http://education.odu.edu/chs/academics/counseling> (<http://education.odu.edu/chs/academics/counseling/>).

Curriculum Requirements

Required Courses

FOUN 722	Introduction to Applied Statistics and Data Analysis	3
COUN 670	Introduction to Counseling Supervision	3
COUN 801	Current Issues in Counseling and Counselor Education	3

COUN 820	Counselor Education Teaching and Practice	3
COUN 835	Advanced Counseling Research Design and Assessment	3
COUN 842	Advanced Counseling Theory and Practice	3
COUN 844	Advanced Group Counseling	3
COUN 846	Advanced Counseling Supervision	3
COUN 848	Multicultural Perspectives in Counselor Education, Supervision, and Research	3
COUN 868	Internship in Counseling	6
COUN 869	Advanced Supervised Practicum in Counseling	3
COUN 899	Dissertation	12
FOUN 813	Program Evaluation in Education	3
TLCI 814	Qualitative Research Design in Education	3
Select one of the following quantitative courses:		3
FOUN 822	Applied Linear Models in Educational Research	
FOUN 823	Analysis of Variance Applied to Educational Research	
COUN 898	Dissertation Seminar	3
Total Credit Hours		60

Additional Requirements

Program Course Requirements

The Doctor of Philosophy in Education (Counseling) is comprised of courses totaling 60 academic credit hours beyond the master's degree. The curriculum includes advanced courses in counseling, supervision, teaching, and research, a doctoral practicum and an internship, and 12 credits of dissertation.

Program Completion and Exit

In order to complete the program, students must complete required courses in a satisfactory manner, pass examinations, and complete an acceptable dissertation. Ph.D. students must meet all requirements included in the University Graduate Catalog, the Ph.D. in Education (Counseling) Program Handbook. It is the responsibility of the student to obtain these documents and complete requirements.

Prerequisites

Graduation from a master's degree program in counseling that was accredited by the Council on Accreditation of Counseling and Related Educational Programs (CACREP) is a prerequisite. If a doctoral student's master's degree program was not accredited by CACREP, the student must take master's-level courses and field experiences they are missing as part of their Ph.D. program.

Certificate

Advanced Counseling Practice Certificate

The Advanced Counseling Practice Certificate is a 12 hour certificate program that allows students to complete additional coursework needed for their professional endeavors.

Admissions

1. Master's in counseling or closely related field
2. Eligibility to pursue the Licensed Professional Counselor in the Commonwealth of Virginia
3. Evaluation of all graduate transcripts and resume or vita by program faculty for fitness within the scope of the certificate and future practice as a licensed counseling professional
4. Criminal background check consistent with criteria for license eligibility

Curriculum

COUN 647	Addictive Disorders	3
COUN 691	Family Systems and Family Development	3
COUN 685	Diagnosis and Treatment Planning in Mental Health Counseling	3
COUN 670	Introduction to Counseling Supervision	3
Total Credit Hours		12

Additional Requirements

Continuance

Students must maintain a cumulative 3.0 GPA to be in good academic standing.

Exit

To successfully complete the program, students must complete the four required courses with a cumulative GPA of 3.0 or better.

Educational Leadership and Workforce Development

4100 Education Building
757-683-4305

Mickey Kosloski, Chair

The Department of Educational Foundations and Leadership offers graduate programs in workforce and organizational development (PhD, career and technical education post-baccalaureate), educational leadership (MSEd, EdS, PhD), higher education (MSEd, EdS, PhD), and community college leadership (certificate, PhD).

Due to changing University requirements, national accreditation standards, and Commonwealth licensure regulations, the programs in the Darden College of Education and Professional Studies are under constant revision. Any changes resulting from these factors supersede the program requirements described in the catalog. Students should obtain current program information from their advisors and the Darden College of Education and Professional Studies website at <http://www.odu.edu/education> (<http://www.odu.edu/education/>).

Workforce and Organizational Development

- Doctor of Philosophy, Education – Workforce and Organizational Development Concentration
 - Career and Technical Education
 - Human Resources Training
 - Technology Education
- Post-baccalaureate, Career and Technical Education

Educational Leadership

- K-12 Licensure only
- Master of Science in Education – Educational Leadership, Administration and Supervision (K-12 Licensure) Concentration
- Education Specialist, Educational Leadership - Administration and Supervision (K-12 Licensure) Concentration
- Education Specialist, Educational Leadership - Administration and Supervision (Non-Licensure) Concentration
- Doctor of Philosophy, Education – Educational Leadership Concentration

Higher Education

- Master of Science in Education – Higher Education
 - Student Affairs Administration
 - Leadership and Administration
 - International Higher Education Leadership
- Education Specialist, Higher Education
- Doctor of Philosophy, Education - Higher Education Concentration

Community College Leadership

- Certificate, Community College Leadership
- Doctor of Philosophy, Community College Leadership

Programs

Doctor of Philosophy Programs

- Community College Leadership (PhD) (p. 148)
- Education with a Concentration in Educational Leadership (PhD) (p. 152)
- Education with a Concentration in Higher Education (PhD) (p. 157)
- Education with a Concentration in Workforce and Organizational Development (PhD) (p. 159)

Education Specialist Programs

- Educational Leadership with a Concentration in Administration and Supervision (Non-Licensure) (EdS) (p. 152)
- Educational Leadership with a Concentration in Administration and Supervision - Licensure (EdS) (p. 151)
- Educational Leadership with a Concentration in Higher Education (EdS) (p. 155)
- Educational Leadership with a Concentration in Occupational and Technical Studies (EdS) (p. 158)

Master of Science in Education Programs

- Educational Leadership with a Concentration in Administration and Supervision (K-12 Licensure) (MSEd) (p. 150)
- Educational Leadership with a Concentration in Higher Education (MSEd) (p. 153)

Certificate Program

- Community College Leadership Certificate (p. 149)

Post-Baccalaureate Programs

- Marketing Education Post-Baccalaureate Endorsement (p. 160)
- Technology Education Post-Baccalaureate Endorsement (p. 160)

Doctor of Philosophy
Community College Leadership
(PhD)

4100 Education Building
757-683-4575

James E. Bartlett, II, Ph.D., Graduate Program Director

The Ph.D. degree in Community College Leadership is designed to equip leaders for the nation's community colleges and develop researchers focusing on community college topics. The curriculum is tailored for professionals aiming to expand their knowledge and advance their careers. It includes courses in leadership, administration, workforce development, curriculum design, finance, and policy development, with an emphasis on improving student success and labor market outcomes. Participants will acquire skills that prepare them for high-level leadership positions at community colleges, as well as roles as faculty members, researchers, national policy advocates, and leaders in federal and state organizations (such as system offices, state

agencies, and federal agencies), workforce development leaders, as well as other related careers.

Students engage in a cohort model, promoting a shared learning experience, community engagement, and the broadening of professional networks. Working professionals from across the U.S. participate in live, online classes throughout the year and attend an annual, one-week Summer Institute. At the Institute, they connect with faculty, colleagues, and guest scholars. The curriculum is divided into four main areas: core community college content courses, research methods courses, electives, and a dissertation. This program is available online, with the face-to-face Summer Institute.

Admission

Prospective students seeking admission to the Ph.D. program in Community College Leadership must:

1. Meet all University admission requirements as listed in the Old Dominion University Catalog;
2. Have a completed Master's degree;
3. Provide three (3) letters of recommendation. At least one letter must come from an individual can describe the applicant's academic performance and writing ability. Letters from senior-level leaders that endorse the applicant's leadership potential are encouraged;
4. Provide a 1-page, single-spaced essay that presents a concise statement about your academic and professional background, your career goals, and your reasons for applying to this degree program. Please be specific in explaining how this program aligns with your educational and career objectives.
5. Provide an original academic writing sample, up to 2 pages double-spaced, in which you identify at least one thematic research area of interest and explain your interest in this area. Possible topics may include completion and transfer, learning outcomes, labor market outcomes, equity, technology, culture/organizational behavior, or a topic of your choosing. Be sure to describe the issue at hand and explain its significance to community college research and practice. (Possible Outline: Introduction, Area of Interest and Problem, Significance of Problem to Community College Leadership, and Conclusion)
6. Provide a CV or resume that describes the applicant's academic and professional background;
7. Applicants whose native language is not English must submit a current score for the Test of English as a Foreign Language (TOEFL) iBT of at least 80.

Applications for admission are on a rolling basis. Graduate assistantships are awarded in February annually. The admissions committee will review and select applicants. Interviews may be used to determine final admissions decisions.

Admitted students will complete the first Summer Institute in the summer semester following their admission. Students admitted for the summer will start with the Summer Institute, while those admitted in the fall or spring will complete their first Summer Institute in the subsequent summer. Both first- and second-year students are expected to attend the Summer Institute and will enroll in two courses, with the majority of the meeting time scheduled during their week at Old Dominion University's main campus. The dissertation requires a minimum of nine credit hours, depending on the time necessary for a student to complete their dissertation work.

Curriculum Requirements

Core Courses		
CCL 820	Community College Leadership	3
CCL 824	Community College Finance, Fundraising, and Resource Management	3
CCL 826	Community College Curriculum, Program Development, and Quality Assurance	3
CCL 830	Community College Politics, Policy, and Advocacy	3

CCL 866	Seminar on the Modern Community College: Foundations, Philosophy, and Vision	3
SEPS 765	Trends and Issues of Economic and Workforce Development	3
CCL 809	Seminar on Doctoral Research and the Dissertation	3
CCL 868	Internship in Community College Leadership	3
Research Courses *		
FOUN 812	Research Design and Analysis	3
FOUN 813	Program Evaluation in Education	3
FOUN 822	Applied Linear Models in Educational Research	3
or FOUN 823	Analysis of Variance Applied to Educational Research	
TLCI 814	Qualitative Research Design in Education	3
or CCL 895	Topics in Community College Leadership	
Electives **		
Select two of the following:		6
CCL 895	Topics in Community College Leadership	
CCL 897	Independent Study	
SEPS 861	Foundations of Adult Education and Training	
SEPS 888	Instructional Strategies for Innovation in Training and Occupational Education	
SEPS 889	Instructional Technology in Education and Training	
SEPS 895	Topics in Occupational Education	
HIED 812	Strategic Planning	
HIED 852	The Law of Higher Education	
Dissertation Seminar		3
CCL 881	Dissertation Seminar	
Dissertation (minimum 9 credits)		9
CCL 899	Dissertation	
Total Credit Hours		54

- * Prerequisites: Doctoral students with no prior coursework in statistics must enroll in FOUN 722.
- ** CCL 868 Internship in Community College Leadership (3 credits) is required for all doctoral students who have not served in a full-time administrative position for at least three years.

Additional Requirements

Continuance

Students must meet all department, college, and university policy requirements for continuation in their academic program. See department policy above.

Exit

In order to graduate from the program, students must successfully complete all degree requirements including all coursework, candidacy requirements, and the dissertation.

Non-Degree

Non-degree students are limited to a maximum of 2 courses prior to admission unless they receive permission from the GPD. Students must receive academic advising from a program faculty member prior to enrollment in any course as a non-degree student. Taking courses as a non-degree student does not guarantee admission into the program

Certificate Community College Leadership Certificate

4100 Education Building
757-683-4375

Mitch Williams, Graduate Program Director

The synchronous, online graduate certificate in Community College Leadership is designed for emerging leaders in community college administration, as well as administrators who have recently transitioned to a community college from careers in other industries. The 15-credit program targets the American Association for Community Colleges (AACCC) standards.

Admission

Prospective students seeking admission to the graduate certificate program in Community College Leadership must:

1. Meet all University admission requirements as listed in the Old Dominion University Catalog;
2. Provide one letter of recommendation that demonstrates the applicant's academic and writing ability as well as leadership potential;
3. Provide a CV or resume that describes the applicant's academic and professional background;
4. Complete an online application; and
5. Upload transcripts of all undergraduate and/or graduate work at regionally-accredited institutions.

There are two windows for applications. Materials for Fall admission are due by May 1 and Spring admissions started October 1. The admissions committee composed of Higher Education and Community College Leadership faculty will review all applications then will make admission decisions.

Curriculum Requirements

CCL 820	Community College Leadership	3
CCL 830	Community College Politics, Policy, and Advocacy	3
CCL 824	Community College Finance, Fundraising, and Resource Management	3
CCL 826	Community College Curriculum, Program Development, and Quality Assurance	3
CCL 868	Internship in Community College Leadership	3
Total Credit Hours		15

Additional Requirements

Continuance

Students must meet all department, college, and university policy requirements for continuation in their academic program. See department policy above.

Exit

In order to graduate from the program, students must successfully complete all coursework.

Continuance Policy and Procedures for the Educational Leadership Program

The following policy has been established for continuance in *Educational Leadership Program*.

At the end of each semester – fall, spring, and summer – the graduate program directors (GPD) will review student records. As per university policy, students who do not maintain an overall GPA of at least 3.0 in their

ELS program will be placed on probation. Students placed on probation have one semester to bring their overall GPA back to a minimum of 3.0. A student may be placed on probation only one time in their EFL program and will not be eligible for a second probationary period. Should a student's GPA fall below 3.0 twice, he/she will be dismissed from the program.

Students who receive a grade of F in any ELS required or elective program course or who receive a final grade of lower than B- in more than one class in their program will be dismissed from their program by the Graduate Program Director and Department Chair. A failing grade in dissertation credits for one semester places the student in warning status and does not automatically dismiss the student from the program. However, two failing grades in dissertation credits will result in dismissal from the program. Students may follow the Grade Appeal Procedure in the ODU Graduate Catalog. In the event a grade is appealed such that the student comes into compliance with the EFL Continuance Policy, he/she will be reinstated.

In accord with University policy, ODU email is considered official communication.

Master of Science in Education Educational Leadership with a Concentration in Administration and Supervision (K-12 Licensure) (MSEd)

757-683-4305

<http://www.odu.edu/efl> (<http://www.odu.edu/efl/>)

Karen Sanzo, Graduate Program Director

The purpose of graduate programs in educational leadership is to prepare individuals to assume leadership responsibilities in education, training, and other human service organizations. Educational leadership offers the MSEd and the EdS degrees for candidates seeking PK-12 administration and supervision licensure. The programs prepare leaders who are visionary, who have depth of knowledge, and who can be effective and responsive organizational leaders. The programs develop graduates who can apply research-based knowledge, skills, and dispositions that translate into effective practice through innovative program instruction and authentic field-based experiences. The concentration area in educational administration and supervision is approved by the state of Virginia and is fully accredited by the Council for the Accreditation of Educator Preparation. Students complete 30 semester hours of coursework to lead to licensure as an administrator. The program is offered online only.

Admission

To gain admission, applicants must:

1. meet all University admissions requirements;
2. have an undergraduate grade point average of 2.80 overall and 3.00 in the major;
3. provide two letters of recommendation, including one from a school administrator; and,
4. write a one page essay that explains the applicant's professional experiences and personal goals, specific ways the applicant hopes to improve public education as an educational leader, and how this degree will help the applicant address her/his professional goals.
5. write a one page, single-spaced statement about a contemporary and critical issue facing educational leaders. Address the following:
 - What is the contemporary issue and why is it critical?
 - Why is this issue relevant to school and/or division leaders?
 - What role should school and/or division leaders play in addressing this issue and how?

In addition, all students who wish to enter the administration and supervision program with Commonwealth of Virginia accreditation must satisfactorily complete an administrative skills portfolio assessment process. ELS 700 must be the first course in which students enroll. *The M.S.Ed.*

in Educational Leadership with a concentration in Administration & Supervision is offered online only.

Curriculum Requirements

Program Requirements

For the Master of Science in Education with a concentration in administration and supervision, a student must have completed an approved 30-hour minimum graduate program including two internships and a culminating written comprehensive examination. Approved internship experiences are required by the Commonwealth of Virginia.

Administration and Supervision (K-12 Licensure) Concentration

Requirements for this concentration area are as follows.

Prerequisite/Corequisite

ELS 700	Strategic Leadership and Management for School Improvement	3

Curriculum

ELS 701	Accountability and Organizational Improvement	3
ELS 702	Educational Politics and Policymaking	3
ELS 710	Strategic Communication and External Relations	3
ELS 727	Learning Theories and Professional Development	3
ELS 728	Instructional Leadership and Supervision	3
ELS 753	Educational Finance and Budgeting	3
ELS 757	Educational Law and Ethics	3

Clinical Experience

ELS 668	Internship in Educational Leadership	3
ELS 669	Instructional Internship	3

Total Credit Hours **30**

* This course must be taken first and include the start of an Administration Portfolio Skills Assessment.

Additional Requirements

Continuance

Students must meet all department, college, and university policy requirements for continuation in their academic program. See department policy below.

Continuance Policy and Procedures for the Educational Leadership Program

The following policy has been established for continuance in *Educational Leadership Program*.

At the end of each semester – fall, spring, and summer – the graduate program directors (GPD) will review student records. As per university policy, students who do not maintain an overall GPA of at least 3.0 in their ELS program will be placed on probation. Students placed on probation have one semester to bring their overall GPA back to a minimum of 3.0. A student may be placed on probation only one time in their EFL program and will not be eligible for a second probationary period. Should a student's GPA fall below 3.0 twice, he/she will be dismissed from the program.

Students who receive a grade of F in any ELS required or elective program course or who receive a final grade of lower than B- in more than one class in their program will be dismissed from their program by the Graduate Program Director and Department Chair. A failing grade in dissertation credits for one semester places the student in warning status and does not automatically dismiss the student from the program. However, two failing grades in dissertation credits will result in dismissal from the program.

Students may follow the Grade Appeal Procedure in the ODU Graduate Catalog. In the event a grade is appealed such that the student comes into compliance with the EFL Continuation Policy, he/she will be reinstated.

In accord with University policy, ODU email is considered official communication.

Exit

Students must successfully complete:

1. the School Leaders Licensure Assessment (SLLA);
2. the required course of study;
3. three self assessments, one at the start of the program, one after the first internship, and one upon completion of all coursework;
4. Two internships of 320 hours and 5 placements per VDOE administrative licensure regulations; and,
5. have a minimum 3.00 grade point average in order to graduate.

Education Specialist Educational Leadership with a Concentration in Administration and Supervision - Licensure (EdS)

757-683-4305

<http://www.odu.edu/efl> (<http://www.odu.edu/efl/>)

Karen Sanzo, Graduate Program Director

The purpose of graduate programs in educational leadership is to prepare individuals to assume leadership responsibilities in education, training, and other human service organizations. Educational leadership offers the MSEd and the EdS degrees for candidates seeking PK-12 administration and supervision licensure. The programs prepare leaders who are visionary, who have depth of knowledge, and who can be effective and responsive organizational leaders. The programs develop graduates who can apply research-based knowledge, skills, and dispositions that translate into effective practice through innovative program instruction and authentic field-based experiences. The concentration area in educational administration and supervision is approved by the state of Virginia and is fully accredited by the Council for the Accreditation of Educator Preparation.

Students who have a master's degree in another area and do not have a license in administration supervision PreK-12 may be accepted into the EdS with Licensure Program. These students would complete 30 semester hours of coursework to lead to licensure as an administrator. The EdS with a Concentration in Administration and Supervision with Licensure Program is offered online only.

Admission

To gain admission, applicants must:

1. meet all University admissions requirements;
2. have an undergraduate grade point average of 2.80 overall and 3.00 in the major;
3. provide two letters of recommendation, including one from a school administrator; and,
4. write a one page essay that explains the applicant's professional experiences and personal goals, specific ways the applicant hopes to improve public education as an educational leader, and how this degree will help the applicant address her/his professional goals.
5. write a one page, single-spaced statement about a contemporary and critical issue facing educational leaders. Address the following:
 - What is the contemporary issue and why is it critical?
 - Why is this issue relevant to school and/or division leaders?
 - What role should school and/or division leaders play in addressing this issue and how?

In addition, all students who wish to enter the administration and supervision program with Commonwealth of Virginia accreditation must satisfactorily complete an administrative skills portfolio assessment process. ELS 800 must be the first course in which students enroll.

Curriculum Requirements

Prerequisite/Corequisite

ELS 800	Strategic Leadership and Management for School Improvement (Curriculum)	3

Course Requirements

ELS 801	Accountability and Organizational Improvement	3
ELS 802	Educational Politics and Policymaking	3
ELS 810	Strategic Communication and External Relations	3
ELS 827	Learning Theories and Professional Development	3
ELS 828	Instructional Leadership and Supervision	3
ELS 853	Educational Finance and Budgeting	3
ELS 857	Educational Law and Ethics	3

Clinical Experience

ELS 668	Internship in Educational Leadership (Clinical Experience) *	3
ELS 669	Instructional Internship (Clinical Experience) *	3

Total Credit Hours	30

- * The classes marked with an asterisk are required classes for licensure.
- ** Other doctoral-level classes may be taken in consultation with your advisor.

Students must successfully complete the School Leaders Licensure Assessment (SLLA).

Additional Requirements

Continuance

Students must meet all department, college, and university policy requirements for continuation in their academic program. See department policy below.

Continuance Policy and Procedures for the Educational Leadership Program

The following policy has been established for continuance in *Educational Leadership Program*.

At the end of each semester – fall, spring, and summer – the graduate program directors (GPD) will review student records. As per university policy, students who do not maintain an overall GPA of at least 3.0 in their ELS program will be placed on probation. Students placed on probation have one semester to bring their overall GPA back to a minimum of 3.0. A student may be placed on probation only one time in their EFL program and will not be eligible for a second probationary period. Should a student's GPA fall below 3.0 twice, he/she will be dismissed from the program.

Students who receive a grade of F in any ELS required or elective program course or who receive a final grade of lower than B- in more than one class in their program will be dismissed from their program by the Graduate Program Director and Department Chair. A failing grade in dissertation credits for one semester places the student in warning status and does not automatically dismiss the student from the program. However, two failing grades in dissertation credits will result in dismissal from the program. Students may follow the Grade Appeal Procedure in the ODU Graduate Catalog. In the event a grade is appealed such that the student comes into compliance with the EFL Continuation Policy, he/she will be reinstated.

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Exit

Students must successfully complete:

1. the School Leaders Licensure Assessment (SLLA);
2. the required course of study;
3. three self assessments, one at the start of the program, one after the first internship, and one upon completion of all coursework;
4. Two internships of 320 hours and 5 placements per VDOE administrative licensure regulations; and,
5. have a minimum 3.00 grade point average in order to graduate.

Education Specialist Educational Leadership with a Concentration in Administration and Supervision (Non-Licensure) (EdS)

4100 Education Building
757-683-4305
<http://www.odu.edu/efl> (<http://www.odu.edu/efl/>)

Karen Sanzo, Graduate Program Director

The Education Specialist (EdS) with a concentration in Educational Leadership program is designed to provide further opportunities for holders of master's degrees to develop expertise at a higher professional level. Emphasis is on continued development for leadership in policy formulation, planning, and executive action related to educational and training institutions and human service organizations. Individuals who aspire to advance in educational leadership will find in this program a meaningful base for building toward their professional objectives. The EdS program in educational leadership includes emphasis areas in administration and supervision and in higher education.

Admission

Students must:

1. meet all University requirements;
2. provide two letters of recommendation;
3. hold a master's degree from an accredited institution (minimum 3.25 graduate grade point average on a 4.00 scale); and,
4. provide a one-page essay explaining why he/she should be admitted into the program.
5. Applicants whose admission credentials are slightly below the required minimum will be considered for provisional admission. Performance in classes as a non-degree student will not be taken into consideration in the admission process.

Curriculum Requirements

Program Requirements

The EdS requires the completion of a minimum of 30 approved semester credit hours consisting of at least 18 hours at the 800 level.

Curriculum

ELS 835	Organizational Theory and Behavior in Education	3
ELS 853	Educational Finance and Budgeting	3
ELS 871	Educational Systems Planning and Futures	3
ELS 876	Leadership for Social Justice	3
ELS 878	Leadership for Teaching and Learning	3

ELS 879	Field Research in School Administration and Supervision	3
FOUN 722	Introduction to Applied Statistics and Data Analysis	3
Select three Electives from the following:		9
ELS 811	Leadership Theory for Educational Improvement	
ELS 880	Multicultural Curriculum Leadership and Globalization	
ELS 883	Contemporary Issues in Education	
Total Credit Hours		30

Additional Requirements

Continuance

Students must meet all department, college, and university policy requirements for continuance in their academic program. See department policy above.

Continuance Policy and Procedures for the Educational Leadership Program

The following policy has been established for continuance in **Educational Leadership Program**.

At the end of each semester – fall, spring, and summer – the graduate program directors (GPD) will review student records. As per university policy, students who do not maintain an overall GPA of at least 3.0 in their ELS program will be placed on probation. Students placed on probation have one semester to bring their overall GPA back to a minimum of 3.0. A student may be placed on probation only one time in their EFL program and will not be eligible for a second probationary period. Should a student's GPA fall below 3.0 twice, he/she will be dismissed from the program.

Students who receive a grade of F in any ELS required or elective program course or who receive a final grade of lower than B- in more than one class in their program will be dismissed from their program by the Graduate Program Director and Department Chair. A failing grade in dissertation credits for one semester places the student in warning status and does not automatically dismiss the student from the program. However, two failing grades in dissertation credits will result in dismissal from the program. Students may follow the Grade Appeal Procedure in the ODU Graduate Catalog. In the event a grade is appealed such that the student comes into compliance with the EFL Continuance Policy, he/she will be reinstated.

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Exit

Students must successfully complete:

1. a written comprehensive examination;
2. the required course of study; and,
3. have a 3.00 grade point average or above.

Doctor of Philosophy Education with a Concentration in Educational Leadership (PhD)

Web Site: <http://www.odu.edu/efl> (<http://www.odu.edu/efl/>)

Steve Myran, Graduate Program Director

Program Requirements

The Ph.D. Program in Education with an Educational Leadership Concentration consists of a minimum of 48 academic credit hours beyond the master's degree and a minimum of 12 credits for the dissertation. The curriculum includes 18 hours of ELS content area credit, 15 hours of research methods and design credit, 12 hours of elective credit, and 3 hours

of dissertation seminar credit. Students entering the program may also need to complete one or more introductory statistics courses if they have not had such coursework or cannot demonstrate competency at a satisfactory level. Students who come into the Ph.D. program with a master's degree in an academic field that is unrelated to educational leadership and/or who have not completed courses to develop competency in specified areas may need to complete other courses in lieu of electives. *This program is available online.*

Admission

To gain admission, applicants must:

- 1. meet all University admissions requirements;
- 2. have a graduate grade point average of 3.00 overall;
- 3. provide three letters of recommendation;
- 4. write a one page, single-spaced essay that explains the applicant's qualifications, professional and career goals, and reasons for seeking the Ph.D.;
- 5. write a one page, single-spaced statement about a contemporary and critical issue facing educational leaders; and
- 6. write a one page, single-spaced statement about an instructional and/or learning issue facing your organization and the implication for school leaders and/or policy.

Curriculum Requirements

Prerequisites

FOUN 722	Introduction to Applied Statistics and Data Analysis	

Research Core

ELS 831	Accountability Systems in Public Education	3
FOUN 822	Applied Linear Models in Educational Research	3
or FOUN 823	Analysis of Variance Applied to Educational Research	
FOUN 812	Research Design and Analysis	3
TLCI 814	Qualitative Research Design in Education	3
FOUN 813	Program Evaluation in Education	3

Educational Leadership and Services Concentration Courses

ELS 811	Leadership Theory for Educational Improvement	3
ELS 815	Leadership for Equity and Inclusive Education	3
ELS 821	Policy and Politics in Educational Leadership	3
ELS 835	Organizational Theory and Behavior in Education	3
ELS 876	Leadership for Social Justice	3
ELS 878	Leadership for Teaching and Learning	3
Select four Electives from the following (other electives may be substituted with advisor approval):*		12

ELS 871	Educational Systems Planning and Futures	
ELS 874	Advanced School Finance, and Operations	
ELS 880	Multicultural Curriculum Leadership and Globalization	
ELS 883	Contemporary Issues in Education	

Capstone Course

FOUN 881	Dissertation Seminar	3

Dissertation (minimum 12 hours)

ELS 899	Dissertation	12

Total Credit Hours		60

* With advisor approval, two of these courses may be substituted with courses outside of the educational

leadership program to allow students to form cognate areas.

Additional Requirements

Continuance

Students must meet all department, college, and university policy requirements for continuance in their academic program. See department policy above.

Exit

In order to graduate from the program, students must successfully complete all degree requirements including all coursework, candidacy requirements, and the dissertation.

Continuance Policy and Procedures for the Educational Leadership Program

The following policy has been established for continuance in *Educational Leadership Program*.

At the end of each semester – fall, spring, and summer – the graduate program directors (GPD) will review student records. As per university policy, students who do not maintain an overall GPA of at least 3.0 in their ELS program will be placed on probation. Students placed on probation have one semester to bring their overall GPA back to a minimum of 3.0. A student may be placed on probation only one time in their EFL program and will not be eligible for a second probationary period. Should a student's GPA fall below 3.0 twice, he/she will be dismissed from the program.

Students who receive a grade of F in any ELS required or elective program course or who receive a final grade of lower than B- in more than one class in their program will be dismissed from their program by the Graduate Program Director and Department Chair. A failing grade in dissertation credits for one semester places the student in warning status and does not automatically dismiss the student from the program. However, two failing grades in dissertation credits will result in dismissal from the program. Students may follow the Grade Appeal Procedure in the ODU Graduate Catalog. In the event a grade is appealed such that the student comes into compliance with the EFL Continuance Policy, he/she will be reinstated.

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Advancement to Candidacy Policy for all EFL Programs

In the Department of Educational Foundations and Leadership, advancement to candidacy is a formal step that occurs after the student 1) completes formal coursework, 2) passes the PhD written and oral candidacy examinations, and 3) has an approved dissertation topic.

Master of Science in Education Educational Leadership with a Concentration in Higher Education (MSEd)

4101 Education Building
757-683-4305

Kim Bullington, Graduate Program Director

The Higher Education program offers professional graduate degrees for careers in advanced leadership positions in colleges, universities, non-profit organizations, or educational associations. The program has specialized curricular tracks in student affairs administration, international higher education leadership, and leadership and administration.

Students gain professional experience through internships with a wide variety of colleges, universities, agencies, and associations in the U.S. and

abroad. A capstone experience engages students in real-life research projects that are commissioned by university and community leaders.

The program meets the requirements for graduate programs of the American College Personnel Association (ACPA), the National Association of Student Personnel Administrators (NASPA), and the Association for the Study of Higher Education (ASHE). The program meets standards established by the Council for the Advancement of Standards in Higher Education (CAS).

Admission

Prospective students seeking admission to the Master's degree program in Higher Education must:

1. Meet all University admission requirements as listed in the Old Dominion University Catalog;
2. Submit transcripts of all undergraduate work with an undergraduate GPA of 2.8 overall and 3.0 in the major (students with a GPA lower than 3.0 in the major may be admitted provisionally);
3. Provide two (2) letters of recommendation. At least one letter must come from a professor or an individual who describes the applicant's academic performance and writing ability. Letters from senior-level leaders that endorse the applicant's leadership potential are encouraged;
4. Provide a 1-page single-spaced essay that addresses the questions: What are your professional goals? Why do you wish to obtain the specific degree for which you are applying?
5. Provide a writing sample from undergraduate coursework;
6. Provide a resume that describes the applicant's academic and professional background;
7. Applicants whose native language is not English must submit a current score for the Test of English as a Foreign Language (TOEFL) iBT of at least 80.

Applicants whose admission credentials are slightly below the required minimum will be considered for provisional admission.

Curriculum Requirements

Core:

Core Courses

FOUN 611	Introduction to Research Methods in Education	3
or FOUN 722	Introduction to Applied Statistics and Data Analysis	
HIED 708	Foundations of Higher Education	3
HIED 752	The Law of Higher Education	3
HIED 757	Learning Environment Design and Assessment	3
Total Credit Hours		12

Tracks:

International Higher Education Leadership Track

The International Higher Education Leadership track prepares professionals for positions in international education, including study abroad, international student and scholar services, international campus programming, and higher education for international development.

Cognate

HIED 743	Campus Internationalization	3
HIED 771	Global and Intercultural Perspectives in Higher Education	3

Electives **9**

Select 3 from the following:

IS 713	Global Political Economy
IS 741	Globalization and Social Change in the World System
IS 760	International Cultural Studies: History, Theory and Application

HIED 710	Student Affairs Administration
HIED 712	Strategic Planning
HIED 720	The Private College and University
HIED 733	Professional Helping Skills in Higher Education
HIED 744	Global Higher Education Systems: A Comparative Approach
HIED 745	Today's College Student
HIED 756	Institutional Finance and Resource Management
HIED 758	Higher Education Leadership
HIED 762	Institutional Advancement
HIED 763	Topical Issues in Higher Education
HIED 764	College and the University Presidency
HIED 765	Adult and Continuing Education
HIED 770	External and Internal Relations for Higher Education
HIED 793	History of Higher Education
HIED 794	Governance, Organization, and Administration of Higher Education
HIED 795	Topics in Higher Education Administration
CCL 766	Seminar on the Modern Community College: Foundations, Philosophy, and Vision
COUN 648	Foundations of Career Development
COUN 707	Adult and College Student Development

Field Experiences

HIED 768	Internship in Higher Education Administration	3
HIED 768	Internship in Higher Education Administration	3
HIED 761	Higher Education Capstone	3

Total Credit Hours 24

Leadership and Administration Track

The Leadership and Administration track prepares professionals for positions in mid- and senior-level positions in academic affairs in colleges, universities, agencies, and associations.

Cognate

HIED 712	Strategic Planning	3
HIED 758	Higher Education Leadership	3
HIED 794	Governance, Organization, and Administration of Higher Education	3

Electives **6**

Select two of the following:

HIED 710	Student Affairs Administration
HIED 733	Professional Helping Skills in Higher Education
HIED 720	The Private College and University
HIED 743	Campus Internationalization
HIED 744	Global Higher Education Systems: A Comparative Approach
HIED 745	Today's College Student
HIED 756	Institutional Finance and Resource Management
HIED 762	Institutional Advancement
HIED 763	Topical Issues in Higher Education
HIED 764	College and the University Presidency
HIED 765	Adult and Continuing Education
HIED 770	External and Internal Relations for Higher Education

HIED 771	Global and Intercultural Perspectives in Higher Education	
HIED 793	History of Higher Education	
HIED 795	Topics in Higher Education Administration	
CCL 766	Seminar on the Modern Community College: Foundations, Philosophy, and Vision	

Field Experiences

HIED 768	Internship in Higher Education Administration (A)	3
HIED 768	Internship in Higher Education Administration (B)	3
HIED 761	Higher Education Capstone	3

Total Credit Hours **24**

Student Affairs Administration Track

The Student Affairs Administration track prepares professionals for positions in student affairs, including academic advising, admissions, campus activities, sorority and fraternity life, judicial affairs, multicultural affairs, orientation, and residence life and housing.

Cognate

HIED 710	Student Affairs Administration	3
HIED 733	Professional Helping Skills in Higher Education	3
HIED 745	Today's College Student	3

Electives **6**

Select two of the following:

HIED 712	Strategic Planning	
HIED 720	The Private College and University	
HIED 743	Campus Internationalization	
HIED 756	Institutional Finance and Resource Management	
HIED 758	Higher Education Leadership	
HIED 762	Institutional Advancement	
HIED 763	Topical Issues in Higher Education	
HIED 764	College and the University Presidency	
HIED 765	Adult and Continuing Education	
HIED 770	External and Internal Relations for Higher Education	
HIED 771	Global and Intercultural Perspectives in Higher Education	
HIED 794	Governance, Organization, and Administration of Higher Education	
HIED 795	Topics in Higher Education Administration	
CCL 766	Seminar on the Modern Community College: Foundations, Philosophy, and Vision	
COUN 648	Foundations of Career Development	
COUN 707	Adult and College Student Development	

Field Experiences

HIED 768	Internship in Higher Education Administration (A)	3
HIED 768	Internship in Higher Education Administration (B)	3
HIED 761	Higher Education Capstone	3

Total Credit Hours **24**

Special Courses

These courses may be used for a variety of specialized topical seminars and may fulfill requirements in one or more of the cognate areas noted above.

HIED 795	Topics in Higher Education Administration	1-6

Additional Requirements

Continuance

Students must meet all department, college, and university policy requirements for continuance in their academic program. See department policy below.

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Students who receive a grade of F in any ELS required or elective program course or who receive a final grade of lower than B- in more than one class in their program will be dismissed from their program by the Graduate Program Director and Department Chair. A failing grade in dissertation credits for one semester places the student in warning status and does not automatically dismiss the student from the program. However, two failing grades in dissertation credits will result in dismissal from the program. Students may follow the Grade Appeal Procedure in the ODU Graduate Catalog. In the event a grade is appealed such that the student comes into compliance with the EFL Continuance Policy, he/she will be reinstated.

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Exit

In order to graduate from the program, students must successfully complete:

1. the required course of study for a total of at least 36 credit hours of coursework; and
2. pass a written comprehensive examination.

Non-Degree

Non-degree students are limited to a maximum of 2 courses prior to admission unless they receive permission from the GPD. Students must receive academic advising from a program faculty member prior to enrollment in any course as a non-degree student. Taking courses as a non-degree student does not guarantee admission into the program.

Education Specialist Educational Leadership with a Concentration in Higher Education (EdS)

Kim Bullington, Graduate Program Director

Working professionals who aspire to advance in higher education administration will find the Ed.S. program a meaningful base for building toward their professional objectives. Students who enter the Ed.S. program have diverse backgrounds, experiences, and goals. For this reason, they have the ability, through consultation with their advisor, to tailor the cognate chosen to fulfill their degree obligations towards these goals.

Admission

Prospective students seeking admission to the Ed.S. program with a Concentration in Higher Education must:

1. Meet all University admission requirements as listed in the Old Dominion University Catalog;

2. Have a completed Master's degree in an appropriate discipline from a regionally accredited university, and submit transcripts of all undergraduate and graduate work with a minimum GPA of 3.5. Degrees that are equivalent to a Master's degree such as LLB, JD, and DDS are also acceptable;
3. Provide two (2) letters of recommendation. At least one letter must come from a professor or an individual who describes the applicant's academic performance and writing ability. Letters from senior-level leaders that endorse the applicant's leadership potential are encouraged;
4. Provide a 1-page single-spaced essay that addresses the questions: What are your professional goals? Why do you wish to obtain the specific degree for which you are applying?
5. Provide an original 2-page single-spaced academic writing sample. Pick one current issue facing higher education of interest to you. What is the issue? Why is the issue important to the field of higher education research and practice?
6. Provide a CV or resume that describes the applicant's academic and professional background;
7. Applicants whose native language is not English must submit a current score for the Test of English as a Foreign Language (TOEFL) iBT of at least 80.

Applicants whose admission credentials are slightly below the required minimum will be considered for provisional admission.

Non-degree students are limited to a maximum of two HIED, CCL, and/or FOUN courses prior to admission unless they receive permission from the GPD. Non-degree students must receive academic advising by a Higher Education program faculty member prior to enrollment in any course as a non-degree student. Performance in classes as a non-degree student will not guarantee admission into the program.

Curriculum Requirements

The Education Specialist in Higher Education Concentration requires the completion of a minimum of 30 credit hours beyond the master's degree. Due to the wide variation of backgrounds among students seeking this degree, the curricular requirements will be determined based upon the applicant's background.

Required Courses *

Students, with the assistance of their advisor, will choose six courses from the following that do not repeat courses taken for the Master's degree: 18

HIED 808	Foundations of Higher Education
HIED 810	Student Affairs Administration
HIED 812	Strategic Planning
HIED 820	The Private College and University
HIED 825	Higher Education Politics and Policy
HIED 833	Professional Helping Skills in Higher Education
HIED 843	Campus Internationalization
HIED 844	Global Higher Education Systems: A Comparative Approach
HIED 845	Today's College Student
HIED 852	The Law of Higher Education
HIED 856	Institutional Finance and Resource Management
HIED 857	Learning Environment Design and Assessment
HIED 858	Higher Education Leadership
HIED 862	Institutional Advancement
HIED 863	Topical Issues in Higher Education
HIED 864	College and the University Presidency
HIED 865	Adult and Continuing Education
HIED 870	External and Internal Relations for Higher Education

HIED 871	Global and Intercultural Perspectives in Higher Education	
HIED 893	History of Higher Education	
HIED 894	Governance, Organization, and Administration of Higher Education	
CCL 820	Community College Leadership	
CCL 824	Community College Finance, Fundraising, and Resource Management	
CCL 826	Community College Curriculum, Program Development, and Quality Assurance	
CCL 830	Community College Politics, Policy, and Advocacy	
CCL 866	Seminar on the Modern Community College: Foundations, Philosophy, and Vision	
COUN 807	Adult and College Student Development	
Research Courses		
FOUN 722	Introduction to Applied Statistics and Data Analysis	3
FOUN 813	Program Evaluation in Education	3
FOUN 812	Research Design and Analysis	3
Field Experience		
HIED 868	Internship in Higher Education Administration	3
or HIED 844	Global Higher Education Systems: A Comparative Approach	
Total Credit Hours		30

* Required courses must include the following if they have not already been taken at the 700 level within a Master's degree program

HIED 808	Foundations of Higher Education	3
HIED 856	Institutional Finance and Resource Management	3
HIED 857	Learning Environment Design and Assessment	3
HIED 893	History of Higher Education	3
HIED 894	Governance, Organization, and Administration of Higher Education	3
Total Credit Hours		15

Special Courses

These courses may be used for a variety of specialized topical seminars and may fulfill requirements in one or more of the cognate areas noted above.

HIED 895	Topics in Higher Education Administration	1-6

Additional Requirements

Continuance

Students must meet all department, college, and university policy requirements for continuance in their academic program. See department policy below.

Continuance Policy and Procedures for the Educational Leadership Program

The following policy has been established for continuance in **Educational Leadership Program**.

At the end of each semester – fall, spring, and summer – the graduate program directors (GPD) will review student records. As per university policy, students who do not maintain an overall GPA of at least 3.0 in their ELS program will be placed on probation. Students placed on probation have one semester to bring their overall GPA back to a minimum of 3.0. A student may be placed on probation only one time in their EFL program

and will not be eligible for a second probationary period. Should a student's GPA fall below 3.0 twice, he/she will be dismissed from the program.

Students who receive a grade of F in any ELS required or elective program course or who receive a final grade of lower than B- in more than one class in their program will be dismissed from their program by the Graduate Program Director and Department Chair. A failing grade in dissertation credits for one semester places the student in warning status and does not automatically dismiss the student from the program. However, two failing grades in dissertation credits will result in dismissal from the program. Students may follow the Grade Appeal Procedure in the ODU Graduate Catalog. In the event a grade is appealed such that the student comes into compliance with the EFL Continuance Policy, he/she will be reinstated.

In accord with University policy, ODU email is considered official communication.

Exit

In order to graduate from the program, students must successfully complete:

1. the required course of study for a total of at least 30 credit hours of coursework; and
2. pass a written comprehensive examination.

Non-Degree

Non-degree students are limited to a maximum of 2 courses prior to admission unless they receive permission from the GPD. Students must receive academic advising from a program faculty member prior to enrollment in any course as a non-degree student. Taking courses as a non-degree student does not guarantee admission into the program.

Doctor of Philosophy Education with a Concentration in Higher Education (PhD)

Kim Bullington, Graduate Program Director

The Ph.D. Program in Education with a Higher Education Concentration is designed for those who aspire to senior administrative and faculty roles in institutions of higher education. Possession of this degree also provides those who have earned it with entry into business, government, research, and other leadership positions. The Higher Education Concentration is intended to prepare individuals for administrative and faculty positions and to provide these students with the skills to carry out scholarly research, lead organizations, and create new knowledge. The curriculum includes four parts: core courses, research courses, electives, and dissertation.

Admission

Prospective students seeking admission to the Ph.D. Program in Education - Higher Education Concentration must:

1. Meet all University admission requirements as listed in the Old Dominion University Catalog;
2. Have a completed Master's degree in an appropriate discipline from a regionally accredited university, and submit transcripts of all undergraduate and graduate work with a minimum GPA of 3.5 overall for the Master's degree. Degrees that are equivalent to a Master's degree such as L.L.B., J.D., and D.D.S. are also acceptable;
3. Provide three (3) letters of recommendation. At least one letter must come from a professor or an individual who describes the applicant's academic performance and writing ability. Letters from senior-level leaders that endorse the applicant's leadership potential are encouraged;
4. Provide a 1-page single-spaced essay that addresses the questions: What are your professional goals? Why do you wish to obtain the specific degree for which you are applying?
5. Provide an original 2-page single-spaced academic writing sample. Pick one current issue facing higher education of interest to you. What is the issue? Why is the issue important to the field of higher education research and practice?

6. Provide a CV or resume that describes the applicant's academic and professional background;
7. Applicants whose native language is not English must submit a current score for the Test of English as a Foreign Language (TOEFL) iBT of at least 80.

Applicants must submit completed application materials by February

1. The admissions committee composed of Higher Education faculty will review all applications then will select applicants for an interview with the committee or committee member(s). Interviews will be used to determine final admissions decisions.

Admitted students typically begin in the summer semester of the same year. First- and second-year students are expected to attend the Summer Institute, a series of intensive courses offered on Old Dominion University's main campus each summer. The dissertation requires a minimum of twelve credit hours depending on the length of time necessary for completion.

Curriculum Requirements

Core Courses*

HIED 805	Contemporary Issues in Higher Education	3
HIED 825	Higher Education Politics and Policy	3
HIED 852	The Law of Higher Education	3
HIED 893	History of Higher Education	3
HIED 894	Governance, Organization, and Administration of Higher Education	3

Cognate (15 credits minimum) **

Students work with advisor to select 5 courses that reflect their research interests.	15

Research***

FOUN 812	Research Design and Analysis	3
FOUN 822	Applied Linear Models in Educational Research	3
or FOUN 823	Analysis of Variance Applied to Educational Research	
TLCI 814	Qualitative Research Design in Education	3
Students work with advisor to select at least two (2) additional advanced FOUN courses.		6

Dissertation

HIED 809	Proseminar in Doctoral Studies	1-3
FOUN 881	Dissertation Seminar	3
HIED 899	Dissertation (12 credits minimum suggested)	12

Total Credit Hours	61-63

*

**

Some courses may be waived based on previous study. Students who enter the Ph.D. program have diverse backgrounds, experiences, and goals. For this reason they have the ability, through consultation with their advisor, to tailor the cognate chosen to fulfill their degree obligations towards these goals. Cognate courses may be taken in the following departments: Community College Leadership, Foundations, Higher Education, International Studies, and Sports Management. The GPD may allow other cognate areas to be developed and implemented by students and advisors upon request if a particular justification is made in writing. HIED 868 Internship in Higher Education (3-6 credits) is required for all doctoral students who have not served in a full-time administrative position for at least three years prior to admission. Prerequisites: Doctoral students with no prior coursework in statistics must enroll in FOUN 722. Doctoral students with no prior coursework in educational research must enroll in FOUN 611.

Special Courses

These courses may be used for a variety of specialized topical seminars and may fulfill requirements in one or more of the cognate areas noted above.

HIED 895 Topics in Higher Education Administration 1-6

Additional Requirements

Continuance

Students must meet all department, college, and university policy requirements for continuation in their academic program. See department policy above.

Exit

In order to graduate from the program, students must successfully complete all degree requirements including all coursework, candidacy requirements, and the dissertation.

Non-Degree

Non-degree students are limited to a maximum of 2 courses prior to admission unless they receive permission from the GPD. Students must receive academic advising from a program faculty member prior to enrollment in any course as a non-degree student. Taking courses as a non-degree student does not guarantee admission into the program.

Continuance Policy and Procedures for the Educational Leadership Program

The following policy has been established for continuance in *Educational Leadership Program*.

At the end of each semester – fall, spring, and summer – the graduate program directors (GPD) will review student records. As per university policy, students who do not maintain an overall GPA of at least 3.0 in their ELS program will be placed on probation. Students placed on probation have one semester to bring their overall GPA back to a minimum of 3.0. A student may be placed on probation only one time in their EFL program and will not be eligible for a second probationary period. Should a student's GPA fall below 3.0 twice, he/she will be dismissed from the program.

Students who receive a grade of F in any ELS required or elective program course or who receive a final grade of lower than B- in more than one class in their program will be dismissed from their program by the Graduate Program Director and Department Chair. A failing grade in dissertation credits for one semester places the student in warning status and does not automatically dismiss the student from the program. However, two failing grades in dissertation credits will result in dismissal from the program. Students may follow the Grade Appeal Procedure in the ODU Graduate Catalog. In the event a grade is appealed such that the student comes into compliance with the EFL Continuance Policy, he/she will be reinstated.

In accord with University policy, ODU email is considered official communication.

Advancement to Candidacy Policy for all EFL Programs

In the Department of Educational Foundations and Leadership, advancement to candidacy is a formal step that occurs after the student 1) completes formal coursework, 2) passes the PhD written and oral candidacy examinations, and 3) has an approved dissertation topic.

Education Specialist Educational Leadership with a Concentration in Occupational and Technical Studies (EdS)

Mickey Koslowski, Graduate Program Director

The Department of STEM Education and Professional Studies jointly offers the education specialist (EdS) with the Department of Educational Foundations and Leadership. The program offers a cohesive sequence of academic studies designed to help graduates deal effectively with administrative problems encountered in urban schools and agencies. This program does not lead to K-12 school leadership licensure.

Admission

To be admitted to the EdS program, an applicant must:

1. Hold a master's degree in career and technical education or related field;
2. Have a successful experience as an administrator or teacher;
3. Hold a teaching license or equivalent; and

Students seeking this degree need to apply through the EdS program in the Department of Educational Leadership and Counseling.

Entrance

Students must:

1. meet all University requirements,
2. provide two letters of recommendation;
3. hold a master's degree from an accredited institution (minimum 3.25 graduate grade point average),
4. provide a one-page essay explaining why he/she should be admitted to the program; and
5. have an acceptable score on the GRE or Miller Analogies Test.

Curriculum Requirements

Requirements for the EdS with a specialty in occupational and technical studies include 30 semester hours (18 hours must be completed in 800-level courses in ELS), as follows:

Educational Leadership

ELS 753	Educational Finance and Budgeting	3
ELS 871	Educational Systems Planning and Futures	3
ELS 876	Leadership for Social Justice	3
ELS 878	Leadership for Teaching and Learning	3
ELS 879	Field Research in School Administration and Supervision	3

Occupational & Technical Studies

SEPS 860	Trends and Issues in Occupational Education	3
SEPS 862	Administration and Management of Education and Training Programs	3
SEPS 885	Curriculum Development in Occupational Education and Training	3
SEPS 888	Instructional Strategies for Innovation in Training and Occupational Education	3
SEPS 889	Instructional Technology in Education and Training **	3

Total Credit Hours **30**

** And/or other courses approved by the candidate's advisor.

Additional Requirements

Continuance

Students must meet all University requirements and maintain a 3.00 or higher grade point average.

Exit

Students must successfully complete:

1. a written comprehensive examination,
2. the required course of study,

3. have a 3.00 grade point average or above, and
4. complete a university graduate student assessment.

Doctor of Philosophy Education with a Concentration in Workforce and Organizational Development (PhD)

Mickey Kosloski, Graduate Program Director

The PhD in Education, Workforce and Organizational Development concentration has three area of focus:

- career and technical education
- human resources training
- technology education.

The PhD is delivered on campus and through ODUGlobal. All students must be on the Norfolk campus for two, two-week summer Institute sessions. The focus of the degree is to prepare post-secondary workforce development faculty, directors/supervisors of career and technical education, and directors of training departments in business, industry, and government.

The curriculum associated with Old Dominion University's PhD in Education, occupational and technical studies concentration is intended to accomplish the following learning outcomes:

- Individuals will apply knowledge, skills, behaviors, and dispositions in today's complex educational and business environments.
- Every individual who completes this doctoral program will develop competencies for understanding and using research methods and statistics to make data-based driven decisions.
- The Workforce and Organizational Development concentration offers courses that enable graduates to know and apply their knowledge in today's complex educational, business, or industry environments and emerge as leaders in their chosen careers.

Note for students concerning the Doctor of Philosophy in Education - Workforce and Organizational Development concentration: This program is not intended to lead to teacher certification or school leadership licensure. This program is available on-campus and online.

Admission

Entrance

All applicants to the Doctor of Philosophy degree, Workforce and Organizational Development concentration, must meet University, college and department requirements. In addition, all applicants must:

1. hold a master's degree or equivalent related to this field;
2. complete the graduate application with necessary fee;
3. submit an essay statement of academic and professional goals with an emphasis on how the PhD in Education concentration in occupational and technical studies will contribute to the achievement of career goals;
4. submit three letters of reference from sources capable of commenting on readiness for advanced graduate study;
5. submit a resume that shows your educational and professional background;
6. submit academic transcripts from all undergraduate and graduate institutions previously attended or currently being attended;
7. if the applicant's primary language is not English, submit a current score for the Test of English as a Foreign Language (TOEFL) that meets the University's current standard.

Applications for admission are on a rolling basis. Graduate assistantships are awarded in February annually.

Students may enroll in this program full- or part-time. The program faculty reviews all applicants as their application packages are completed. The following criteria are used for admittance:

1. graduate grade point average;
2. undergraduate grade point average;
3. essay, 1500 word, describing how the PhD in OTS aligns with your professional goals; and
4. goodness of fit with program goals, faculty expertise, and supporting references.

Graduate assistantships and fellowships may be available. Contact the graduate program director for information.

Curriculum Requirements

Prerequisites

A master's degree in an appropriate field related to this concentration is required for admission to the PhD program. Students who do not have equivalent coursework or appropriate educational experiences must complete the following prerequisite courses:

FOUN 722	Introduction to Applied Statistics and Data Analysis	3
Total Credit Hours		3

Curriculum (60 credits minimum)

Students in the Workforce and Organizational Development concentration complete courses in research, the Workforce and Organizational Development concentration, and electives. Students select their elective credits in consultation with their advisor.

Research Core

SEPS 835	Research Design for Occupational and Technical Studies *	3
FOUN 812	Research Design and Analysis	3
FOUN 822	Applied Linear Models in Educational Research	3
or FOUN 823	Analysis of Variance Applied to Educational Research	
TLCI 814	Qualitative Research Design in Education	3

Concentration Core

Must be taken with one emphasis area-Technology Education, Career and Technical Education, or Human Resources-Training

SEPS 840	Readings in Occupational and Technical Studies	3
SEPS 860	Trends and Issues in Occupational Education	3
SEPS 862	Administration and Management of Education and Training Programs	3
SEPS 865	Trends and Issues of Economic and Workforce Development	3
SEPS 885	Curriculum Development in Occupational Education and Training	3
SEPS 888	Instructional Strategies for Innovation in Training and Occupational Education	3
SEPS 889	Instructional Technology in Education and Training	3

Select one of the following Emphasis Areas: 12

<i>Technology Education Emphasis</i>		
STEM 820	STEM Educational Foundations	
STEM 830	Introduction to Technology	
<i>Career and Technical Education Emphasis</i>		
SEPS 868	Internship	
SEPS 887	Career and Technical Education Curriculum	
<i>Human Resources - Training Emphasis</i>		
SEPS 861	Foundations of Adult Education and Training	

Electives		
Electives are selected in consultation with the advisor. They should be planned and included in the student's program of study.		9-12
Capstone Courses		
Select 12-15 credits of the following:		12-15
FOUN 881	Dissertation Seminar (if needed)	
SEPS 899	Dissertation in Occupational Education	
Total Credit Hours		66-72

Additional Requirements

Continuance

Students must:

1. have their PhD program approved;
2. successfully complete annual progress reviews;
3. meet faculty and University program expectations;
4. meet professional development and career preparation expectations.

Exit

Students must:

1. complete a minimum of 60 credit hours beyond the master's degree;
2. complete all competencies listed on course syllabi;
3. achieve an overall grade point average of 3.00 with no course having a grade less than a B-;
4. pass the written and oral comprehensive examination;
5. select a dissertation committee;
6. prepare and defend a dissertation prospectus;
7. successfully complete a dissertation with an oral defense; and
8. complete the graduate student University assessment.

Post-Baccalaureate Endorsement Marketing Education Post-Baccalaureate Endorsement

Michael F. Kosloski, Program Coordinator

The post-baccalaureate endorsement in marketing education is designed to prepare a person who has a baccalaureate degree to be a marketing education teacher-coordinator. Participants who successfully complete this program will qualify to apply for a Virginia teaching license to teach marketing education.

Admission

For those students seeking licensure only, they must first apply to ODU as non-degree seeking. Students subsequently complete undergraduate or graduate level courses that meet Virginia licensure requirements. For students simultaneously seeking a graduate degree, they should apply for the graduate program and may take up to 12 credit hours that may be used toward both the MS and post-baccalaureate programs. Students should schedule an interview with the program coordinator for program admissions as well as to discuss course evaluation and options.

Curriculum Requirements

Complete the following courses:

SEPS 297	Observation and Participation	1
SEPS 400/500	Instructional Systems Development	3
SEPS 401/501	Foundations of Career and Technical Education	3
SEPS 402/502	Instructional Methods in Occupational Studies	3
SEPS 408/508	Advanced Classroom Issues and Practices in Career and Technical Education	3

SEPS 450/550	Assessment, Evaluation and Improvement	3
SEPS 485	Student Teaching	12
READ 680	Literacy Across the Curriculum	3
or SPED 313	Fundamentals of Human Growth and Development: Birth through Adolescence	
Total Credit Hours		31

Additional Requirements

Continuation and Exit

Students must:

1. earn a 2.75 cumulative grade point average if licensure is at the undergraduate level and a 3.00 cumulative grade point average if licensure is at the graduate level;
2. document at least 4000 clock hours of marketing-related work experience completed within the past five years or complete a directed field experience (SEPS 405);
3. earn credit in any marketing- related content courses required by the Virginia Department of Education that have not yet been met. Such courses are identified in a transcript evaluation of all prior college-level work. Students with an undergraduate degree in marketing is considered to have met all content requirements. Experiential credit may be considered for individual courses on a case-by-case basis.
4. complete a university graduate student assessment if enrolled in the M.S. degree program.
5. obtain certificate of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training. These must be on file with the Office of Clinical Experiences.

Twelve hours of 500/600 level courses may be applied toward the Master of Science in occupational and technical studies, career and technical education teaching concentration.

Post-Baccalaureate Endorsement Technology Education Post-Baccalaureate Endorsement

Mickey Kosloski, Graduate Program Director

The post-baccalaureate endorsement in technology education is designed to prepare a person who has a baccalaureate degree to be a technology education teacher. Participants who successfully complete this program will qualify to apply for a Virginia teaching license to teach technology education.

Admission

For those students seeking licensure only, they must first apply to ODU as non-degree seeking. Students subsequently complete undergraduate or graduate level courses that meet Virginia licensure requirements. For students simultaneously seeking a graduate degree, they should apply for the graduate program and may take up to 12 credit hours that may be used toward both the M.S. and post-baccalaureate programs. Students should schedule an interview with the program coordinator for program admissions as well as to discuss course evaluation and options.

Curriculum Requirements

Complete the following courses:

FOUN 612	Applied Research Methods in Education	3
READ 680	Literacy Across the Curriculum	3
SEPS 586	Middle School Student Teaching for Technical Education	6
SEPS 596	Topics in Career and Technical Education	1-3

SEPS 636	Problems in Occupational and Technical Studies	3
SEPS 788	Instructional Strategies for Innovation in Training and Occupational Education	3
SEPS 789	Instructional Technology in Education and Training	3
TLED 608	Foundations of Education and Instructional Assessment	3
SPED 613	Human Growth and Development	3
STEM 231	Materials and Processes Technology	3
STEM 320	Manufacturing and Construction Technology	3
STEM 350	Communication Technology Processes	3
STEM 351	Communication Technology	3
STEM 730	Introduction to Technology	3
Total Credit Hours		43-45

Additional Requirements

Continuance and Exit

Students must:

1. earn a 2.75 cumulative grade point average on undergraduate level courses and a 3.00 cumulative grade point average at the graduate level,
2. complete the graduate student University assessment.
3. Obtain certificate of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training. These must be on file with the Office of Clinical Experiences.

Complete this licensure program and other departmental requirements will allow the candidate to earn the Master of Science in occupational and technical studies, career and technical education teaching concentration.

Department of Human Movement Studies and Special Education

2006 Student Recreation Center
757 683-4995 (phone)
757 683-4270 (fax)

Xihe Zhu, Chair

The Department of Human Movement Studies and Special Education offers graduate programs leading to Master's degrees in three disciplines, which includes Health and Physical Education, Special Education, and Sport Management. Within Physical Education, there are concentrations in Adapted Physical Education, Curriculum & Instruction, Coaching Education, and Initial Virginia Teaching Licensure in Health & Physical Education. Within Special Education, there are concentrations in Early Childhood Special Education, K-12 General Curriculum, and K-12 Adapted Curriculum. Additionally, students can earn a graduate certificate in Adapted Physical Education, Applied Behavior Analysis, and Autism. We also offer a Doctoral degree (PhD in Education - Human Movement Sciences, and Special Education concentrations) with emphasis areas in Health & Sport Pedagogy, and Sport & Recreation Management.

Due to changing University requirements, national accreditation standards, and Commonwealth licensure regulations, the programs in the Darden College of Education and Professional Studies are under constant revision. Any changes resulting from these factors supersede the program requirements described in the catalog. Students should obtain current program information from their advisors and the Darden College of Education and Professional Studies website at <http://www.odu.edu/education>. (<http://education.odu.edu/>)

Programs

Doctor of Philosophy Programs

- Education with a Concentration in Human Movement Sciences - Applied Kinesiology (PhD) (p. 161)
- Education with a Concentration in Human Movement Sciences - Health and Sport Pedagogy (PhD) (p. 163)
- Education with a Concentration in Human Movement Sciences - Sport and Recreation Management (PhD) (p. 164)
- Education with a Concentration in Special Education (PhD) (p. 174)

Master of Science Programs

- Sport Management (MS) (p. 176)
- Sport Management with a Concentration in Sport Analytics (MS) (<http://catalog.odu.edu/graduate/education/human-movement-studies-special-education/sport-management-sport-analytics-ms/>)

Master of Science in Education Programs

- Physical Education with a Concentration in Adapted Physical Education (MSEd) (p. 165)
- Physical Education with a Concentration in Coaching (MSEd) (p. 166)
- Physical Education with a Concentration in Curriculum & Instruction (MSEd) (p. 167)
- Physical Education with a Concentration in Initial Virginia Licensure in Health and Physical Education (MSEd) (p. 168)
- Special Education with a Concentration in Early Childhood Special Education (MSEd) (p. 169)
- Special Education with a Concentration in K-12 Licensure - Adapted Curriculum - K-12 (MSEd) (p. 171)
- Special Education with a Concentration in K-12 Licensure - General Curriculum - K-12 (MSEd) (p. 173)

Certificate Programs

- Adapted Physical Education Certificate (p. 177)
- Applied Behavior Analysis Certificate (p. 177)
- Autism Certificate (p. 178)

Post-Baccalaureate Endorsements

- Early Childhood Special Education Post-Baccalaureate Endorsement (p. 178)
- Special Education - Visual Impairments, PreK-12 Post-Baccalaureate Endorsement (p. 181)
- Special Education Adapted Curriculum, K-12 Post-Baccalaureate Endorsement (p. 179)
- Special Education General Curriculum, K-12 Post-Baccalaureate Endorsement (p. 180)
- Teacher Preparation in Special Education Adapted Curriculum Post-Baccalaureate Endorsement (p. 183)

Doctor of Philosophy Education with a Concentration in Human Movement Sciences - Applied Kinesiology (PhD)

Justin Haegele, Ph.D.
2009 Student Recreation Center
757-683-5338
jhaegele@odu.edu

The goal of our doctoral program is to prepare professionals with research knowledge, critical thinking skills and problem solving abilities required to be successful leaders, scholars, and educators. The program provides a

solid theoretical foundation, advanced methodological training, one-on-one mentorship, and opportunities to teach undergraduate courses.

We offer a PhD in Education with a concentration in Human Movement Sciences. There are three emphasis areas within the HMS concentration. These include:

Applied Kinesiology Emphasis – this area focuses on Exercise Physiology and Biomechanics and prepares graduates for positions as post-doctoral research fellows, university faculty, and/or governmental research officials.

Sport & Recreation Management Emphasis – this area focuses on issues related to the administration of sport and recreation organizations. Graduates are prepared for careers as faculty or administrators in higher education, private organizations, public agencies, and/or other research-based institutions.

Health & Sport Pedagogy Emphasis – this area focuses on research, scholarship, and leadership opportunities in health and sport pedagogy. This program prepares individuals for academic positions in departments of physical education/ kinesiology at universities and colleges.

Admission

Admission and Entrance Requirements

Admission to the Human Movement Sciences concentration of the Ph.D. in Education is competitive and meeting the minimum requirements does not ensure admission to the program. The admissions committee reviews applications and considers a number of criteria, including a goodness of fit between student and faculty.

The deadline for applying is January 15. Applicants may be contacted to set up an interview as part of the final selection process.

Individuals interested in applying for the doctoral program with a concentration in Human Movement Sciences must submit the following:

- An application to the University. Contact the Office of Graduate Admissions for applications. Applications for graduate study can be completed online or submitted to the Office of Graduate Admissions (<http://www.odu.edu/admission/graduate/>) (757-683-3685). Apply for the Ph.D. Human Movement Sciences Concentration.
- Official transcripts of all undergraduate and graduate courses and degrees completed. To be considered for the program, applicants must have completed a Bachelor's and a Master's degree from regionally accredited colleges/universities. At least one degree should be in a related discipline to the emphasis area. A minimum GPA of 3.5 (on a 4.0 scale) for the Master's degree is required.
- Two writing samples. The first writing sample should be a research-based document that includes citations and a list of references. This could be a submitted manuscript or published article, a summary of your thesis, or a research paper from a graduate course. The second writing sample should be a personal statement that explains your qualifications, professional and career goals, and reasons for seeking the Ph.D. In this second essay, you must also identify the potential professor(s) at ODU with whom you share common research interests.
- A current copy of your résumé or Curriculum Vitae.
- Three letters of recommendation from professional sources qualified to assess your suitability for study at the doctoral level. One letter of recommendation should be from a graduate advisor or faculty member and one should be from a current or former supervisor.
- Official GRE scores taken within the last 5 years that indicate a total score of at least 297 (1000 by former scoring standard) for both the verbal reasoning and quantitative reasoning sections and a minimum of 4.5 on the analytical writing component. While these scores are recommended, other portions of the total application package will be considered. The Sport and Recreation Management emphasis area will also accept GMAT scores of 470 or higher.
- Applicants whose native language is not English must also submit current scores for the Test of English as a Foreign Language (TOEFL) of at least 550.

After successful advancement to candidacy, all doctoral students are required to be registered for at least one graduate credit hour each term (fall, spring, and summer) until the degree is completed, including the semester in which they graduate. Failure to comply with this requirement will result in charges to the student's account for one graduate credit hour plus required fees for each semester after passing the candidacy examination. Students are not eligible for graduation until all charges are paid.

Curriculum

Patrick Wilson, Ph.D.
2003A Student Recreation Center
757-683-4783

Requirements for the emphasis are as follows (minimum of 60 credits):

Prerequisite Courses

Prerequisite Coursework *

FOUN 612	Applied Research Methods in Education
FOUN 722	Introduction to Applied Statistics and Data Analysis

Research Core

FOUN 812	Research Design and Analysis	3
TLCI 814	Qualitative Research Design in Education	3
FOUN 822	Applied Linear Models in Educational Research	3
FOUN 823	Analysis of Variance Applied to Educational Research	3

Professional Preparation

Select two of the following:	6
HMS 890	Doctoral Studies Seminar
FOUN 881	Dissertation Seminar
TLCI 803	Theoretical Perspectives in Curriculum and Instruction
TLCI 804	Instruction Theories and Models

Applied Kinesiology Emphasis

EXSC 827	Advanced Biomechanics	3
EXSC 830	Advanced Cardiovascular Exercise Physiology	3
EXSC 838	Exercise Endocrinology	3
EXSC 840	Ergogenic Aids in Sport and Human Performance	3
HMS 897	Independent Study in Human Movement Sciences	3

Electives **

Select three of the following:	9
BME 821	Mathematical Modeling in Physiology
BIOL 816	Endocrinology
BIOL 824	Neuromuscular Physiology
BIOL 889	Gross Anatomy

Dissertation Capstone Courses

HMS 899	Dissertation	12

Total Credit Hours	54

- + A master's degree in an appropriate field related to this concentration is required for regular admission to the Ph.D. in human movement science.
- * Students who do not have equivalent coursework or appropriate educational experiences must complete these prerequisite courses.
- ** Substitute other courses by permission of advisor.

Additional Requirements

Continuance and Exit Requirements

Students completing the program of study must:

- Have an overall grade point average of 3.0 or higher
- Satisfy all course competencies
- Pass comprehensive examinations
- Complete a dissertation
- Have an exit interview with the program director
- File the necessary paperwork for graduation

Doctor of Philosophy Education with a Concentration in Human Movement Sciences - Health and Sport Pedagogy (PhD)

Justin Haegele, Ph.D.
2009 Student Recreation Center
757-683-5338
jhaegele@odu.edu

The goal of our doctoral program is to prepare professionals with research knowledge, critical thinking skills and problem solving abilities required to be successful leaders, scholars, and educators. The program provides a solid theoretical foundation, advanced methodological training, one-on-one mentorship, and opportunities to teach undergraduate courses.

We offer a PhD in Education with a concentration in Human Movement Sciences. There are two emphasis areas within the HMS concentration. These include:

Sport & Recreation Management Emphasis – this area focuses on issues related to the administration of sport and recreation organizations. Graduates are prepared for careers as faculty or administrators in higher education, private organizations, public agencies, and/or other research-based institutions.

Health & Sport Pedagogy Emphasis – this area focuses on research, scholarship, and leadership opportunities in health and sport pedagogy. This program prepares individuals for academic positions in departments of physical education/ kinesiology at universities and colleges.

Admission

Admission and Entrance Requirements

Admission to the Human Movement Sciences concentration of the PhD in Education is competitive and meeting the minimum requirements does not ensure admission to the program. The admissions committee reviews applications and considers a number of criteria, including a goodness of fit between student and faculty.

The deadline for applying is January 15. Applicants may be contacted to set up an interview as part of the final selection process.

Individuals interested in applying for the doctoral program with a concentration in Human Movement Sciences must submit the following:

- An application to the University. Contact the Office of Graduate Admissions for applications. Applications for graduate study can be completed online or submitted to the Office of Graduate Admissions (<http://www.odu.edu/admission/graduate/>) (757-683-3685). Apply for the PhD Human Movement Sciences Concentration.
- Official transcripts of all undergraduate and graduate courses and degrees completed. To be considered for the program, applicants must have completed a Bachelor's and a Master's degree from regionally accredited colleges/universities. At least one degree should be in a related discipline to the emphasis area. A minimum GPA of 3.5 (on a 4.0 scale) for the Master's degree is required.

- Two writing samples. The first writing sample should be a research-based document that includes citations and a list of references. This could be a submitted manuscript or published article, a summary of your thesis, or a research paper from a graduate course. The second writing sample should be a personal statement that explains your qualifications, professional and career goals, and reasons for seeking the PhD. In this second essay, you must also identify the potential professor(s) at ODU with whom you share common research interests.
- A current copy of your résumé or Curriculum Vitae.
- Three letters of recommendation from professional sources qualified to assess your suitability for study at the doctoral level. One letter of recommendation should be from a graduate advisor or faculty member and one should be from a current or former supervisor.
- Official GRE scores taken within the last 5 years that indicate a total score of at least 297 (1000 by former scoring standard) for both the verbal reasoning and quantitative reasoning sections and a minimum of 4.5 on the analytical writing component. While these scores are recommended, other portions of the total application package will be considered. The Sport and Recreation Management emphasis area will also accept GMAT scores of 470 or higher.
- Applicants whose native language is not English must also submit current scores for the Test of English as a Foreign Language (TOEFL) of at least 550, or other equivalent scores.

After successful advancement to candidacy, all doctoral students are required to be registered for at least one graduate credit hour each term (fall, spring, and summer) until the degree is completed, including the semester in which they graduate. Failure to comply with this requirement will result in charges to the student's account for one graduate credit hour plus required fees for each semester after passing the candidacy examination. Students are not eligible for graduation until all charges are paid.

Curriculum

Justin Haegele, Ph.D., Graduate Program Director
2009 Student Recreation Center
757-683-5338

Requirements for the emphasis are as follows (minimum of 60 credits):

Research Core (12 credits minimum, required*)

FOUN 812	Research Design and Analysis *	3
TLCI 814	Qualitative Research Design in Education	3
FOUN 822	Applied Linear Models in Educational Research *	3
FOUN 823	Analysis of Variance Applied to Educational Research *	3
FOUN 825	Applied Multilevel Modeling in Educational Research	3
FOUN 826	Applied Structural Equation Modeling in Educational Research	3
PSYC 847	Multivariate Methods for the Social/ Behavioral Sciences	3

Health & Sport Pedagogy Emphasis

HPE 718	Applied Learning and Coaching Theory	3
HPE 721	Motivational Issues in Sports	3
HPE 804	Advanced Studies in Adapted Physical Education	3
HPE 819	Planning and Administration in PE and Sport Programs	3
HPE 820	Curriculum Development in Physical Education	3
HPE 840	Motor Learning and Development	3
HPE 845	Assessment/Evaluation and Technology in Sport/PE	3

Professional Preparation (9 credits minimum, required*)

FOUN 881	Dissertation Seminar *	

HMS 890	Doctoral Studies Seminar
PSYC 833	Grant and Manuscript Writing
or TLCI 804	Instruction Theories and Models

Advisor Approved Electives

Select a minimum of 6 credits from the following. Other electives may be approved. Consult with your advisor. 6

PSYC 845	Applied Psychometrics
HIED 857	Learning Environment Design and Assessment
PSYC 835	Health Psychology
SPED 801	Historical and Contemporary Research in Special Education
FOUN 816	Single Subject Research Designs
PRTS 880	Youth Development in Recreation

Dissertation Capstone Course (12 credits, required*)

HMS 899	Dissertation *	12
Total Credit Hours		60

Additional Requirements

Continuance and Exit Requirements

Students completing the program of study must:

- Have an overall grade point average of 3.0 or higher
- Satisfy all course competencies
- Pass comprehensive examinations
- Complete a dissertation
- Have an exit interview with the program director
- File the necessary paperwork for graduation

Doctor of Philosophy Education with a Concentration in Human Movement Sciences - Sport and Recreation Management (PhD)

Justin Haegele, Ph.D.
2009 Student Recreation Center
757-683-5338
jhaegele@odu.edu

The goal of our doctoral program is to prepare professionals with research knowledge, critical thinking skills and problem solving abilities required to be successful leaders, scholars, and educators. The program provides a solid theoretical foundation, advanced methodological training, one-on-one mentorship, and opportunities to teach undergraduate courses.

We offer a PhD in Education with a concentration in Human Movement Sciences. There are two emphasis areas within the HMS concentration. These include:

Sport & Recreation Management Emphasis – this area focuses on issues related to the administration of sport and recreation organizations. Graduates are prepared for careers as faculty or administrators in higher education, private organizations, public agencies, and/or other research-based institutions.

Health & Sport Pedagogy Emphasis – this area focuses on research, scholarship, and leadership opportunities in health and sport pedagogy. This program prepares individuals for academic positions in departments of physical education/ kinesiology at universities and colleges.

Admission

Admission and Entrance Requirements

Admission to the Human Movement Sciences concentration of the PhD in Education is competitive and meeting the minimum requirements does

not ensure admission to the program. The admissions committee reviews applications and considers a number of criteria, including a goodness of fit between student and faculty.

The deadline for applying is January 15. Applicants may be contacted to set up an interview as part of the final selection process.

Individuals interested in applying for the doctoral program with a concentration in Human Movement Sciences must submit the following:

- An application to the University. Contact the Office of Graduate Admissions for applications. Applications for graduate study can be completed online or submitted to the Office of Graduate Admissions (<http://www.odu.edu/admission/graduate/>) (757-683-3685). Apply for the PhD Human Movement Sciences Concentration.
- Official transcripts of all undergraduate and graduate courses and degrees completed. To be considered for the program, applicants must have completed a Bachelor's and a Master's degree from regionally accredited colleges/universities. At least one degree should be in a related discipline to the emphasis area. A minimum GPA of 3.5 (on a 4.0 scale) for the Master's degree is required.
- Two writing samples. The first writing sample should be a research-based document that includes citations and a list of references. This could be a submitted manuscript or published article, a summary of your thesis, or a research paper from a graduate course. The second writing sample should be a personal statement that explains your qualifications, professional and career goals, and reasons for seeking the PhD. In this second essay, you must also identify the potential professor(s) at ODU with whom you share common research interests.
- A current copy of your résumé or Curriculum Vitae.
- Three letters of recommendation from professional sources qualified to assess your suitability for study at the doctoral level. One letter of recommendation should be from a graduate advisor or faculty member and one should be from a current or former supervisor.
- Official GRE scores taken within the last 5 years that indicate a total score of at least 297 (1000 by former scoring standard) for both the verbal reasoning and quantitative reasoning sections and a minimum of 4.5 on the analytical writing component. While these scores are recommended, other portions of the total application package will be considered. The Sport and Recreation Management emphasis area will also accept GMAT scores of 470 or higher.
- Applicants whose native language is not English must also submit current scores for the Test of English as a Foreign Language (TOEFL) of at least 550, or equivalent score.

After successful advancement to candidacy, all doctoral students are required to be registered for at least one graduate credit hour each term (fall, spring, and summer) until the degree is completed, including the semester in which they graduate. Failure to comply with this requirement will result in charges to the student's account for one graduate credit hour plus required fees for each semester after passing the candidacy examination. Students are not eligible for graduation until all charges are paid.

Curriculum

Requirements for the emphasis are as follows (minimum of 60 credits):

Prerequisite Courses

FOUN 612	Applied Research Methods in Education
FOUN 722	Introduction to Applied Statistics and Data Analysis

Research Core

Select a minimum of 12 credits from the following: 12

FOUN 812	Research Design and Analysis
FOUN 813	Program Evaluation in Education
TLCI 814	Qualitative Research Design in Education
FOUN 818	Analysis with Large Datasets
FOUN 822	Applied Linear Models in Educational Research

FOUN 823	Analysis of Variance Applied to Educational Research	
FOUN 825	Applied Multilevel Modeling in Educational Research	
FOUN 826	Applied Structural Equation Modeling in Educational Research	
FOUN 840	Educational Measurement and Assessment	
FOUN 870	Formative Assessment of Student Learning	
Professional Preparation		
Select a minimum of 9 credits from the following:		9
HMS 890	Doctoral Studies Seminar	
FOUN 830	Theories of Learning and Instruction	
FOUN 835	Motivation in Education	
FOUN 881	Dissertation Seminar	
TLCI 731	Instructional Technology Trends in Curriculum and Instruction	
TLCI 803	Theoretical Perspectives in Curriculum and Instruction	
TLCI 804	Instruction Theories and Models	
Sport Management Emphasis		
Select a minimum of 18 credits from the following:		18
SMGT 785	Sport Entrepreneurship	
SMGT 838	Sport Finance	
SMGT 846	Strategic Marketing in Sport	
SMGT 850	Ethics in Sport Management	
SMGT 855	Social Issues in Sport	
SMGT 860	Sport Law	
SMGT 875	Management and Leadership in Sport	
SMGT 890	Applied Sport Analytics	
Electives*		
Select a minimum of 9 credits from the following:		9
MGMT 835	Organization Theory	
MGMT 838	Strategic Entrepreneurship Seminar	
MKTG 802	Seminar in Marketing Concepts and Issues	
MKTG 803	Seminar in Consumer Behavior	
PADM 801	Policy Theory	
PADM 845	Managing Development and Change in Organizations	
Dissertation Capstone Courses		
HMS 899	Dissertation	12
Total Credit Hours		60

* List of electives is not comprehensive. Prior approval from graduate advisor is required for other possible electives.

Additional Requirements

Continuance and Exit Requirements

Students completing the program of study must:

- Have an overall grade point average of 3.0 or higher
- Satisfy all course competencies
- Pass comprehensive examinations
- Complete a dissertation
- Have an exit interview with the program director
- File the necessary paperwork for graduation

Master of Science in Education Physical Education with a Concentration in Adapted Physical Education (MSEd)

Student Recreation Center
757-683-3351

Within each concentration, there are thesis and non-thesis options.

Justin Haegle, Ph.D., Graduate Program Director
2009 Student Recreation Center
757-683-5338

Linked Program Information

There is a linked program available to qualified students under existing university policy to link the Bachelor of Science (Physical Education with a Major in PreK-12 Health and Physical Education) (<http://catalog.odu.edu/undergraduate/education/human-movement-studies-special-education/physical-education-prek-12-health-bs/>) undergraduate program with the Master of Science in Education (Physical Education with a Concentration in Adapted Physical Education) (p. 165) graduate program. See program director for additional details.

Admission

Admission and Entrance Requirements

Applicants for the MSEd in Physical Education are required to submit credentials for consideration through the Office of Graduate Admissions at Old Dominion University. Students applying for admission with regular status must have:

- A completed online application via www.odu.edu/admission/graduate (<http://www.odu.edu/admission/graduate/>)
- A baccalaureate degree from a regionally-accredited institution or an equivalent degree from a foreign institution
- 2.8 cumulative GPA or higher (on a 4.0 scale) *
- 3.0 GPA or higher in the undergraduate major *
- A combined GRE score of 291 or higher (verbal and quantitative sections) *
- Personal essay (no more than two pages) addressing motivations to apply to program, career interests, and ability to complete graduate level work
- Three letters of recommendation (from former professors or employers)
- Current copy of résumé
- Transcripts from all prior postsecondary institutions
- Test of English as a Foreign Language (TOEFL) score of 550 on the paper-based test (or 79-80 on the iBT) for non-native English speakers

* Students who have a low GPA or a low GRE score may be considered for admission with provisional status.

* The program admissions committee will consider GRE waiver requests for high potential candidates by considering application elements that demonstrate the ability to take on the rigor of graduate level studies. A request for a waiver does not guarantee that a waiver will be granted.

Curriculum

Research Core

FOUN 611	Introduction to Research Methods in Education	3
or FOUN 612	Applied Research Methods in Education	
FOUN 722	Introduction to Applied Statistics and Data Analysis (Research Core)	3

Core Courses

HPE 504	Adapted Physical Education	3

HPE 704	Advanced Studies in Adapted Physical Education	3
HPE 719	Planning and Administration in PE and Sport Programs	3
HPE 740	Motor Learning and Development	3
HPE 745	Assessment/Evaluation and Technology in Sport/PE	3
Electives		
Select one of the following:		3
SPED 625	Characteristics of Students with Autism Spectrum Disorders *	
SPED 621	Effective Interventions for Children and Youth with Challenging Behavior **	
HPE 718	Applied Learning and Coaching Theory	
HPE 720	Curriculum Development in Physical Education	
Thesis		
HMS 698	Thesis	3
HMS 699	Thesis	3
Research Project Option ***		
HPE 636	Research Problems in Health & Physical Education	3
Total Credit Hours		33

- * One SPED course is strongly recommended to meet CAPE certification requirements.
- ** List is not comprehensive. Prior approval from graduate advisor is required for other possible electives
- *** An additional Requirement of comprehensive exam based on core course requirements

Additional Requirements

Continuance and Exit Requirements

Students must meet all requirements for continuance as outlined in the graduate continuance policy for the University. Students completing the program of study must:

- Have an overall grade point average of 3.0 or higher
- Have a grade point average of 3.0 or higher in the major
- Demonstrate writing proficiency
- Satisfy all course competencies
- Complete a research problem or thesis
- If doing a research problem, also pass a comprehensive examination
- File the necessary paperwork for graduation

Master of Science in Education Physical Education with a Concentration in Coaching (MSEd)

Student Recreation Center
757-683-3351

Within each concentration, there are thesis and non-thesis options.

This emphasis will offer additional theories and knowledge in the coaching profession providing advanced skills to those individuals pursuing a coaching career. The courses selected for the Coaching Education emphasis area will meet accreditation standards, certify students as athletic coaches, and provide valuable knowledge and skills.

Justin Haegele, PhD, Graduate Program Director
2009 Student Recreation Center
757-683-5338

Linked Program Information

There is a linked program available to qualified students under existing university policy to link the Bachelor of Science (Physical Education with a Major in PreK-12 Health and Physical Education) (<http://catalog.odu.edu/undergraduate/education/human-movement-studies-special-education/physical-education-prek-12-health-bs/>) undergraduate program with the Master of Science in Education (Physical Education with a Concentration in (p. 165) Coaching) (p. 166) graduate program. See program director for additional details.

Admission

Admission and Entrance Requirements

Applicants for the MSEd in Physical Education are required to submit credentials for consideration through the Office of Graduate Admissions at Old Dominion University. Students applying for admission with regular status must have:

- A completed online application via www.odu.edu/admission/graduate (<http://www.odu.edu/admission/graduate/>)
- A baccalaureate degree from a regionally-accredited institution or an equivalent degree from a foreign institution
- 2.8 cumulative GPA or higher (on a 4.0 scale) *
- 3.0 GPA or higher in the undergraduate major *
- A combined GRE score of 291 or higher (verbal and quantitative sections) *
- Personal essay (no more than two pages) addressing motivations to apply to program, career interests, and ability to complete graduate level work
- Three letters of recommendation (from former professors or employers)
- Current copy of résumé
- Transcripts from all prior postsecondary institutions
- Test of English as a Foreign Language (TOEFL) score of 550 on the paper-based test (or 79-80 on the iBT) for non-native English speakers

* Students who have a low GPA or a low GRE score may be considered for admission with provisional status.

* The program admissions committee will consider GRE waiver requests for high potential candidates by considering application elements that demonstrate the ability to take on the rigor of graduate level studies. A request for a waiver does not guarantee that a waiver will be granted.

Curriculum

Prerequisites

BIOL 250 or BIOL 240	Human Anatomy and Physiology I Fundamentals of Anatomy and Physiology I
EXSC 322	Anatomical Kinesiology
HPE 409	Physiology of Exercise

Note: Students who do not have equivalent coursework or appropriate educational experiences must complete these prerequisite courses.

Research Core

FOUN 611 or FOUN 612	Introduction to Research Methods in Education Applied Research Methods in Education	3
FOUN 722	Introduction to Applied Statistics and Data Analysis	3

Core Courses

HPE 718	Applied Learning and Coaching Theory	3
HPE 719	Planning and Administration in PE and Sport Programs	3
HPE 721	Motivational Issues in Sports	3
HPE 740	Motor Learning and Development	3

HPE 745	Assessment/Evaluation and Technology in Sport/PE	3

Capstone Experience

Select one of the following:	6

Internship Option (3-6 Credits): *

HPE 668	Internship in Health & Physical Education

Electives (3-6 credits)

Thesis Option: (3-6 Credits)	

HPE 698	Thesis

HPE 699	Thesis

Electives (3-6 credits)

Electives **	

Select one of the following:	3

EXSC 508	Nutrition for Fitness and Sport (pre-req EXSC 409 Ex Phys)

HPE 509	Exercise Physiology (recommended if you have not taken HPE 409 or equivalent as a prerequisite)

HPE 720	Curriculum Development in Physical Education

SMGT 760	Sport Law

Total Credit Hours	30

* The hours for the internship and electives are variable depending on the student's interest for elective options and availability of internship opportunities. Passing the comprehensive exams is required for the internship option

** List of electives is not comprehensive. Prior approval from graduate advisor is required for other possible electives.

Additional Requirements

Continuance and Exit Requirements

Students must meet all requirements for continuance as outlined in the graduate continuance policy for the University. Students completing the program of study must:

- Have an overall grade point average of 3.0 or higher
- Have a grade point average of 3.0 or higher in the major
- Demonstrate writing proficiency
- Satisfy all course competencies
- Complete an internship, research problem, or thesis
- If doing an internship or research problem, also pass a comprehensive examination
- Have an exit interview with the program director
- File the necessary paperwork for graduation

Master of Science in Education Physical Education with a Concentration in Curriculum & Instruction (MSEd)

Student Recreation Center
757-683-3351

This program is designed to prepare students and practitioners for advanced study in the concepts, theories, research, and management of health and physical education programs. Course work (30 credit hours) is designed to develop students' abilities to understand, analyze, and conduct research in the field, and apply empirical data to improve practice and program

management. Within each concentration, there are thesis and non-thesis options.

Justin Haegele, PhD, Graduate Program Director
2009 Student Recreation Center
757-683-5338

Linked Program Information

There is a linked program available to qualified students under existing university policy to link the Bachelor of Science (Physical Education with a Major in PreK-12 Health and Physical Education) (<http://catalog.odu.edu/undergraduate/education/human-movement-studies-special-education/physical-education-prek-12-health-bs/>) undergraduate program with the Master of Science in Education (Physical Education with a Concentration in (p. 165)Curriculum & Instruction) (p. 167) graduate program. See program director for additional details.

Admission

Admission and Entrance Requirements

Applicants for the MSEd in Physical Education are required to submit credentials for consideration through the Office of Graduate Admissions at Old Dominion University. Students applying for admission with regular status must have:

- A completed online application via www.odu.edu/admission/graduate (<http://www.odu.edu/admission/graduate/>)
- A baccalaureate degree from a regionally-accredited institution or an equivalent degree from a foreign institution
- 2.8 cumulative GPA or higher (on a 4.0 scale) *
- 3.0 GPA or higher in the undergraduate major *
- A combined GRE score of 291 or higher (verbal and quantitative sections) *
- Personal essay (no more than two pages) addressing motivations to apply to program, career interests, and ability to complete graduate level work
- Three letters of recommendation (from former professors or employers)
- Current copy of résumé
- Transcripts from all prior postsecondary institutions
- Test of English as a Foreign Language (TOEFL) score of 550 on the paper-based test (or 79-80 on the iBT) for non-native English speakers

* Students who have a low GPA or a low GRE score may be considered for admission with provisional status.

* The program admissions committee will consider GRE waiver requests for high potential candidates by considering application elements that demonstrate the ability to take on the rigor of graduate level studies. A request for a waiver does not guarantee that a waiver will be granted.

Curriculum

Research Core

FOUN 611	Introduction to Research Methods in Education	3
or FOUN 612	Applied Research Methods in Education	
FOUN 722	Introduction to Applied Statistics and Data Analysis	3

Core Courses

HPE 718	Applied Learning and Coaching Theory	3
HPE 719	Planning and Administration in PE and Sport Programs	3
HPE 720	Curriculum Development in Physical Education	3
HPE 740	Motor Learning and Development	3
HPE 745	Assessment/Evaluation and Technology in Sport/PE	3

Thesis

HMS 698	Thesis	3
HMS 699	Thesis	3
Research Project Options *		
HPE 636	Research Problems in Health & Physical Education	3
Electives **		
Select one of the following:		3
EXSC 508	Nutrition for Fitness and Sport	
HPE 721	Motivational Issues in Sports	
PRTS 780	Youth Development in Recreation	
Total Credit Hours		33

* An additional Requirement of comprehensive exam based on core course requirements

** List is not comprehensive. Prior approval from graduate advisor is required for other possible electives.

Additional Requirements

Continuance and Exit Requirements

Students must meet all requirements for continuance as outlined in the graduate continuance policy for the University. Students completing the program of study must:

- Have an overall grade point average of 3.0 or higher
- Have a grade point average of 3.0 or higher in the major
- Demonstrate writing proficiency
- Satisfy all course competencies
- Complete an internship, research problem, or thesis
- If doing a research problem, also pass a comprehensive examination
- Students completing a thesis do not need to complete the comprehensive exam.
- Student completing a teaching internship, who also pass the praxis exam, do not need to complete the comprehensive exam.
- File the necessary paperwork for graduation

Master of Science in Education Physical Education with a Concentration in Initial Virginia Licensure in Health and Physical Education (MSEd)

Student Recreation Center
757-683-3351

Within each concentration, there are thesis and non-thesis options.

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Admission

Admission and Entrance Requirements

Applicants for the MSEd in Physical Education are required to submit credentials for consideration through the Office of Graduate Admissions at Old Dominion University. Students applying for admission with regular status must have:

- A completed online application via www.odu.edu/admission/graduate (<http://www.odu.edu/admission/graduate/>)
- A baccalaureate degree from a regionally-accredited institution or an equivalent degree from a foreign institution

- 2.8 cumulative GPA or higher (on a 4.0 scale) *
- 3.0 GPA or higher in the undergraduate major *
- A combined GRE score of 291 or higher (verbal and quantitative sections) *
- Personal essay (no more than two pages) addressing motivations to apply to program, career interests, and ability to complete graduate level work
- Three letters of recommendation (from former professors or employers)
- Current copy of résumé
- Transcripts from all prior postsecondary institutions
- Test of English as a Foreign Language (TOEFL) score of 550 on the paper-based test (or 79-80 on the iBT) for non-native English speakers
- * Students who have a low GPA or a low GRE score may be considered for admission with provisional status.

* The program admissions committee will consider GRE waiver requests for high potential candidates by considering application elements that demonstrate the ability to take on the rigor of graduate level studies. A request for a waiver does not guarantee that a waiver will be granted.

Curriculum

Specific requirements for the program are as follows (33 total graduate credits with additional credits up to 54 as needed to satisfy Virginia licensure requirements):

Prerequisites for VA Teaching Licensure

BIOL 105N	Biology for Nonscience Majors I
BIOL 250 or BIOL 240	Human Anatomy and Physiology I Fundamentals of Anatomy and Physiology I
EXSC 322	Anatomical Kinesiology
HPE 200	Foundations of Education, Physical Education and Health
HPE 220	Teaching of Team Sports
HPE 222	Teaching Individual Sports and Dance
HPE 324	Teaching Injury Care for Sports
HPE 480	Teacher Candidate Seminar
TLED 408	Reading and Writing in Content Areas
HPE 469	Practicum Experience and Instructional Planning in Health and Physical Education (^)

^Field Observation and/or teaching experience required

Master Level Core Course Requirements

HPE 719	Planning and Administration in PE and Sport Programs	3
HPE 720	Curriculum Development in Physical Education	3
HPE 740	Motor Learning and Development	3
HPE 745	Assessment/Evaluation and Technology in Sport/PE	3

VA Teaching Licensure Requirements

HPE 402	Methods and Materials in Health Education	3
HPE 430	Nutrition and Fitness Education	3
HPE 504	Adapted Physical Education	3
HPE 509	Exercise Physiology	3

Research Foundation

FOUN 611 or FOUN 612	Introduction to Research Methods in Education Applied Research Methods in Education	3
FOUN 722	Introduction to Applied Statistics and Data Analysis	3

Internship Requirements

HPE 668	Internship in Health & Physical Education	6

Electives when needed (advisor approval required)

HPE 636	Research Problems in Health & Physical Education	3
or HPE 721	Motivational Issues in Sports	
Total Credit Hours		39

Additional Requirements

Continuance and Exit Requirements

Students must meet all requirements for continuance as outlined in the graduate continuance policy for the University. Students completing the program of study must:

- Have an overall grade point average of 3.0 or higher
- Have a grade point average of 3.0 or higher in the major
- Demonstrate writing proficiency
- Satisfy all course competencies
- Complete a teaching internship.
- Students in the licensure path must pass the Praxis exam and complete the teaching internship as their culminating experience/comprehensive examination
- File the necessary paperwork for graduation

Additional Information and Requirements

- Passing score on PRAXIS II Test of Content Knowledge must be on file in the Office of Clinical Experiences before the teacher candidate internship can begin.
- With approval from the graduate advisor, the licensure requirements may be fulfilled by equivalent undergraduate courses where applicable.
- Certificate of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training must be on file with the Office of Clinical Experiences.

** Background check clearance required for teaching licensure admission: <https://www.odu.edu/success/academic/teacher-education/placement/background-checks> (<https://www.odu.edu/success/academic/teacher-education/placement/background-checks/>).

Master of Science in Education Special Education with a Concentration in Early Childhood Special Education (MSEd)

Master of Science in Education, Special Education

Anne M. Perrotti, PhD, CCC-SLP, Graduate Program Director

122 Child Study Center

The Master of Science in Education, major in Special Education, has three endorsement specific concentrations for those who seek both an advanced degree in special education and either initial teacher licensure or endorsement in special education. The special education graduate program is guided by a philosophy of service and education as a catalyst to promote awareness, understanding, and acceptance of individuals with disabilities. The course work focuses on improving the quality and scope of educational and related services available to individuals with disabilities from infancy to adulthood. *The Master of Science in Education, Special Education, Initial Licensure is offered on-line only.* For more information regarding the other programs listed below, please contact the department.

Note to students in Washington State from the Student Achievement Council (SAC) concerning the Master of Science in Education-Special Education: Eligibility for initial educator certification in Washington is based on completion of a state approved educator preparation program. This

program is approved in Virginia and is authorized for field placements in Washington by the Professional Educators Standards Board. Even though you may be residing in Washington while in this program, your application for educator certification in Washington will be processed as an out-of-state application. Go to <http://pathway.pesb.wa.gov/archive/outofstate> (<http://pathway.pesb.wa.gov/archive/outofstate/>) for more information. Teachers are advised to contact their individual school districts as to whether or not this program may qualify for teacher advancement.

Master of Science in Education, Special Education - General Curriculum K-12, Adapted Curriculum K-12, or Early Childhood Special Education Concentrations

The master's degree program with special education licensure prepares teachers and agency personnel to design and implement programs for individuals with disabilities in a variety of settings. This program can be completed in approximately two years and enrolled students will specify a special education concentration in General Curriculum K-12, Adapted Curriculum K-12, or Early Childhood Special Education (Birth to 5). In addition to meeting the Master of Science in Education degree requirements, this program targets the coursework required to satisfy the Virginia Department of Education (VDOE) special educator licensure endorsement competencies. Due to changing national accreditation standards and state licensure regulations (i.e. assessments, certifications), the programs in teacher education, including special education, are under constant revision. Any student pursuing Virginia licensure should speak with their Graduate Program Director regarding requirements.

Graduates are prepared to work effectively with children, adolescents, and adults who require special education services. Classroom instruction is supplemented by field experiences with children, adolescents, and adults in a variety of settings. Teacher interns have been placed in children's hospitals, special education classes in public and private facilities, regional education programs, residential psychiatric hospitals, mental health centers, and community agencies.

Graduates in special education serve as key members of child study teams and are prepared to address educational, emotional, and physical disabilities. They also find employment as educational therapists, psycho-educational diagnosticians, and special education teachers and staff members in public and private schools.

Linked Program Information

There is a linked program available to qualified students under existing university policy to link the Bachelor of Science (Special Education with a Major in Special Education Adapted Curriculum K-12) (<http://catalog.odu.edu/undergraduate/education/human-movement-studies-special-education/special-education-adapted-curriculum-k12-bs/>) or Bachelor of Science (Special Education with a Major in Special Education General Curriculum K-12) (<http://catalog.odu.edu/undergraduate/education/human-movement-studies-special-education/special-education-general-curriculum-k12-bs/>) undergraduate program with the Master of Science in Education (Special Education with a Concentration in Early Childhood Special Education (p. 169)) graduate program. See program director for additional details.

Admission

Admission to the graduate program in special education is granted by the department's graduate program director in conjunction with special education faculty. The following requirements are necessary for admission to the master's degree program.

Regular Admittance Requirements

1. a baccalaureate degree from a regionally accredited institution;
2. an undergraduate grade point average of 2.80 or better in an academic content area; and

3. a 400-500 word goal statement indicating why the student wishes to enroll in the special education program.

Provisional Admittance Requirements

Provisional admittance may be offered to students with marginal grades. In this case, provisional admittance requires:

1. a baccalaureate degree from a regionally accredited institution;
2. an undergraduate grade point average of 2.70 or better in an academic content area; and
3. a 400-500 word goal statement indicating why the student wishes to enroll in the special education program.

Curriculum Requirements

Special Education, Licensure - Early Childhood Special Education Endorsement

The early childhood special education program is designed to prepare students to teach children from birth to age five who manifest disabilities or who are at risk of later school failure. Students endorsed in the area of early childhood special education will be eligible to teach in infant and preschool programs in both public and private settings. The program combines course work, supervised practica and internship to facilitate the integration of theory and practice in the development of evidence-based interventions applicable for infants and young children. Program practica and internship allow students opportunities to apply management, instructional and problem-solving skills in one-to-one and group settings. Students following the early childhood special education endorsement will take the prerequisite, core, and early childhood special education course blocks and teacher candidate internship.

Curriculum

Prerequisite Courses (or Undergraduate Minor or BS in special education)

SPED 313	Fundamentals of Human Growth and Development: Birth through Adolescence

Required Graduate Courses: Special Education Core

SPED 620	Advanced Foundations of Special Education: Legal Aspects and Characteristics	3
SPED 615	Advanced Classroom and Behavior Management Techniques for Students with Diverse Needs	3
SPED 623	Adv Instructional Design II: Curriculum Procedures and Individualized Education Planning	3
SPED 622	Advanced Collaboration and Transitions	3
SPED 626	Advanced Procedures in Reading and Writing for Students with Diverse Learning Needs	3

Early Childhood Special Education Core:

SPED 504	Characteristics and Medical Aspects of Disabling Conditions	3
SPED 541	Teaching Students with Severe Physical and Sensorimotor Disabilities *	3
SPED 569	Communication/Language Development/ Intervention for Students with Significant Disabilities	3
SPED 560	Teaching Preschoolers With Diverse Abilities *	3
SPED 561	Developmental Assessment of Young Children with Diverse Abilities *	3
SPED 567	Family-Centered Practices in Early Childhood Intervention *	3

Teacher Candidate Internship ***		3
SPED 686	Teacher Candidate Internship for Special Endorsement	

or SPED 669 Directed Field Internship Special Education, PreK-12

Total Credit Hours **36**

- * Requires a 45-hour practicum
- ** Requires valid provisional, or renewable VDOE-issued teaching license
- *** Please talk with your Graduate Program Director regarding your internship requirements to complete the degree.

Additional Requirements

Fast Track Teacher Preparation Admission Policy

Please refer to the appropriate section in the undergraduate catalog.

Continuance

Students must:

1. complete the Pre-Task Rating Form at time of admission;
2. complete the CITI Responsible Conduct of Research, Social and Behavioral Research training modules. See the Responsible Conduct of Research site (<https://www.odu.edu/impact/responsible-conduct-of-training/>) for more information;
3. maintain a grade point average of 3.00;
4. achieve a grade of B or better in all field experience practicum coursework and a grade of B- or better in all additional course work; and
5. successfully complete all competencies relative to their area(s) of emphasis.

Exit

Program exit entails successful completion of both master's degree requirements and teacher licensure competencies. Students must:

1. maintain a grade point average of 3.00, achieve a grade of B or better in all field experience practicum coursework, and achieve a grade of B- or better in all additional course work;
2. obtain passing scores on the PRAXIS Special Education Core Knowledge and Applications assessment (Test Code 5354)**
3. successfully complete either SPED 686: Teacher Candidate Internship or SPED 669: Directed Field Internship in Special Education*
4. obtain passing scores on the Praxis Teaching Reading: Elementary assessment (Test Code 5205) (Special Education General Curriculum K-12 only)**
5. obtain certificate of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.**
6. complete a Graduate Student Assessment;
7. complete the Post Task Rating Form

*Student must hold a valid provisional, or renewable teaching license in special education from the Virginia Department of Education (VDOE) to be eligible for SPED 669.

**Due to changing national accreditation standards and VDOE licensure regulations, the special education program requirements are frequently revised. Any changes resulting from these factors supersede the program requirements described in the catalog. Students should verify current program exit requirements with the appropriate Graduate Program Director and/or program coordinator/academic advisor.

Program Requirements

Successful completion of the master's degree requires a minimum of 30 to 33 semester hours of graduate study in special education. For all

students who have successfully (C-grade or better) completed undergraduate coursework in special education, the graduate program director will review course content to determine if Virginia Department of Education teacher endorsement competencies were satisfied by previous course completion. Course(s) in special education taken at the undergraduate level that satisfy Virginia Department of Education competencies for licensure may be substituted for coursework required in the master's degree program; however, the undergraduate credit does not count as transfer graduate credit. Students enrolled in a teacher preparation program are expected to demonstrate dedication to special education students through the effective use of differentiated strategies for assessment and planning and application of evidence-based practices. Furthermore, student are expected to demonstrate behaviors indicative of effective, professional educators and reflected in the program's technical standards and professional dispositions policy.

Master of Science in Education Special Education with a Concentration in K-12 Licensure - Adapted Curriculum - K-12 (MSEd)

Master of Science in Education, Special Education

Anne M. Perrotti, PhD, CCC-SLP, Graduate Program Director

122 Child Study Center

The Master of Science in Education, major in Special Education, has three endorsement specific concentrations for those who seek both an advanced degree in special education and either initial teacher licensure or endorsement in special education. The special education graduate program is guided by a philosophy of service and education as a catalyst to promote awareness, understanding, and acceptance of individuals with disabilities. The course work focuses on improving the quality and scope of educational and related services available to individuals with disabilities from infancy to adulthood. *The Master of Science in Education, Special Education, Initial Licensure is offered on-line only.* For more information regarding the other programs listed below, please contact the department.

Note to students in Washington State from the Student Achievement Council (SAC) concerning the Master of Science in Education-Special Education: Eligibility for initial educator certification in Washington is based on completion of a state approved educator preparation program. This program is approved in Virginia and is authorized for field placements in Washington by the Professional Educators Standards Board. Even though you may be residing in Washington while in this program, your application for educator certification in Washington will be processed as an out-of-state application. Go to <http://pathway.pesb.wa.gov/archive/outofstate> (<http://pathway.pesb.wa.gov/archive/outofstate/>) for more information. Teachers are advised to contact their individual school districts as to whether or not this program may qualify for teacher advancement.

Master of Science in Education, Special Education - General Curriculum K-12, Adapted Curriculum K-12, or Early Childhood Special Education Concentrations

The master's degree program with special education licensure prepares teachers and agency personnel to design and implement programs for individuals with disabilities in a variety of settings. This program can be completed in approximately two years and enrolled students will specify a special education concentration in General Curriculum K-12, Adapted Curriculum K-12, or Early Childhood Special Education (Birth to 5). In addition to meeting the Master of Science in Education degree

requirements, this program targets the coursework required to satisfy the Virginia Department of Education (VDOE) special educator licensure endorsement competencies. Due to changing national accreditation standards and state licensure regulations (i.e. assessments, certifications), the programs in teacher education are under constant revision. Any student pursuing Virginia licensure should speak with their Graduate Program Director regarding requirements.

Graduates are prepared to work effectively with children, adolescents, and adults who require special educational services. Classroom instruction is supplemented by field experiences with children, adolescents, and adults in a variety of settings. Teacher interns have been placed in children's hospitals, special education classes in public and private facilities, regional education programs, residential psychiatric hospitals, mental health centers, and community agencies.

Graduates in special education serve as key members of child study teams and are prepared to address educational, emotional, and physical disabilities. They also find employment as educational therapists, psycho-educational diagnosticians, and special education teachers and staff members in public and private schools.

Linked Program Information

There is a linked program available to qualified students under existing university policy to link the Bachelor of Science (Special Education with a Major in Special Education General Curriculum K-12) (<http://catalog.odu.edu/undergraduate/education/human-movement-studies-special-education/special-education-general-curriculum-k12-bs/>) or Bachelor of Science (Special Education with a Major in Early Intervention/ Early Childhood Special Education Birth-5) (<http://catalog.odu.edu/undergraduate/education/human-movement-studies-special-education/special-education-early-intervention-early-childhood-special-education-birth-5-bs/>) undergraduate program with the Master of Science in Education (Special Education with a Concentration in K-12 Licensure-Adapted Curriculum-K-12) (p. 171) graduate program. See program director for additional details.

Admission

Admission to the graduate program in special education is granted by the department's graduate program director in conjunction with special education faculty. The following requirements are necessary for admission to the master's degree program.

Regular Admittance Requirements

1. a baccalaureate degree from a regionally accredited institution;
2. an undergraduate grade point average of 2.80 or better in an academic content area; and
3. a 400-500 word goal statement indicating why the student wishes to enroll in the special education program.

Provisional Admittance Requirements

Provisional admittance may be offered to students with marginal grades. In this case, provisional admittance requires:

1. a baccalaureate degree from a regionally accredited institution;
2. an undergraduate grade point average of 2.70 or better in an academic content area; and
3. a 400-500 word goal statement indicating why the student wishes to enroll in the special education program.

Curriculum Requirements

Special Education, Licensure - Adapted Curriculum K - 12 Endorsement

The adapted curriculum program is designed to prepare teachers to instruct individuals traditionally labeled with multiple, moderate, severe, or profound disabilities who are accessing an alternative academic curriculum. Individuals accessing the adapted curriculum may have disabling conditions such as cerebral palsy, autism, or a sensory impairment. The program

combines course work, supervised practica and internship to facilitate the integration of theory and practice in the development of evidence-based interventions applicable for individuals with special needs from preschool through adult in both public and private facilities. Program competencies prepare students to work in school-based programs in a variety of settings, including residential and hospitals settings. Program practica and internship allow students opportunities to apply management, instructional and problem-solving skills in one-to-one and group settings. Students wishing to be endorsed in special education: adapted curriculum will take the prerequisite, core, and adapted curriculum course blocks and teacher candidate internship.

Curriculum

Prerequisite Courses (or Undergraduate Minor or BS in special education)

SPED 313	Fundamentals of Human Growth and Development: Birth through Adolescence	

Required Graduate Courses: Special Education Core

SPED 620	Advanced Foundations of Special Education: Legal Aspects and Characteristics	3
SPED 615	Advanced Classroom and Behavior Management Techniques for Students with Diverse Needs	3
SPED 623	Adv Instructional Design II: Curriculum Procedures and Individualized Education Planning	3
SPED 622	Advanced Collaboration and Transitions	3
SPED 626	Advanced Procedures in Reading and Writing for Students with Diverse Learning Needs	3

Required Courses: Adapted Curriculum Core

SPED 504	Characteristics and Medical Aspects of Disabling Conditions	3
SPED 528	Instructional Strategies for Students Accessing the Adapted Curriculum *	3
SPED 541	Teaching Students with Severe Physical and Sensorimotor Disabilities *	3
SPED 569	Communication/Language Development/ Intervention for Students with Significant Disabilities	3
SPED 618	Advanced Instructional Design I: Learner Characteristics and Assessment	3

Teacher Candidate Internship ***

SPED 686	Teacher Candidate Internship for Special Endorsement	3
or SPED 669	Directed Field Internship Special Education, PreK-12	

Total Credit Hours **33**

* Requires a 45-hour practicum

** Requires valid provisional, or renewable VDOE-issued teaching license

*** Please talk with your Graduate Program Director regarding your internship requirements to complete the degree.

Due to changing national accreditation standards and state licensure regulations (i.e. assessments, certifications), teacher preparation programs in the Darden College of Education and Professional Studies are under constant revision. Any changes resulting from these factors supersede the program requirements described in the catalog. Students are encouraged to obtain current program information from their advisors and the Darden College of Education and Professional Studies website at <http://www.odu.edu/education> (<http://www.odu.edu/education/>).

Additional Requirements

Fast Track Teacher Preparation Admission Policy

Please refer to the appropriate section in the undergraduate catalog.

Continuance

Students must:

1. complete the Pre-Task Rating Form at time of admission;
2. complete the CITI Responsible Conduct of Research, Social and Behavioral Research training modules. See the Responsible Conduct of Research site (<https://www.odu.edu/impact/responsible-conduct-of-training/>) for more information;
3. maintain a grade point average of 3.00;
4. achieve a grade of B or better in all field experience practicum coursework and a grade of B- or better in all additional course work; and
5. successfully complete all competencies relative to their area(s) of emphasis.

Exit

Program exit entails successful completion of both master's degree requirements and teacher licensure competencies. Students must:

1. maintain a grade point average of 3.00, achieve a grade of B or better in all field experience practicum coursework, and achieve a grade of B- or better in all additional course work;
2. obtain passing scores on the PRAXIS Special Education Core Knowledge and Applications assessment (Test Code 5354)**
3. successfully complete either SPED 686: Teacher Candidate Internship or SPED 669: Directed Field Internship in Special Education*
4. obtain passing scores on the Praxis Teaching Reading: Elementary assessment (Test Code 5205) (Special Education General Curriculum K-12 only)**
5. obtain certificate of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.**
6. complete a Graduate Student Assessment;
7. complete the Post Task Rating Form

*Student must hold a valid provisional, or renewable teaching license in special education from the Virginia Department of Education (VDOE) to be eligible for SPED 669.

**Due to changing national accreditation standards and VDOE licensure regulations, the special education program requirements are frequently revised. Any changes resulting from these factors supersede the program requirements described in the catalog. Students should verify current program exit requirements with the appropriate Graduate Program Director and/or program coordinator/academic advisor.

Program Requirements

Successful completion of the master's degree requires a minimum of 30 to 33 semester hours of graduate study in special education. For all students who have successfully (C-grade or better) completed undergraduate coursework in special education, the graduate program director will review course content to determine if Virginia Department of Education teacher endorsement competencies were satisfied by previous course completion. Course(s) in special education taken at the undergraduate level that satisfy Virginia Department of Education competencies for licensure may be substituted for coursework required in the master's degree program; however, the undergraduate credit does not count as transfer graduate credit. Students enrolled in a teacher preparation program are expected to demonstrate dedication to special education students through the effective use of differentiated strategies for assessment and planning and

application of evidence-based practices. Furthermore, students are expected to demonstrate behaviors indicative of effective, professional educators and reflected in the program's technical standards and professional dispositions policy.

Master of Science in Education Special Education with a Concentration in K-12 Licensure - General Curriculum - K-12 (MSEd)

Master of Science in Education, Special Education

Anne M. Perrotti, PhD, CCC-SLP, Graduate Program Director

122 Child Study Center

The Master of Science in Education, major in Special Education, has three endorsement specific concentrations for those who seek both an advanced degree in special education and either initial teacher licensure or endorsement in special education. The special education graduate program is guided by a philosophy of service and education as a catalyst to promote awareness, understanding, and acceptance of individuals with disabilities. The course work focuses on improving the quality and scope of educational and related services available to individuals with disabilities from infancy to adulthood. *The Master of Science in Education, Special Education, Initial Licensure is offered on-line only.* For more information regarding the other programs listed below, please contact the department.

Note to students in Washington State from the Student Achievement Council (SAC) concerning the Master of Science in Education-Special Education: Eligibility for initial educator certification in Washington is based on completion of a state approved educator preparation program. This program is approved in Virginia and is authorized for field placements in Washington by the Professional Educators Standards Board. Even though you may be residing in Washington while in this program, your application for educator certification in Washington will be processed as an out-of-state application. Go to <http://pathway.pesb.wa.gov/archive/outofstate> (<http://pathway.pesb.wa.gov/archive/outofstate/>) for more information. Teachers are advised to contact their individual school districts as to whether or not this program may qualify for teacher advancement.

Master of Science in Education, Special Education - General Curriculum K-12, Adapted Curriculum K-12, or Early Childhood Special Education Concentrations

The master's degree program with special education licensure prepares teachers and agency personnel to design and implement programs for individuals with disabilities in a variety of settings. This program can be completed in approximately two years and enrolled students will specify a special education concentration in General Curriculum K-12, Adapted Curriculum K-12, or Early Childhood Special Education (Birth to 5). In addition to meeting the Master of Science in Education degree requirements, this program targets the coursework required to satisfy the Virginia Department of Education (VDOE) special educator licensure endorsement competencies. Due to changing national accreditation standards and state licensure regulations (i.e. assessments, certifications), the programs in teacher education are under constant revision. Any student pursuing Virginia licensure should speak with their Graduate Program Director regarding requirements.

Graduates are prepared to work effectively with children, adolescents, and adults who require special educational services. Classroom instruction is supplemented by field experiences with children, adolescents, and adults in a variety of settings. Teacher interns have been placed in children's hospitals, special education classes in public and private facilities, regional

education programs, residential psychiatric hospitals, mental health centers, and community agencies.

Graduates in special education serve as key members of child study teams and are prepared to address educational, emotional, and physical disabilities. They also find employment as educational therapists, psycho-educational diagnosticians, and special education teachers and staff members in public and private schools.

Linked Program Information

There is a linked program available to qualified students under existing university policy to link the Bachelor of Science (Special Education with a Major in Special Education Adapted Curriculum K-12) (<http://catalog.odu.edu/undergraduate/education/human-movement-studies-special-education/special-education-adapted-curriculum-k12-bs/>) or or Bachelor of Science (Special Education with a Major in Early Intervention/ Early Childhood Special Education Birth-5) (<http://catalog.odu.edu/undergraduate/education/human-movement-studies-special-education/special-education-early-intervention-early-childhood-special-education-birth-5-bs/>) undergraduate program with the Master of Science in Education (Special Education with a Concentration in K-12 Licensure-General Curriculum-K-12) (p. 173) graduate program. See program director for additional details.

Admission

Admission to the graduate program in special education is granted by the department's graduate program director in conjunction with special education faculty. The following requirements are necessary for admission to the master's degree program.

Regular Admittance Requirements

1. a baccalaureate degree from a regionally accredited institution;
2. an undergraduate grade point average of 2.80 or better in an academic content area; and
3. a 400-500 word goal statement indicating why the student wishes to enroll in the special education program.

Provisional Admittance Requirements

Provisional admittance may be offered to students with marginal grades. In this case, provisional admittance requires:

1. a baccalaureate degree from a regionally accredited institution;
2. an undergraduate grade point average of 2.70 or better in an academic content area; and
3. a 400-500 word goal statement indicating why the student wishes to enroll in the special education program.

Curriculum Requirements

Special Education, Licensure – General Curriculum K-12 Endorsement

This program is designed to prepare professionals who are able to design and to implement appropriate educational programs for students who manifest mild disabilities and participate in the general academic curriculum. The program combines course work, supervised practica and internship to facilitate the integration of theory and practice in the development of evidence-based interventions applicable for individuals with special needs from preschool through adult in both public and private facilities. Program competencies prepare students to work in school-based programs in a variety of settings, including residential and hospitals settings. Program practica and internship allow students opportunities to apply management, instructional and problem-solving skills in one-to-one and group settings.

Note to students in Washington State from the Student Achievement Council (SAC) concerning the Master of Science in Education (Special Education - General Curriculum K-12): Eligibility for initial educator certification in Washington is based on completion of a state approved educator preparation program. This program is approved in Virginia and is authorized for field placements in Washington by the Professional Educators Standards Board.

Even though you may be residing in Washington while in this program, your application for educator certification in Washington will be processed as an out-of-state application. Go to <http://pathway.pesb.wa.gov/archive/outofstate/> for more information. Teachers are advised to contact their individual school districts as to whether or not this program may qualify for teacher advancement.

Curriculum

Prerequisite Courses (or Undergraduate Minor or BS in special education)

SPED 313	Fundamentals of Human Growth and Development: Birth through Adolescence	

Required Courses: Special Education Core

SPED 620	Advanced Foundations of Special Education: Legal Aspects and Characteristics	3
SPED 615	Advanced Classroom and Behavior Management Techniques for Students with Diverse Needs	3
SPED 623	Adv Instructional Design II: Curriculum Procedures and Individualized Education Planning	3
SPED 622	Advanced Collaboration and Transitions	3
SPED 626	Advanced Procedures in Reading and Writing for Students with Diverse Learning Needs	3

Required Courses: General Curriculum Core

SPED 518	Instructional Strategies to Meet Diverse Learning Needs in Math	3
TLED 568	Language Acquisition and Reading for Students with Diverse Learning Needs	3
SPED 610	Characteristics of Students Accessing the General Curriculum	3
SPED 611	Instructional Strategies for Students Accessing the General Education Curriculum *	3
SPED 618	Advanced Instructional Design I: Learner Characteristics and Assessment	3

Teacher Candidate Internship *** 3

SPED 686	Teacher Candidate Internship for Special Endorsement	
or SPED 669	Directed Field Internship Special Education, PreK-12	

Total Credit Hours 33

* Requires a practicum of 45 hours

** Requires valid provisional, or renewable VDOE-issued teaching license

*** Please talk with your Graduate Program Director regarding your internship requirements to complete the degree.

Additional Requirements

Fast Track Teacher Preparation Admission Policy

Please refer to the appropriate section in the undergraduate catalog.

Continuance

Students must:

1. complete the Pre-Task Rating Form at time of admission;
2. complete the CITI Responsible Conduct of Research, Social and Behavioral Research training modules. See the Responsible Conduct of Research site (<https://www.odu.edu/impact/responsible-conduct-of-training/>) for more information;
3. maintain a grade point average of 3.00;

4. achieve a grade of B or better in all field experience practicum coursework and a grade of B- or better in all additional course work; and
5. successfully complete all competencies relative to their area(s) of emphasis.

Exit

Program exit entails successful completion of both master's degree requirements and teacher licensure competencies. Students must:

1. maintain a grade point average of 3.00, achieve a grade of B or better in all field experience practicum coursework, and achieve a grade of B- or better in all additional course work;
2. obtain passing scores on the PRAXIS Special Education Core Knowledge and Applications assessment (Test Code 5354)**
3. successfully complete either SPED 686: Teacher Candidate Internship or SPED 669: Directed Field Internship in Special Education*
4. obtain passing scores on the Praxis Teaching Reading: Elementary assessment (Test Code 5205) (Special Education General Curriculum K-12 only)**
5. obtain certificate of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.**
6. complete a Graduate Student Assessment;
7. complete the Post Task Rating Form

*Student must hold a valid provisional, or renewable teaching license in special education from the Virginia Department of Education (VDOE) to be eligible for SPED 669.

**Due to changing national accreditation standards and VDOE licensure regulations, the special education program requirements are frequently revised. Any changes resulting from these factors supersede the program requirements described in the catalog. Students should verify current program exit requirements with the appropriate Graduate Program Director and/or program coordinator/academic advisor.

Program Requirements

Successful completion of the master's degree requires a minimum of 30 to 33 semester hours of graduate study in special education. For all students who have successfully (C-grade or better) completed undergraduate coursework in special education, the graduate program director will review course content to determine if Virginia Department of Education teacher endorsement competencies were satisfied by previous course completion. Course(s) in special education taken at the undergraduate level that satisfy Virginia Department of Education competencies for licensure may be substituted for coursework required in the master's degree program; however, the undergraduate credit does not count as transfer graduate credit. Students enrolled in a teacher preparation program are expected to demonstrate dedication to special education students through the effective use of differentiated strategies for assessment and planning and application of evidence-based practices. Furthermore, student are expected to demonstrate behaviors indicative of effective, professional educators and reflected in the program's technical standards and professional dispositions policy.

Doctor of Philosophy Education with a Concentration in Special Education (PhD)

Laura Chezan, PhD Program Coordinator

The Doctor of Philosophy is the degree most often desired for those who wish to become faculty in colleges and universities and those who aspire to senior administrative roles in institutions and agencies. The PhD in

education with a concentration in special education is intended to prepare individuals for administrative and faculty positions and to provide students with the skills to carry out scholarly research, lead organizations, and create new research.

The PhD in education with a concentration in special education is designed to address the acute shortage of doctoral level special education personnel in the Commonwealth and across the nation. Program graduates will be prepared as content experts in pre-referral intervention and early intervention to assume positions of leadership as special education faculty at the university and college level. Additionally, graduates of the special education program will have the professional research skills to work with school systems to address the diverse learning needs and behavior challenges associated with the education of students with special needs and those students at risk. Program graduates will attain a degree of proficiency in research and writing that will prepare them to make contributions to the professional literature of special education and related disciplines.

The curriculum described below contains elements that will provide research expertise, administrative skills and experience, and the ability to serve the nation's colleges, universities, and agencies providing special education services.

Admissions

Entrance Criteria

In order to be considered for admission into the Old Dominion University PhD in Education: Special Education Concentration program (special education PhD program) a candidate must include the following information in the application:

1. Proof of a completed master's degree in special education or an equivalent degree in a related discipline from a program that is accredited by an appropriate specialized accrediting agency or from a regionally accredited institution of higher education. Transcripts from universities outside the United States must be accompanied by a global credit evaluation from an accredited agency. A minimum grade point average (GPA) of 3.60 (on a 4.0 scale) overall for the master's degree and in the major area of study in the master's degree is expected;
2. Acceptable scores on the Graduate Record Examination (GRE): 156 [550] on the verbal portion and no less than a 4.5 on the writing sample. Applicants whose first language is not English must submit a current score for the Test of English as a Foreign Language (TOEFL) according to the standards established by Old Dominion University;
3. A minimum of three years teaching experience in a pre-K – 12 setting with students with disabilities;
4. A 500-800-word statement of academic and professional goals. This statement must describe the applicant's research agenda to meet his/her academic and professional goals;
5. A professional curriculum vitae;
6. Three letters of reference from individuals capable of commenting on the applicant's readiness for advanced graduate study. At least two of these letters must be from academic sources. If a non-academic letter of reference is necessary, it should be from a professional source; and
7. Evidence of prior course work in statistics and in theories of learning. If this requirement is not met, a student may be admitted, and additional course work will be added to the candidate's program of study.

Admissions Process

Admission to the special education PhD program occurs during the spring semester to ensure a fall semester start. Admission to the program is competitive, with the number of applications expected to exceed the number of available openings. In order to enhance the experience of the students and to increase the efficiency by which courses are offered, a cohort of 10 students will be admitted each year. This limited number of students is necessary to ensure that there is an adequate number of full-time faculty to serve the students through advising and other duties, particularly when the cohorts reach the dissertation stage of the program. Applicants must submit

the application package, including the online graduate student application and all related materials no later than February 1 of the admission cycle year.

Once the application deadline has passed, complete application packages will be initially reviewed by the special education PhD program admissions committee. Following the preliminary review of complete applications, the admissions committee will invite eligible applicants to participate in a two-part interview, including a formal interview with the special education PhD program faculty and a one-hour, proctored spontaneous writing session during which applicants will compose a spontaneous response to a question regarding special education policy and procedure in the United States.

Curriculum Requirements

Program Requirements

The PhD in education with a concentration in special education is comprised of courses totaling a minimum of 60 academic credit hours beyond the master's degree. The curriculum includes a content concentration totaling 24 credit hours, an introductory core of nine hours, a research component including 15 credit hours, and the dissertation, which will include a minimum of 12 hours. The dissertation will often include more than 12 credit hours depending on the length of time necessary for completion. Students entering the program may also need to complete one introductory statistics course if they have not had such a course or cannot demonstrate competency at a satisfactory level. Students who enter the PhD program with a master's degree in an academic field that is unrelated to special education and/or who have not completed courses to develop competency in specified areas may need to complete additional prerequisite course work.

Prerequisite Course work		3
FOUN 722	Introduction to Applied Statistics and Data Analysis	
Speciality Core		15
SPED 803	Scholarly Writing for Doctoral Students	
SPED 820	Curriculum and Instruction: Research Into Practice	
SPED 821	Critical Issues I: Readings in Special Education and Professional Writing	
SPED 822	Critical Issues II: Research and Professional Writing	
SPED 893	Professional Seminar: Teaching, Research, and Service	
Research Core		15
FOUN 822	Applied Linear Models in Educational Research	
FOUN 812	Research Design and Analysis	
FOUN 813	Program Evaluation in Education	
TLCI 814	Qualitative Research Design in Education	
SPED 830	Single Subject Research	
Special Education Concentration		12
SPED 802	Cognitive Processes and Learning Strategies for Students with Special Needs	
SPED 807	Advanced Instructional Procedures in Special Education	
SPED 897	Independent Study: Teaching in Special Education	
SPED 868	Internship: Research in Special Education	
Electives *		6
Candidacy Examination		
Written Candidacy Examination		
Oral Candidacy Examination		
Dissertation		
SPED 899	Dissertation	12
Total Credit Hours		63

- * Students must take 6 credit hours as electives with approval of the Graduate Program Director or PhD Coordinator. The electives must be graduate courses at the 700 or 800 level. Electives may be taken in other areas in the College of Education (e.g., educational leadership, higher education, instructional design and technology) or in other colleges with the approval of the appropriate college official.

Due to changing University requirements, national accreditation standards, and Commonwealth licensure regulations, the programs in the Darden College of Education and Professional Studies are under constant revision. Any changes resulting from these factors supersede the program requirements described in the catalog. Students are encouraged to obtain current program information from their advisors and the Darden College of Education and Professional Studies website at <http://www.odu.edu/education> (<http://www.odu.edu/education/>).

Additional Requirements

Continuance

Students must:

1. maintain a grade point average of 3.00 overall;
2. complete the CITI Responsible Conduct of Research training modules. See <https://www.odu.edu/impact/responsible-conduct-of-training> (<https://www.odu.edu/impact/responsible-conduct-of-training/>).
3. complete an annual continuance review;
4. complete a one-time written continuance evaluation; and
5. successfully complete all competencies relative to their program of study.

Exit

In order to complete the program, students must fully complete the curriculum below and all requirements noted elsewhere in the University catalog for graduate students and within the PhD in Education Handbook. It is the responsibility of the student to obtain these materials and comply with all requirements.

Practicum Experiences Policy

A student may participate in a course with a practicum experience if he/she has been admitted into an approved teacher education program. In addition, candidates must meet the GPA for their individual programs, professional education courses, and minimum grade requirements, along with any other course prerequisites.

Master of Science Sport Management (MS)

Lynn Ridinger, Ph.D., Graduate Program Director
2010 Student Recreation Center
757-683-4353

This program is designed to prepare students for leadership roles within the sport industry. Students are provided with theoretical and practical knowledge and skills to face opportunities and challenges associated with sport business careers. The curriculum is consistent with current principles and practices of academic and sport marketplace standards. This program is available on-campus and online.

Admission

Admission and Entrance Requirements

Applicants for the M.S. in Sport Management are required to submit credentials for consideration through the Office of Graduate Admissions at Old Dominion University. We have rolling admissions, but applicants who submit materials prior to March 1st for Fall admissions and prior to November 1st for Spring admissions will receive first

consideration. Students applying for admission with regular status must have:

- A completed online application submitted to the Office of Graduate Admissions or International Admissions.
 - Domestic students submit at: <https://www.odu.edu/admission/graduate> (<https://www.odu.edu/admission/graduate/>)
 - International students submit at: <https://www.odu.edu/admission/international> (<https://www.odu.edu/admission/international/>)
- A baccalaureate degree from a regionally-accredited institution or an equivalent degree from a foreign institution.
- 2.8 cumulative GPA or higher (on a 4.0 scale)*
- 3.0 GPA or higher in the undergraduate major*
- Personal essay (no more than two pages) addressing motivations to apply to program, career interests, and ability to complete graduate level work.
- Two letters of recommendation from former professors or employers.
- Current copy of resume.
- Transcripts from all prior post-secondary institutions.
- Test of English as a Foreign Language (TOEFL) score of at least 550 on the paper-based test (79 on the iBT) or 6.5 overall on the IELTS for non-native English speakers.
- A standardized test score (GRE, GMAT, or MAT) is optional, but may help demonstrate the ability to take on the rigor of graduate level studies. It is recommended if an applicant has an overall GPA lower than 3.0.

* Students who have a low GPA may be considered for admission with provisional status.

Curriculum

Sport Management Core Courses ⁺

SMGT 738	Sport Finance	3
SMGT 746	Strategic Marketing in Sport	3
SMGT 760	Sport Law	3
SMGT 775	Management and Leadership in Sport	3

Research Core ⁺

FOUN 611	Introduction to Research Methods in Education	3
or FOUN 612	Applied Research Methods in Education	
SMGT 580	Introduction to Sport Analytics	3

Capstone Experience ⁺

Select one of the following options:	6

Thesis Option:

SMGT 698	Thesis Research in Sport Management
SMGT 699	Thesis in Sport Management

Research Project Option: ⁺⁺

SMGT 636	Research Problems in Sport Management (plus one additional elective)

Internship Option: ⁺⁺

SMGT 668	Internship in Sport Management

Electives ^{*}

Select 9 credits from the following:	9

SMGT/HPE 515	Principles of Coaching Management
SMGT 560	Sport and Social Justice
SMGT 652	Facility Management for Sport, Recreation and Entertainment
SMGT 653	Sponsorship and Event Planning
SMGT 750	Ethics in Sport Management
SMGT 755	Social Issues in Sport
SMGT 785	Sport Entrepreneurship
SMGT 790	Applied Sport Analytics
COMM 562	Sport Communication

Concentration in Sport Analytics **

SMGT 580	Introduction to Sport Analytics	
CS/DASC 620	Introduction to Data Science and Analytics	
SMGT 790	Applied Sport Analytics	
Total Credit Hours		33

- + Required courses.
- ++ Denotes an additional requirement of comprehensive exam based on core course requirements.
- * List of electives is not comprehensive. Prior approval from graduate advisor is required for other possible electives.
- ** The Sport Analytics concentration is optional. It includes one required course (SMGT 580) and two of three electives.

Additional Requirements

Continuance and Exit Requirements

Students must meet all requirements for continuance as outlined in the graduate continuance policy for the University. Students completing the program must:

- Have an overall grade point average of 3.0 or higher.
- Have a grade point average of 3.0 or higher in the major.
- Demonstrate writing proficiency.
- Satisfy all course competencies.
- Complete an internship or research problem or thesis.
- If doing an internship or research problem, also pass a comprehensive examination.
- Complete exit survey.
- File the necessary paperwork for graduation.

Certificate Applied Behavior Analysis Certificate

Old Dominion University is pleased to offer the 5th Edition Verified Course Sequence (VCS) approved by the Association for Behavior Analysis International (ABAI). The 5th Edition VCS consists of 315 hours of coursework (21 graduate-level credits or 7 courses) for students taking the Board Certified Behavior Analyst (BCBA®) examination. Applicants will need to meet additional degree and experience requirements before they can be deemed eligible to take the examination.

The program's primary goal is to provide teachers and related-service providers with instruction in applied behavior analysis that will broaden the range of empirically-supported instructional methodologies used to meet the academic, social, and behavioral needs of a diverse student or client population. The program's secondary goal is to provide teachers and related-service providers with the educational and supervised fieldwork experience needed to sit for the national BCBA® examination.

In this program, the seven courses are offered in a combined distance learning and online format on a pre-determined schedule. An applicant must (a) have a master's degree from an accredited university or the equivalent from a foreign institution OR (b) be accepted into and currently pursuing a master's degree offered by an accredited university.

Successful completion of the ODU ABA certificate program, in addition to a supervised internship that meets the Behavior Analyst Certification Board (BACB) guidelines®, will allow the participant to apply for the national BCBA® examination. A student who successfully completes the 21-credit course sequence and does not complete the internship requirement may earn the ODU ABA Certificate, but is not eligible to sit for the national BCBA® examination.

Curriculum Requirements

Courses required to complete the ODU Applied Behavior Analysis Certificate Program include the following courses:

Required Courses

SPED 740	Concepts and Principles in Behavior Analysis	3
SPED 741	Research Methods in Behavior Analysis	3
SPED 742	Ethics in Behavior Analysis	3
SPED 743	Assessments and Interventions I: Positive Behavior Support	3
SPED 744	Theory and Philosophy in Behavior Analysis	3
SPED 745	Assessments and Interventions II: Verbal Behavior	3
SPED 746	Organizational Behavior Management	3

Optional Internship Hours

SPED 769	Supervised Fieldwork in Applied Behavior Analysis (Optional Internship Hours)	3

Total Credit Hours **24**

Certificate Adapted Physical Education Certificate

The Graduate Certificate in adapted physical education is designed for individuals who are practicing or planning to teach in school-based physical education settings. This certificate aims to meet the professional advancement needs of at least three populations:

- Existing student populations at ODU interested in acquiring requisite knowledge and skills to effectively teach children with disabilities in physical education. These are expected to include graduate students in each concentration area (i.e., coaching, curriculum & instruction, initial licensure, adapted physical education) of physical education, as well as others in different education-related areas. Graduate degree seeking students will be able to obtain the Certificate and degree simultaneously using the available four elective courses in their degree program.
- Currently practicing physical education teachers looking to further enhance their knowledge and skills in teaching students with disabilities in their classes.
- Non-degree seeking students seeking to enhance their employability in the physical education/ adapted physical education job acquisition search.

Admission

Degree seeking graduate-level students admitted to the certificate program must meet ODU requirements for graduate admission: an earned baccalaureate degree from a regionally-accredited institution or an equivalent degree from a foreign institution. Those whose native language is not English must submit a minimum score of 230 on the computer-based TOEFL or 80 on the TOEFL iBT.

Individuals not seeking graduate-level degrees admitted to the certificate program must have a completed baccalaureate degree (or equivalent).

Curriculum Requirements

The certificate requires four (4) three-hour courses for a total of twelve (12) credits. This includes three core courses and one elective course, as follows

Core Courses

HPE 504	Adapted Physical Education	3
HPE 704	Advanced Studies in Adapted Physical Education	3
HPE 740	Motor Learning and Development	3

Elective Courses

HPE 720	Curriculum Development in Physical Education	3
or HPE 745	Assessment/Evaluation and Technology in Sport/PE	

Total Credit Hours 12

Certificate

Autism Certificate

Old Dominion University is pleased to offer a 12-credit hour certificate program designed to prepare teachers and related service providers to effectively work and provide support for students with autism spectrum disorder (ASD). This coursework can be completed separately from, or integrated into, the Master's Degree in Special Education.

Curriculum Requirements

SPED 625	Characteristics of Students with Autism Spectrum Disorders	3
SPED 627	Instructional Strategies for Students with Autism Spectrum Disorders *	3
SPED 569	Communication/Language Development/ Intervention for Students with Significant Disabilities	3
SPED 621	Effective Interventions for Children and Youth with Challenging Behavior *	3

Total Credit Hours 12

* Requires practicum of 45 hours

Post-Baccalaureate Endorsement Early Childhood Special Education Post-Baccalaureate Endorsement Special Education Post-Baccalaureate Endorsement Program

TBA, Graduate Program Director
122 Child Study Center

Many students who already possess an undergraduate degree enter Old Dominion University for the sole purpose of meeting the Virginia Department of Education teaching licensure standards. The special education post-baccalaureate endorsement option is available for those students who wish to complete the coursework required for licensure in special education, but have no desire to complete a master's degree program or who do not meet the master's degree admission requirements. Individuals pursuing a post-baccalaureate endorsement program must first apply for admission to Old Dominion University as a non-degree seeking graduate student; however, admission to Old Dominion University does not guarantee admission into post-baccalaureate endorsement or teacher preparation programs in the Darden College of Education and Professional Studies. Once admitted to the University, individuals must also apply for admission into a post-baccalaureate endorsement program and must meet the college's policy for admitting students into an approved teacher education program.

The college offers four post-baccalaureate endorsement programs in special education: general curriculum K-12, adapted curriculum K-12, early childhood special education, and visual impairments prek-12.

The Post-Baccalaureate Endorsement Program offers the coursework required to satisfy the Virginia Department of Education (VDOE) special educator licensure endorsement competencies. Due to changing national accreditation standards and state licensure regulations (i.e. assessments, certifications), the programs in teacher education are under constant revision. Students are encouraged to obtain current program information from the Special Education Program website at: <http://www.odu.edu/cdse/academics/sped/grad> (<http://www.odu.edu/cdse/academics/sped/grad/>). Program completers find employment as special education teachers within the

continuum of services provided for children with special needs and may also serve as key members of child study teams; they are prepared to address the educational, emotional, and physical needs of students with disabilities.

Admission

Regular Admittance Requirements

1. completion of an undergraduate degree in the arts and sciences (or equivalent);
2. admission to Old Dominion University as a non-degree seeking graduate student;
3. cumulative GPA of 2.80 for all college credit courses taken in the baccalaureate degree program from an accredited college/university; and,
4. submission of an application for admittance into the Darden College of Education and Professional Studies Teacher Post-Baccalaureate Endorsement Program.

Provisional Admittance Requirements

1. completion of an undergraduate degree in the arts and sciences (or equivalent);
2. admission to Old Dominion University as a non-degree seeking graduate student;
3. cumulative GPA of 2.50-2.74 for all college credit courses taken in the baccalaureate degree program from an accredited college/university; and,
4. submission of an application for admittance into the Darden College of Education and Professional Studies Teacher Post-Baccalaureate Endorsement Program.

Curriculum Requirements

Core Requirements

SPED 613	Human Growth and Development	3
SPED 620	Advanced Foundations of Special Education: Legal Aspects and Characteristics	3
SPED 615	Advanced Classroom and Behavior Management Techniques for Students with Diverse Needs	3
SPED 623	Adv Instructional Design II: Curriculum Procedures and Individualized Education Planning	3
SPED 622	Advanced Collaboration and Transitions	3
SPED 626	Advanced Procedures in Reading and Writing for Students with Diverse Learning Needs	3

Early Childhood Special Education Licensure Only

SPED 504	Characteristics and Medical Aspects of Disabling Conditions	3
SPED 541	Teaching Students with Severe Physical and Sensorimotor Disabilities	3
SPED 569	Communication/Language Development/ Intervention for Students with Significant Disabilities	3
SPED 560	Teaching Preschoolers With Diverse Abilities *	3
SPED 561	Developmental Assessment of Young Children with Diverse Abilities *	3
SPED 567	Family-Centered Practices in Early Childhood Intervention *	3

Teacher Candidate Internship

Select one of the following: 9

SPED 586	Teacher Candidate Internship for Special Endorsement
SPED 669	Directed Field Internship Special Education, PreK-12 **
Total Credit Hours	
45	

- * Requires a practicum of 45 hours
 ** Requires valid provisional, or renewable VDOE-issued teaching license

Additional Requirements

Continuance Requirements

1. completion of the Pre-Task Rating Form upon acceptance;
2. complete the CITI Responsible Conduct of Research, Social and Behavioral Research training modules. See <https://www.odu.edu/impact/responsible-conduct-of-training>;
3. successful completion of all courses required for licensure in an endorsement area(s);
4. maintenance of a GPA of 3.0 with a B or better in all practicum coursework, and a B- or better in all additional course work; and

Exit Requirements

1. completion of all requirements for the program;
2. passing scores on the Special Education Exit Exam.
3. maintenance of a GPA of 3.0 with a B or better in all practicum coursework, and a B- or better in all additional course work
4. successful completion of either SPED 586: Teacher Candidate Internship or SPED 669: Directed Field Internship in Special Education
5. passing scores on the Praxis Teaching Reading: Elementary assessment (Test code 5205) (Special Education General Curriculum K-12 only)**
6. obtaining certificate of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.**
7. completion of the Post Task Rating Form

*Student must hold a valid, provisional or renewable teaching license in special education from the Virginia Department of Education (VDOE) to be eligible for SPED 669.

**Due to changing national accreditation standards and VDOE licensure regulations, the special education program requirements are frequently revised. Any changes resulting from these factors supersede the program requirements described in the catalog. Students should verify current program exit requirements with the appropriate Graduate Program Director and/or program coordinator/academic advisor.

Post-Baccalaureate Endorsement Special Education Adapted Curriculum, K-12 Post- Baccalaureate Endorsement Special Education Post-Baccalaureate Endorsement Program

Anne M. Perrotti, PhD, CCC-SLP, Graduate Program Director
 122 Child Study Center

Many students who already possess an undergraduate degree enter Old Dominion University for the sole purpose of meeting the Virginia Department of Education teaching licensure standards. The special education post-baccalaureate endorsement option is available for those

students who wish to complete the coursework required for licensure in special education, but have no desire to complete a master's degree program or who do not meet the master's degree admission requirements. Individuals pursuing a post-baccalaureate endorsement program must first apply for admission to Old Dominion University as a non-degree seeking graduate student; however, admission to Old Dominion University does not guarantee admission into post-baccalaureate endorsement or teacher preparation programs in the Darden College of Education and Professional Studies. Once admitted to the University, individuals must also apply for admission into a post-baccalaureate endorsement program and must meet the college's policy for admitting students into an approved teacher education program.

The college offers four post-baccalaureate endorsement programs in special education: general curriculum K-12, adapted curriculum K-12, early childhood special education, and visual impairments prek-12.

The Post-Baccalaureate Endorsement Program offers the coursework required to satisfy the Virginia Department of Education (VDOE) special educator licensure endorsement competencies. Due to changing national accreditation standards and state licensure regulations (i.e. assessments, certifications), the programs in teacher education are under constant revision. Students are encouraged to obtain current program information from the Special Education Program website at: <http://www.odu.edu/cdse/academics/sped/grad> (<http://www.odu.edu/cdse/academics/sped/grad/>). Program completers find employment as special education teachers within the continuum of services provided for children with special needs and may also serve as key members of child study teams; they are prepared to address the educational, emotional, and physical needs of students with disabilities.

Admission

Regular Admittance Requirements

1. completion of an undergraduate degree in the arts and sciences (or equivalent);
2. admission to Old Dominion University as a non-degree seeking graduate student;
3. cumulative GPA of 2.80 for all college credit courses taken in the baccalaureate degree program from an accredited college/university; and,
4. submission of an application for admittance into the Darden College of Education and Professional Studies Teacher Post-Baccalaureate Endorsement Program.

Provisional Admittance Requirements

1. completion of an undergraduate degree in the arts and sciences (or equivalent);
2. admission to Old Dominion University as a non-degree seeking graduate student;
3. cumulative GPA of 2.50-2.74 for all college credit courses taken in the baccalaureate degree program from an accredited college/university; and,
4. submission of an application for admittance into the Darden College of Education and Professional Studies Teacher Post-Baccalaureate Endorsement Program.

Curriculum Requirements

Core Requirements

SPED 613	Human Growth and Development	3
SPED 620	Advanced Foundations of Special Education: Legal Aspects and Characteristics	3
SPED 615	Advanced Classroom and Behavior Management Techniques for Students with Diverse Needs	3
SPED 623	Adv Instructional Design II: Curriculum Procedures and Individualized Education Planning	3

SPED 622	Advanced Collaboration and Transitions	3
SPED 626	Advanced Procedures in Reading and Writing for Students with Diverse Learning Needs	3
Adapted Curriculum Licensure Only		
SPED 504	Characteristics and Medical Aspects of Disabling Conditions	3
SPED 569	Communication/Language Development/ Intervention for Students with Significant Disabilities	3
SPED 528	Instructional Strategies for Students Accessing the Adapted Curriculum *	3
SPED 541	Teaching Students with Severe Physical and Sensorimotor Disabilities *	3
SPED 618	Advanced Instructional Design I: Learner Characteristics and Assessment	3
Teacher Candidate Internship		
Select one of the following:		9
SPED 586	Teacher Candidate Internship for Special Endorsement	
SPED 669	Directed Field Internship Special Education, PreK-12 **	
Total Credit Hours		42

* Requires a practicum of 45 hours

** Requires valid provisional, or renewable VDOE-issued teaching license

Additional Requirements

Continuance Requirements

1. completion of the Pre-Task Rating Form upon acceptance;
2. complete the CITI Responsible Conduct of Research, Social and Behavioral Research training modules. See <https://www.odu.edu/impact/responsible-conduct-of-training>;
3. successful completion of all courses required for licensure in an endorsement area(s);
4. maintenance of a GPA of 3.0 with a B or better in all practicum coursework, and a B- or better in all additional course work; and

Exit Requirements

1. completion of all requirements for the program;
2. passing scores on the Special Education Exit Exam.
3. maintenance of a GPA of 3.0 with a B or better in all practicum coursework, and a B- or better in all additional course work
4. successful completion of either SPED 586: Teacher Candidate Internship or SPED 669: Directed Field Internship in Special Education*
5. passing scores on the Praxis Teaching Reading: Elementary assessment (Test code 5205) (Special Education General Curriculum K-12 only)**
6. obtaining certificate of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.**
7. completion of the Post Task Rating Form

*Student must hold a valid, provisional or renewable teaching license in special education from the Virginia Department of Education (VDOE) to be eligible for SPED 669.

**Due to changing national accreditation standards and VDOE licensure regulations, the special education program requirements are frequently revised. Any changes resulting from these factors supersede the program

requirements described in the catalog. Students should verify current program exit requirements with the appropriate Graduate Program Director and/or program coordinator/academic advisor.

Post-Baccalaureate Endorsement Special Education General Curriculum, K-12 Post- Baccalaureate Endorsement

Special Education Post-Baccalaureate Endorsement Program

Anne M. Perrotti, PhD, CCC-SLP, Graduate Program Director
122 Child Study Center

Many students who already possess an undergraduate degree enter Old Dominion University for the sole purpose of meeting the Virginia Department of Education teaching licensure standards. The special education post-baccalaureate endorsement option is available for those students who wish to complete the coursework required for licensure in special education, but have no desire to complete a master's degree program or who do not meet the master's degree admission requirements. Individuals pursuing a post-baccalaureate endorsement program must first apply for admission to Old Dominion University as a non-degree seeking graduate student; however, admission to Old Dominion University does not guarantee admission into post-baccalaureate endorsement or teacher preparation programs in the Darden College of Education and Professional Studies. Once admitted to the University, individuals must also apply for admission into a post-baccalaureate endorsement program and must meet the college's policy for admitting students into an approved teacher education program.

The college offers four post-baccalaureate endorsement programs in special education: general curriculum K-12, adapted curriculum K-12, early childhood special education, and visual impairments preK-12.

The Post-Baccalaureate Endorsement Program offers the coursework required to satisfy the Virginia Department of Education (VDOE) special educator licensure endorsement competencies. Due to changing national accreditation standards and state licensure regulations (i.e. assessments, certifications), the programs in teacher education are under constant revision. Students are encouraged to obtain current program information from the Special Education Program website at: <http://www.odu.edu/cdse/academics/sped/grad> (<http://www.odu.edu/cdse/academics/sped/grad/>). Program completers find employment as special education teachers within the continuum of services provided for children with special needs and may also serve as key members of child study teams; they are prepared to address the educational, emotional, and physical needs of students with disabilities.

Admission

Regular Admittance Requirements

1. completion of an undergraduate degree in the arts and sciences (or equivalent);
2. admission to Old Dominion University as a non-degree seeking graduate student;
3. cumulative GPA of 2.80 for all college credit courses taken in the baccalaureate degree program from an accredited college/university; and,
4. submission of an application for admittance into the Darden College of Education and Professional Studies Teacher Post-Baccalaureate Endorsement Program.

Provisional Admittance Requirements

1. completion of an undergraduate degree in the arts and sciences (or equivalent);

- admission to Old Dominion University as a non-degree seeking graduate student;
- cumulative GPA of 2.50-2.74 for all college credit courses taken in the baccalaureate degree program from an accredited college/university; and,
- submission of an application for admittance into the Darden College of Education and Professional Studies Teacher Post-Baccalaureate Endorsement Program.

Curriculum Requirements

Core Requirements

SPED 613	Human Growth and Development	3
SPED 620	Advanced Foundations of Special Education: Legal Aspects and Characteristics	3
SPED 615	Advanced Classroom and Behavior Management Techniques for Students with Diverse Needs	3
SPED 622	Advanced Collaboration and Transitions	3
SPED 623	Adv Instructional Design II: Curriculum Procedures and Individualized Education Planning	3
SPED 626	Advanced Procedures in Reading and Writing for Students with Diverse Learning Needs	3

Special Education General Curriculum Licensure Only

SPED 618	Advanced Instructional Design I: Learner Characteristics and Assessment	3
SPED 518	Instructional Strategies to Meet Diverse Learning Needs in Math	3
TLED 568	Language Acquisition and Reading for Students with Diverse Learning Needs	3
SPED 610	Characteristics of Students Accessing the General Curriculum	3
SPED 611	Instructional Strategies for Students Accessing the General Education Curriculum	3

Teacher Candidate Internship

Select one of the following:		9
SPED 586	Teacher Candidate Internship for Special Endorsement	
SPED 669	Directed Field Internship Special Education, PreK-12 **	

Total Credit Hours **42**

* Requires a practicum of 45 hours

** Requires valid provisional, or renewable VDOE-issued teaching license

Additional Requirements

Continuance Requirements

- completion of the Pre-Task Rating Form upon acceptance;
- complete the CITI Responsible Conduct of Research, Social and Behavioral Research training modules. See (<https://www.odu.edu/impact/responsible-conduct-of-training/>)<https://www.odu.edu/impact/responsible-conduct-of-training/>;
- successful completion of all courses required for licensure in an endorsement area(s);
- maintenance of a GPA of 3.0 with a B or better in all practicum coursework, and a B- or better in all additional course work; and

Exit Requirements

- completion of all requirements for the program;
- passing scores on the Special Education Exit Exam.
- maintenance of a GPA of 3.0 with a B or better in all practicum coursework, and a B- or better in all additional course work
- successful completion of either SPED 586: Teacher Candidate Internship or SPED 669: Directed Field Internship in Special Education*
- passing scores on the Praxis Teaching Reading: Elementary (Test code 5205) assessment (Special Education General Curriculum K-12 only)**
- obtaining certificate of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.**
- completion of the Post Task Rating Form

*Student must hold a valid, provisional or renewable teaching license in special education from the Virginia Department of Education (VDOE) to be eligible for SPED 669.

**Due to changing national accreditation standards and VDOE licensure regulations, the special education program requirements are frequently revised. Any changes resulting from these factors supersede the program requirements described in the catalog. Students should verify current program exit requirements with the appropriate Graduate Program Director and/or program coordinator/academic advisor.

Post-Baccalaureate Endorsement Special Education - Visual Impairments, PreK-12 Post- Baccalaureate Endorsement Special Education Post-Baccalaureate Endorsement Program

Anne M. Perrotti, PhD, CCC-SLP, Graduate Program Director
122 Child Study Center

Many students who already possess an undergraduate degree enter Old Dominion University for the sole purpose of meeting the Virginia Department of Education teaching licensure standards. The special education post-baccalaureate endorsement option is available for those students who wish to complete the coursework required for licensure in special education, but have no desire to complete a master's degree program or who do not meet the master's degree admission requirements. Individuals pursuing a post-baccalaureate endorsement program must first apply for admission to Old Dominion University as a non-degree seeking graduate student; however, admission to Old Dominion University does not guarantee admission into post-baccalaureate endorsement or teacher preparation programs in the Darden College of Education and Professional Studies. Once admitted to the University, individuals must also apply for admission into a post-baccalaureate endorsement program and must meet the college's policy for admitting students into an approved teacher education program.

The college offers four post-baccalaureate endorsement programs in special education: general curriculum K-12, adapted curriculum K-12, early childhood special education, and visual impairments preK-12.

The Post-Baccalaureate Endorsement Program offers the coursework required to satisfy the Virginia Department of Education (VDOE) special educator licensure endorsement competencies. Due to changing national accreditation standards and state licensure regulations (i.e. assessments, certifications), the programs in teacher education are under constant revision. Students are encouraged to obtain current program information from the Special Education Program website at: [http://www.odu.edu/cdse/academics/sped/grad/](http://www.odu.edu/cdse/academics/sped/grad). Program completers find employment as special education teachers within the continuum of services provided for children with special needs and may also

serve as key members of child study teams; they are prepared to address the educational, emotional, and physical needs of students with disabilities.

Admission

Regular Admittance Requirements

1. completion of an undergraduate degree in the arts and sciences (or equivalent);
2. admission to Old Dominion University as a non-degree seeking graduate student;
3. cumulative GPA of 2.80 for all college credit courses taken in the baccalaureate degree program from an accredited college/university; and,
4. submission of an application for admittance into the Darden College of Education and Professional Studies Teacher Post-Baccalaureate Endorsement Program.

Provisional Admittance Requirements

1. completion of an undergraduate degree in the arts and sciences (or equivalent);
2. admission to Old Dominion University as a non-degree seeking graduate student;
3. cumulative GPA of 2.50-2.74 for all college credit courses taken in the baccalaureate degree program from an accredited college/university; and,
4. submission of an application for admittance into the Darden College of Education and Professional Studies Teacher Post-Baccalaureate Endorsement Program.

Curriculum Requirements

Endorsement Requirements †

SPED 400/500	Foundations of Special Education: Legal Aspects and Characteristics	3
SPED 411/511	Classroom and Behavioral Management Techniques for Students with Diverse Needs	3
SPED 417/517	Collaboration and Transitions	3
SPED 432/532	Characteristics of Students with Visual Impairments	3
SPED 433/533	Braille Code	3
SPED 434/534	Medical and Educational Implications of Visual Impairments *	3
SPED 435/535	Orientation and Mobility *	2
SPED 436/536	Curriculum and Assessment of Students with Visual Impairments	3
SPED 437/537	Assistive Technology for People with Sensory Impairments	3
TLED 468/568	Language Acquisition and Reading for Students with Diverse Learning Needs	3
SPED 638	Teaching Methods for Students with Visual Impairments *	3
SPED 639	Braille Reading and Writing *	3

Teacher Candidate Internship

Select one of the following:		9
SPED 586	Teacher Candidate Internship for Special Endorsement	
SPED 669	Directed Field Internship Special Education, PreK-12 **	

Total Credit Hours **44**

* Field experience required

** Requires valid provisional, or renewable VDOE-issued teaching license
† READ 680 is recommended

Due to changing national accreditation standards and state licensure regulations (i.e. assessments, certifications), teacher preparation programs in the Darden College of Education and Professional Studies are under constant revision. Any changes resulting from these factors supersede the program requirements described in the catalog. Students are encouraged to obtain current program information from their advisors and the Darden College of Education and Professional Studies website at <http://www.odu.edu/education> (<http://www.odu.edu/education/>).

Additional Requirements

Continuance Requirements

1. completion of the Pre-Task Rating Form upon acceptance;
2. complete the CITI Responsible Conduct of Research, Social and Behavioral Research training modules. See <https://www.odu.edu/impact/responsible-conduct-of-training/>;
3. successful completion of all courses required for licensure in an endorsement area(s);
4. maintenance of a GPA of 3.0 with a B or better in all practicum coursework, and a B- or better in all additional course work; and

Exit Requirements

1. completion of all requirements for the program;
2. passing scores on the Special Education Exit Exam.
3. maintenance of a GPA of 3.0 with a B or better in all practicum coursework, and a B- or better in all additional course work
4. successful completion of either SPED 586: Teacher Candidate Internship or SPED 669: Directed Field Internship in Special Education*
5. passing scores on the Praxis Teaching Reading: Elementary assessment (Test code 5205) (Special Education General Curriculum K-12 only)**
6. obtaining certificate of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.**
7. completion of the Post Task Rating Form

*Student must hold a valid, provisional or renewable teaching license in special education from the Virginia Department of Education (VDOE) to be eligible for SPED 669.

**Due to changing national accreditation standards and VDOE licensure regulations, the special education program requirements are frequently revised. Any changes resulting from these factors supersede the program requirements described in the catalog. Students should verify current program exit requirements with the appropriate Graduate Program Director and/or program coordinator/academic advisor.

Post-Baccalaureate Endorsement Teacher Preparation in Special Education Adapted Curriculum Post-Baccalaureate Endorsement

The Virginia Consortium for Teacher Preparation in Special Education Adapted Curriculum: Supporting Students with Severe Disabilities and Autism (ACSD)

The Virginia Consortium for Teacher Preparation in Special Education Adapted Curriculum: Supporting Students with Severe Disabilities and Autism (ACSD Consortium) is comprised of six state-approved teacher preparation programs in *special education: adapted curriculum* K-12. Participating universities are George Mason University; Norfolk State University; Radford University; James Madison University; Virginia Commonwealth University and Old Dominion University. The consortium's primary goal is to prepare teachers across the commonwealth to be highly skilled and effective in teaching learners with severe and multiple disabilities. The program is designed to accelerate the training for teachers with newly-issued provisional licenses and to increase the number of fully endorsed teachers by providing training to full-time pre-service personnel. ACSD Consortium courses will be delivered via online formats using videoconferencing and web modalities. Faculty experts in severe disabilities from the six universities will teach the required classes. Applicants must have bachelor's degrees from regionally accredited universities and passing Praxis Core Academic Skills for Educators Test scores.

Curriculum Requirements

SPED 313	Fundamentals of Human Growth and Development: Birth through Adolescence	3
SPED 500	Foundations of Special Education: Legal Aspects and Characteristics	3
SPED 670	Transition and Community-Based Instruction	3
SPED 671	Positive Behavior Supports *	3
SPED 672	IEP, Assessment & Program Planning for Adapted Curriculum *	3
SPED 673	Communication and Severe Disabilities	3
SPED 674	Characteristics of Students with Severe Disabilities	3
SPED 675	Foundations of Language and Literacy for Diverse Learners *	3
SPED 676	Curriculum and Methods-Severe Disabilities *	3
SPED 677	Consultation and Collaboration	3
SPED 678	Individualized Supports and Specialized Care of Students with Significant Disabilities	3
SPED 583	Field Experience Seminar in Special Education	1
SPED 586	Teacher Candidate Internship for Special Endorsement	3
Total Credit Hours		37

* Field experience required

Department of STEM Education & Professional Studies

Web Site: <http://www.odu.edu/stemps> (<http://www.odu.edu/stemps/>)

Dr. Shana Pribesh, Department Chair

2300 A Education Building
757-683-6684

The Department of Science, Technology, Engineering and Mathematics (STEM) Education and Professional Studies (STEMPS) is an academic leader in graduate studies related to education specialists, including, instructional design and technology, library science, and educational psychology and program evaluation. It offers the M.L.I.S., M.S.Ed, and the Ph.D. in Education as well as multiple certificate programs. The department also offers licensure and teaching endorsement programs. Due to changing University requirements, national accreditation standards, and Commonwealth licensure regulations, the programs in the Darden College of Education and Professional Studies are under constant revision. Any changes resulting from these factors supersede the program requirements described in the catalog. Students should obtain current program information from their advisors and the Darden College of Education and Professional Studies website at <http://education.odu.edu/>.

Instructional Design and Technology Programs

- Master of Science in Education - Elementary Education – Instructional Design and Technology
- Master of Science in Education - Secondary Education – Instructional Design and Technology
- Doctor of Philosophy, Education - Instructional Design and Technology Concentration
- Graduate Certificate in Education and Training in Modeling and Simulation
- Graduate Certificate in Human Performance Technology
- Graduate Certificate in K-12 Online Teaching

Library and Information Studies Programs

- Master of Science in Library and Information Studies
- Master of Science in Library and Information Studies with Concentration in School Librarianship
- Graduate Certificate in School Library Practice (for those with an MLIS)

Educational Psychology and Program Evaluation

- Doctor of Philosophy, Education - Educational Psychology and Program Evaluation concentration

Programs

Doctor of Philosophy Programs

- Education with a Concentration in Educational Psychology and Program Evaluation (PhD) (p. 184)
- Education with a Concentration in Instructional Design and Technology (PhD) (p. 185)

Master of Library and Information Studies Programs

- Library and Information Studies (MLIS) (p. 188)
- Library and Information Studies with a Concentration in School Librarianship (MLIS) (p. 189)

Master of Science in Education Programs

- Elementary Education with a Concentration in Instructional Design and Technology (MSEd) (p. 187)
- Secondary Education with a Concentration in Instructional Design and Technology (MSEd) (p. 191)

Certificate Programs

- Human Performance Technology Certificate (p. 192)
- Online Teaching for K-12 Teachers Certificate (p. 192)
- School Library Practice Certificate (p. 192)

Doctor of Philosophy Education with a Concentration in Educational Psychology and Program Evaluation (PhD)

2300 Education Building
757-683-5163

<https://www.odu.edu/stemps> (<https://www.odu.edu/stemps/>)

Tony Perez, Graduate Program Director

Doctoral students pursuing the Ph.D. in Education with a Concentration in Educational Psychology and Program Evaluation (EPPE) at Old Dominion University will develop a strong foundation in theories of learning, human development, cognition, motivation, self-regulation, and formative assessment as well as training in applied quantitative and qualitative research methods. Educational psychologists study learning across the lifespan and apply psychological principles to formal and informal educational settings in order to promote the success of students in these learning environments. Program evaluators collect and analyze quantitative and qualitative data in order to examine the effectiveness of programs and policies. Our program is designed for students who are interested in teaching, research, and program evaluation-oriented careers. For example, students may be interested in careers as university faculty, researchers in non-profit research organizations, or program evaluators in university research and evaluation centers.

We include two specialized emphasis areas: educational psychology and program evaluation. Students will complete core coursework in research methods and learning theories. Then, students will specialize in coursework and experiences tailored for positions in educational psychology or program evaluation. Along the way, students may take electives that could prepare them for work in PK-12, Higher Education or Instructional Design.

Options for Admission

There are two paths for admission into the EPPE Program: entrance with a Masters' degree and entrance with a Bachelor's degree. Applications are accepted and students may start the program year-round. That is, we have rolling admissions.

Option 1 with earned Master's:

Applicants should have earned a Master's degree in psychology, education, statistics, higher education or other related field from a regionally accredited institution. Submitted transcripts for your Master's degree must show that the degree was conferred and a date of completion. We will consider an applicant for provisional admission who is completing a related Master's degree.

Option 2 with earned Bachelor's:

For the second option, applicants should have earned a Bachelor's degree in a related field from a regionally accepted institution. The submitted transcripts should show that the degree was conferred and the date of completion. We will consider an applicant for provisional admission who is completing a related Master's degree. An additional 18 credit hours will be required for students who pursue this option.

Admission Requirements

Prospective students seeking admission to the Ph.D. in Education with a Concentration in Educational Psychology and Program Evaluation should submit an application that meets the following guidelines:

1. Submit transcripts from all colleges and universities previously attended. (See information above).
2. GRE scores are optional. We are interested in your verbal, quantitative and analytical skills. GRE scores are just one means of demonstrating your aptitude in these areas. If you do not submit your GRE scores, we will look for evidence of these aptitudes in your transcripts, statement

of purpose, letters of recommendation, writing samples and interview responses (see below for descriptions).

3. Complete a Statement of Purpose essay that shows evidence of motivation, competence, and potential as a graduate student/scholar. Address why you think you fit this program, which faculty you would like to work with and why, as well as how you intend to use this degree. We are interested in your verbal, quantitative, and analytical skills critical to your success in the program.
4. Submit three letters of recommendation from professional sources capable of commenting on your readiness for advanced graduate study. These letters are very important in the selection process so you may consider sharing your Statement of Purpose with your references so they can candidly comment on your preparation and purpose for attending this program. Please ask your references to address your verbal, quantitative, and analytical skills as well as your dispositions as they relate to collegiality, ethics, and a commitment to social justice and equity.
5. Submit a scholarly writing sample that showcases your verbal and analytical skills. It may also demonstrate your quantitative skills. Examples include a course paper, technical report, conference paper, journal article, or a Master's thesis. If you do not have a scholarly paper to submit or think that you could submit a higher quality original writing sample, we can provide you with a prompt for you can respond to as the writing sample.
6. We encourage applicants whose native language is not English to apply. Applicants whose native language is not English must submit a current score for the Test of English as a Foreign Language (TOEFL).
7. Selected applications will be asked to participate in a 30-minute phone interview with program faculty to discuss your goals, qualifications, and interest in the program.
8. Prior course work is assumed in statistics and research methods for Master's degree students. If that coursework has not been completed, then additional coursework will be added to the candidate's graduate program of study. For students admitted directly from a Bachelor's program your initial coursework will include Master's level research methods and statistics.
9. Complete and submit an online application. There is a non-refundable application fee for application to any ODU graduate program.
10. Up to four courses may be transferred from another regionally accredited university at the discretion of the Instructor of Record and the Graduate Program Director. They cannot have been used in conferral for another degree unless they undergo an additional review through the Prior Learning Assessment process. Courses that were part of an ODU certificate program can be considered for acceptance.
11. EPPE is committed to social justice and equity. We encourage submissions from diverse applicants. That is, we encourage diversity in terms of race, ethnicity, gender, sexuality, class, disability, and age, among others.

Applications are accepted and students may start the program year-round.

Curriculum Requirements

Program Requirements

Option 1 - With Earned Master's Degree

Students entering the program with an earned master's degree will complete a minimum of 18 research course credits, 18 core content area course credits, and 12 elective course credits. Lastly, students will complete a minimum of 12 credits of dissertation research. The total hours of this option is 60 hours and the courses are listed below.

Option 2 - With Earned Bachelor's Degree

Students entering the program with an earned bachelor's degree (but without a master's degree) will take an additional 18 credit hours in research and elective courses at the 600, 700, or 800 levels **in addition to** the requirements for entry with an earned Master's degree (see option 1). These electives will be selected in consultation with an advisor and approved by the graduate program director. For example, the courses may be in introductory statistics,

research methods, psychology, educational leadership, higher education, teaching and learning, or instructional design and technology. The total hours of this option is 78 hours.

Prerequisite Coursework*

FOUN 611	Introduction to Research Methods in Education	3
or FOUN 612	Applied Research Methods in Education	
FOUN 722	Introduction to Applied Statistics and Data Analysis	3

* Students who do not have equivalent coursework or appropriate educational experiences must complete the prerequisite courses as listed above or equivalent as approved by the Graduate Program Director.

Research Core Courses (18 Credits)

FOUN 812	Research Design and Analysis	3
TLCI 814	Qualitative Research Design in Education	3
FOUN 822	Applied Linear Models in Educational Research	3
FOUN 823	Analysis of Variance Applied to Educational Research	3
FOUN 840	Educational Measurement and Assessment	3
FOUN 813	Program Evaluation in Education	3

Professional Preparation Courses (6 credits)

FOUN 830	Theories of Learning and Instruction	3
FOUN 850	Sociological and Philosophical Foundations of Education	3

Emphasis Areas

Select one of the following:	12
<i>Educational Psychology (12 credits):</i>	
FOUN 831	Human Development in Education
FOUN 835	Motivation in Education
FOUN 870	Formative Assessment of Student Learning
FOUN 836	Metacognition and Self-Regulated Learning
<i>Program Evaluation (12 Credits)</i>	
FOUN 818	Analysis with Large Datasets
TLCI 895	Topics in Education (Grant Writing)
TLCI 815	Advanced Qualitative Research
FOUN 870	Formative Assessment of Student Learning
Elective Courses Chosen with Advisor (12 Credits)	12
Dissertation Research Project (12 Credits)	12
FOUN 899	Dissertation

Total Credit Hours 60

Additional Requirements

Continuance

Students must meet all department, college, and university policy requirements for continuation in their academic program. See department policy above.

Exit

In order to complete the program, students must fully comply with the curriculum below and with all requirements noted elsewhere in the University Catalog for graduate students. It is the responsibility of the student to obtain these materials and comply with required portions.

Continuance Policy and Procedures for the Educational Leadership Program

The following policy has been established for continuance in *Educational Leadership Program*.

At the end of each semester – fall, spring, and summer – the graduate program directors (GPD) will review student records. As per university policy, students who do not maintain an overall GPA of at least 3.0 in their ELS program will be placed on probation. Students placed on probation have one semester to bring their overall GPA back to a minimum of 3.0. A student may be placed on probation only one time in their EFL program and will not be eligible for a second probationary period. Should a student’s GPA fall below 3.0 twice, he/she will be dismissed from the program.

Students who receive a grade of F in any ELS required or elective program course or who receive a final grade of lower than B- in more than one class in their program will be dismissed from their program by the Graduate Program Director and Department Chair. A failing grade in dissertation credits for one semester places the student in warning status and does not automatically dismiss the student from the program. However, two failing grades in dissertation credits will result in dismissal from the program. Students may follow the Grade Appeal Procedure in the ODU Graduate Catalog. In the event a grade is appealed such that the student comes into compliance with the EFL Continuance Policy, he/she will be reinstated.

In accord with University policy, ODU email is considered official communication.

Advancement to Candidacy Policy for all EFL Programs

In the Department of Educational Foundations and Leadership, advancement to candidacy is a formal step that occurs after the student 1) completes formal coursework, 2) passes the PhD written and oral candidacy examinations, and 3) has an approved dissertation topic.

Doctor of Philosophy Education with a Concentration in Instructional Design and Technology (PhD)

Tian Luo, Graduate Program Director

The Doctor of Philosophy in Education Instructional Design and Technology (ID&T) concentration prepares individuals to conduct research and assume leadership roles in the field of instructional technology. Students will master a number of instructional design skills, ranging from instructional problem identification, task and audience analysis, strategy design, assessment, evaluation, and implementation that they can use in a variety of settings including traditional classrooms, distance education, business, health care, military, K-12 and higher education, and government. Courses explore theories and research that provide a foundation for the field. Students are also expected to participate in and conduct research studies as part of their program. Completing the PhD in ID&T will prepare students to take jobs as instructional design and human performance practitioners in business, military, government, health care, and educational settings. They are also prepared to take positions as faculty members in higher education and as researchers for private organizations. *The PhD in Education Instructional Design Technology (ID&T) concentration is offered on-campus and online.*

Admission

For admission to this program, individuals should have completed master’s degree in an appropriate discipline from a regionally accredited university. Degrees that are equivalent to a master’s degree such as LLB, JD, and DDS are also acceptable. Prospective students should also have prior course work in statistics and instructional technology. If this requirement is not met, then additional course work may be added to the candidate’s graduate program of

study at the discretion of the advisor and graduate program director. Please see prerequisites on the curriculum description for specifics.

Admission to the instructional design and technology PhD program is competitive. A number of criteria are considered including graduate and undergraduate GPAs, GRE scores, writing ability, a personal interview, and the match between student interests and faculty expertise. Meeting the minimum requirements established by the department does not ensure admission to the program. A minimum undergraduate GPA of 2.8 and a minimum graduate GPA of 3.25 are recommended.

Application Requirements

Application requirements for the PhD in instructional design and technology are as follows:

1. a completed application which is available online or from the Office of Graduate Admissions.
2. Official transcripts of all undergraduate and graduate courses and degrees completed.
3. Official report scores from the Graduate Record Examination (verbal, quantitative, and analytical) taken within the last five years. GRE scores expire after five years; however, candidates who have completed the exam prior to five years before the application deadline may submit those scores for consideration if they are provided from an official source such as a transcript or form provided by the Educational Testing Service. Old Dominion University reserves the right to determine what is an “official source.”
4. Applicants whose native language is not English (or who do not have a BS or MS degree from an accredited institution in a country where English is the native language) must submit a current score for the Test of English as a Foreign Language (TOEFL) of at least 600 (written) or 250 (computer based).
5. Applicants must submit a 500 word statement of their academic and professional goals with an emphasis on how the PhD degree in instructional design and technology will contribute to the achievement of the stated goals.
6. Three letters of reference from sources capable of commenting on the applicant’s readiness for advanced graduate study. It is recommended that at least two of the letters come from university faculty members. Other letters may come from work supervisors or managers.
7. An interview with the instructional design and technology program faculty. This committee will also review applications for admission.

Under normal circumstances, admissions will be offered at least three times a year for the fall, spring, and summer semesters. Acceptance is competitive to assure that there is an adequate number of full-time faculty to serve the students through advising, mentoring, and other duties, particularly when individuals reach the dissertation stage of the program.

Students interested in attending full-time and applying for financial aid should submit their applications by February 1 prior to the fall semester they wish to start.

Admission Application Deadlines

Applicants must submit completed applications and all related material no later than the following dates:

- May 1st for the Fall Semester
- November 1st for the Spring Semester
- March 1st for the Summer Semester

Curriculum Requirements

Program Requirements

The Ph.D. program in Education with a concentration in instructional design and technology is comprised of courses totaling a minimum of 60 academic credit hours beyond the master’s degree. The curriculum includes an program core of 21 credit hours, 9 credit hours in the instructional design concentration, and a research core of 15 credit hours, the three credit dissertation seminar and the dissertation, which will include a minimum of 12 credit hours. The dissertation will often include more than 12 credit

hours depending on the length of time necessary for completion. Students entering the program may also need to complete introductory statistics courses and an instructional technology foundations course if they have not had equivalent courses or cannot demonstrate competency at a satisfactory level. Students who enter the Ph.D. program with a master’s degree in an academic field that is unrelated to instructional design and technology and/or who have not completed courses to develop competency in specified areas may need to complete these courses in addition to the required courses. All courses are offered online. All students must complete the research residency project (IDT 879 and IDT 898) that results in a submission for publication or presentation to a nationally refereed journal or conference prior to taking comprehensive exams. The residency project must be completed within two years of the start of IDT 879. If not, the student must repeat IDT 879 without credit.

All IDT students are expected to have regular and reliable access to a multimedia computer (headphones, microphone, and web cam) and a high speed internet connection.

Prerequisites: All students admitted into the Ph.D. in instructional design and technology must complete the following prerequisite courses unless they have previously completed equivalent graduate level coursework or have appropriate educational experience.

Prerequisites *

FOUN 722	Introduction to Applied Statistics and Data Analysis
IDT 617	Foundations of Instructional Technology

ID&T Core Courses

IDT 730/830	Principles and Practices of Human Performance Technology	3
IDT 751/851	Computer-Based Multi-Media Design	3
IDT 760/860	Cognition and Instructional Design	3
IDT 773/873	Advanced Instructional Design Techniques	3
IDT 801	Instructional Design and Technology Seminar	3
IDT 810	Trends and Issues in Instructional Design and Technology	3
IDT 849	Instructional Systems Design	3

Research Core

FOUN 812	Research Design and Analysis	3
TLCI 814	Qualitative Research Design in Education	3
FOUN 823	Analysis of Variance Applied to Educational Research	3
IDT 725/825	Human Performance Assessment	3
IDT 879	Research Residency in Instructional Design and Technology	3

Instructional Design Concentration 9

Choose courses from the following:

Design & Theory

IDT 746/846	Foundations of Distance Education
IDT 761/861	Applied Instructional Design Tools
IDT 763/863	Instructional Design Theory
IDT 764/864	Instructional Message Design
IDT 898	Research Residency II

Technology

IDT 752/852	Diffusion and Adoption of Instructional Technology Innovations
IDT 755/855	Theory and Design of Instructional Simulation
IDT 756/856	Instructional Gaming: Theories and Practice
IDT 775/875	Designing Online Instruction
TLCI 735/835	Participatory Research: Theory and Methods

Human Performance Technology

IDT 735/835	Noninstructional Interventions

IDT 737/837	Consulting Skills for Instructional Designers	
IDT 739/839	Needs Analysis and Assessment	
Electives **		
Complete electives		
Capstone Courses		
FOUN 881	Dissertation Seminar ***	3
SEPS 899	Dissertation in Occupational Education	12
Total Credit Hours		60

*	All students admitted into the Ph.D. program in instructional design and technology must complete the prerequisite courses unless they have previously completed equivalent graduate level coursework or have appropriate educational experience.
**	Electives are chosen from the list above, or from related areas, e.g., modeling & simulation, psychology, engineering, speech-communications, business, I/O psychology.
***	If seminar is waived by the doctoral committee, the credits are added to the content.

Additional courses or substitutions may be used as approved by student's advisory committee.

Additional Requirements

Program Continuance

After completing 12 hours in ID&T course work, students must maintain a 3.25 GPA in ID&T courses. Failure to do so will result in one year probation. If the student's GPA in ID&T courses is less than 3.25 at the end of the probation period, the student will be suspended. Students who earn a grade of C+ or lower (including U) in a graduate course in their program of study are considered to be making unsatisfactory progress. Students earning one or more grades of C+ or lower must meet with the program director prior to enrolling in courses in future semesters. Students must provide a plan for making satisfactory progress or they will be suspended. If a student earns three or more grades of C+ or lower, they will be suspended from the program. Students wishing to be considered for reinstatement must follow the procedures set forth in the ODU Graduate Catalog.

In addition, the ODU Graduate Catalog states students who have less than a 3.0 GPA on courses at ODU will be placed on probation and may be suspended if conditions prescribed in the catalog are not met.

Continuous Enrollment and Exams

Doctoral students who do not meet the conditions for continuous enrollment and who do not have an approved leave of absence will be suspended from the degree program. Doctoral students who fail the comprehensive exam (either oral or written) or the doctoral final examination (e.g., dissertation defense) twice will be suspended from the degree program.

Satisfactory Progress

Doctoral students who do not complete at least 12 hours of course credits towards their degree each year with a grade of B- or higher prior to candidacy will be evaluated for continuation in the program. If the program faculty do not feel the student is making adequate progress, the student will be placed on program probation for one year. If the student has not completed 12 hours of course credits toward the degree with a grade of B- or higher, they will be suspended.

Research and Dissertation

Doctoral students will be evaluated annually for their progress in completing their research or dissertation. Students who have not made progress towards the completion as demonstrated evidence of a finished proposal, data collection, data analysis, or drafts of the manuscript/dissertation will be evaluated by faculty for continuance in the program. If faculty feel the student has not made adequate progress, the student will be placed on probation for one year. If the student has not made adequate progress after

one year of probation, faculty may recommend dismissal from the program for failing to make adequate progress towards completion of the degree.

Plagiarism

Any student found guilty of plagiarism will be suspended immediately from the program.

Program Completion and Exit

To complete the program students must fully comply with the curriculum below and all requirements noted elsewhere in the University catalog for graduate students and within the Ph.D. in Education Handbook. It is the responsibility of the student to obtain these materials and complete required portions.

Master of Science in Education Elementary Education with a Concentration in Instructional Design and Technology (MSEd)

John Baaki, Graduate Program Director

In the Master of Science in Education – Elementary-- instructional design and technology concentration, the core and support courses are combined, with students selecting 24 to 30 credits in instructional design and technology along with the problem paper or seminar research option. Working with an assigned advisor, students may take courses in the areas of distance education/telecommunications, instructional design and development, educational applications of instructional technology, and administration of instructional technology. *The MSEd - Elementary -- instructional design and technology concentration is offered online only.*

Admission

Students must:

1. hold a bachelor's degree from a regionally accredited college/university;
2. have a cumulative undergraduate grade point average of 2.80;
3. take and receive satisfactory scores on either the Graduate Record Examination (score of 290 combined on verbal and quantitative with a minimum of 140 verbal for regular admission) or Miller Analogies Test (minimum score of 45 or 399 for regular admission); and
4. have an interview with the graduate program director or his/her designee.

Performance in classes taken as a non-degree graduate student will not be taken into consideration in the admission process. No courses in the undergraduate academic major or professional education in which the student has made below a C- will be accepted for licensure in the Darden College of Education and Professional Studies.

Under certain circumstances, applicants who do not fully meet the requirements for regular admission to the program may be admitted on a provisional basis subject to conditions specified by the graduate program director for elementary/middle education.

Curriculum Requirements

Program Requirements

All courses in the core and elective blocks are offered via synchronous and asynchronous format.

Paper Option: Area I (24 credits); Area II (6 credits); 30 credits total.
Seminar Option: Area I (30 credits); Area II (6 credits); 36 credits total.

Core Courses *

Select 24-30 credits of the following:		24-30
FOUN 840	Educational Measurement and Assessment	
IDT 618	Digital Age Teaching and Learning	
IDT 746	Foundations of Distance Education	

IDT 749	Instructional Systems Design
IDT 761	Applied Instructional Design Tools
IDT 775	Designing Online Instruction
TLCI 731	Instructional Technology Trends in Curriculum and Instruction

Support Courses

Graduate electives approved by the Graduate Program Director may be substituted for technology courses when those courses complement personal and professional goals.

Research Courses

Select 6-12 of the following: 6-12

Problem Paper Option (6 credits; 30 credits required for graduation)

FOUN 612	Applied Research Methods in Education
SEPS 636	Problems in Occupational and Technical Studies

Seminar Option (13 credits; 37 credits required for graduation)

FOUN 612	Applied Research Methods in Education
IDT 773	Advanced Instructional Design Techniques

Electives

Complete electives

Total Credit Hours 30-42

Additional Requirements

Continuance

Students must:

1. maintain a grade point average of 3.00;
2. maintain a grade point average of 3.00 in the major.

All ID&T students are expected to have regular and reliable access to a multimedia computer (headphones, microphone, and web cam) and a high speed internet connection.

Exit

Students must:

1. have a 3.00 grade point average;
2. pass a written comprehensive examination;
3. have an exit interview;
4. have completed all course requirements; and
5. submit an application for graduation.

Master of Library and Information Studies Library and Information Studies (MLIS)

Library Science and Information Studies

4101 Educational Building
Hampton Boulevard
Department of STEM and Professional Studies
757-683-4305

Elizabeth A. Burns, Graduate Program Director

General Description of the Library and Information Studies Program

The purpose of the Master of Library and Information Studies is to prepare students with the theoretical knowledge and practical skills that will enable them to become highly proficient librarians, media specialists, and information authorities. This includes, but is not limited to, professional positions in academic libraries, public libraries, school libraries, and

special libraries such as health sciences, law, or business libraries as well as positions for information specialists in health environments, museums, businesses, government and other agencies.

Graduates of the program will be prepared to manage libraries, select and organize library collections, and interact with library patrons to determine and fulfill information and media needs. Further, librarianship has become a technology-based career and the proposed program reflects this focus. Through specific skills taught in the courses contained in the program of study, individuals will engage in the collection, organization, retrieval, preservation, management, and dissemination of information resources to enrich cultures within society. Thus, MLIS graduates will also be trained to perform tasks such as analyzing patron information requests, assisting in finding information sources including print, audio-video, and virtual information, and teaching information literacy skills.

We offer a concentration in school librarianship leading to endorsement for licensed teachers. Other students are advised through a plan of study completed with an advisor and filed with the program director in the semester when their 12th credit hour is completed. Coursework may focus on a type of library: academic, public, or special or area of library and information work such as youth services or evaluation & assessment.

Coursework for the MLIS is offered asynchronously and online. Coursework is project-based and students are expected to spend time in a library or other information setting for most courses. All students complete an internship. This program is available online.

The Master of Library and Information Studies Program at Old Dominion University is accredited by the American Library Association Committee on Accreditation, with the status of Initial accreditation. The next comprehensive review visit is scheduled for Fall 2028.

Admission

Students must:

1. Hold a bachelor's degree in any field from a regionally accredited college/university;
2. Have an undergraduate grade point average of at least 3.0;
3. Apply for admission to the graduate school;
4. Submit a current resume;
5. Submit a writing sample addressing a prompt supplied by Admissions

Under certain circumstances, applicants who do not fully meet the requirements for regular admission to the program may be admitted on a provisional basis.

Deadlines

New students may apply and are admitted for the fall, spring, or summer semesters.

Deadline for priority Summer admissions is March 1.

Deadline for priority Fall admissions is April 1.

Deadline for priority Spring admissions is Nov. 1.

Curriculum Requirements

Required Courses (15 credits)

LIBS 608	Foundations of Libraries and Information	3
LIBS 674	Library Management and Leadership	3
LIBS 658	Knowledge Resources: Planning, Selecting & Managing Collections	3
LIBS 677	Knowledge Organization and Access	3
LIBS 668	Internship in Libraries and Information Workplaces *	3

Additional Coursework

Select 15 credits from the following: 15

LIBS 601	STEM Education and Maker Spaces in Libraries

LIBS 602	Production of Instructional Materials	
LIBS 603	Online Resources for Teaching	
LIBS 609	History of Books and Libraries	
LIBS 610	Preservation Management in Libraries and Archives	
LIBS 611	Community Archiving	
LIBS 612	Research Methods in Library and Information Studies	
LIBS 614	Information Ethics	
LIBS 615	Action Research for School Librarians	
LIBS 642	Children’s Literature PREK-8	
LIBS 644	Literature and Media for Young Adults	
LIBS 647	Reading and Literature for Adults	
LIBS 648	Reading, Evaluating, and Selecting Graphic Novels	
LIBS 649	Storytelling	
LIBS 653	User Centered Design in Library and Information	
LIBS 654	Information Literacy Instruction	
LIBS 655	Methods and Strategies for the School Library	
LIBS 656	User Services and Programming	
LIBS 657	LGBTQIA+ Issues in Public Libraries	
LIBS 676	Library Media Services and the Curriculum	
LIBS 680	Culturally Responsive Librarianship	
LIBS 681	Assessment and Evaluation in Library and Information Science	
LIBS 684	Advanced Library Management	
LIBS 687	Cataloging and Classification	
LIBS 690	Seminar in Academic Libraries	
LIBS 691	Seminar in Public Libraries	
LIBS 693	Seminar in Archives and Special Collections	
LIBS 694	Seminar in Social Justice in Library and Information Work	
Total Credit Hours		30

* LIBS 668 may be completed after Core Coursework: LIBS 608, LIBS 658, LIBS 674, & LIBS 677

Additional Requirements

Program Requirements

Internship

All students will be expected to complete an internship (LIBS 668) in a library or information setting as a capstone course where they will have the opportunity to apply, develop, and demonstrate the competencies acquired in core courses and electives.

Electronic Portfolio

Submission of an electronic portfolio (E-portfolio) will serve as the comprehensive exam in the program. Students are expected to develop an E-portfolio that represents their mastery of standards, examples of projects completed in the program, and a focus on their individual strengths and beliefs about the profession including a resume and statement of philosophy.

Students will begin work on the E-portfolio in their first course, with coaching and peer-review throughout the program; they will be expected to successfully present the portfolio before graduation. Students who do not successfully present the E-portfolio will be provided detailed feedback and expected to re-submit.

Continuance

Students must:

1. Maintain a grade point average of 3.00;
2. Complete the Responsible Conduct of Research (RCR) modules during the first twelve graduate credit hours at Old Dominion University. For more information review the instructions at: <https://www.odu.edu/impact/responsible-conduct-of-training> (<https://www.odu.edu/impact/responsible-conduct-of-training/>); and
3. Any courses in which the student has made below a "B-" must be repeated or, if applicable, substituted.

Exit

Students must:

1. have a 3.00 grade point average;
2. No courses in which the student has made below a "B-" will be accepted for the degree.
3. have completed all course and credit hour requirements;
4. submit an application for graduation; and
5. have successfully completed a portfolio review.

Master of Library and Information Studies

Library and Information Studies with a Concentration in School Librarianship (MLIS)

Library Science and Information Studies School Librarianship (for Licensed Teachers) Concentration

4101 Educational Building
Hampton Boulevard
Department of STEM and Professional Studies
757-683-4305

Elizabeth Burns, Graduate Program Director

This degree and concentration are intended for licensed teachers seeking to add a School Library Endorsement to their Teaching License. Students interested in school librarianship who do not have a teaching license will be advised through the Master of Library and Information Studies degree and may have additional coursework and requirements.

The purpose of the Master of Library and Information Studies is to prepare students with the theoretical knowledge and practical skills that will enable them to become highly proficient librarians, media specialists, and information authorities. This includes, but is not limited to, professional positions in academic libraries, public libraries, school libraries, and special libraries such as health sciences, law, or business libraries as well as positions for information specialists in health environments, museums, businesses, government and other agencies.

Graduates of the program will be prepared to manage libraries, select and organize library collections, and interact with library patrons to determine and fulfill information and media needs. Further, librarianship has become a technology-based career and the proposed program reflects this focus. Through specific skills taught in the courses contained in the program of study, individuals will engage in the collection, organization, retrieval, preservation, management, and dissemination of information resources to enrich cultures within society. Thus, MLIS graduates will also be trained to perform tasks such as analyzing patron information requests, assisting in finding information sources including print, audio-video, and virtual information, and teaching information literacy skills.

Coursework for the MLIS is offered asynchronously and online. Coursework is project-based and students are expected to spend time in a library or other information setting for most courses. All students complete an internship. This program is available online.

The Master of Library and Information Studies Program at Old Dominion University is accredited by the American Library Association Committee on Accreditation, with the status of Initial accreditation. The next comprehensive review visit is scheduled for Fall 2028.

Admission

Master of Library and Information Studies

School Librarianship (for Licensed Teachers*) Concentration

Students must:

1. Hold a bachelor's degree in any field from a regionally accredited college/university;
2. Have an undergraduate grade point average of at least 3.0;
3. Apply for admission to the Office of Graduate Admissions;
4. Submit a current resume;
5. Submit a writing sample addressing a prompt supplied by admissions.

Hold the Virginia Collegiate Professional License or an equivalent license from another state. Under certain circumstances, applicants who do not fully meet the requirements for regular admission to the program may be admitted on a provisional basis.

* Students interested in school librarianship who do not have a Virginia Collegiate Professional License or an equivalent license from another state should apply to the Master of Library and Information Studies (without the concentration). They will be advised through the Master of Library and Information Studies degree and may have additional coursework and requirements.

Deadlines

New students may apply and are admitted for the fall, spring, or summer semester.

Deadline for priority Summer admissions is March 1.

Deadline for priority Fall admissions is April 1.

Deadline for priority Spring admissions is Nov. 1.

Curriculum Requirements

School Librarianship (for Licensed Teachers) Concentration

Library Studies

LIBS 608	Foundations of Libraries and Information	3
LIBS 674	Library Management and Leadership	3
LIBS 658	Knowledge Resources: Planning, Selecting & Managing Collections	3
LIBS 677	Knowledge Organization and Access	3
LIBS 669	Internship in School Libraries *	3-6

School Library Endorsement

LIBS 602	Production of Instructional Materials	3
LIBS 676	Library Media Services and the Curriculum	3
LIBS 642	Children's Literature PREK-8	3
or LIBS 644	Literature and Media for Young Adults	

Electives

Select two of the following:		6
LIBS 601	STEM Education and Maker Spaces in Libraries	
LIBS 603	Online Resources for Teaching	
LIBS 609	History of Books and Libraries	
LIBS 610	Preservation Management in Libraries and Archives	
LIBS 611	Community Archiving	

LIBS 612	Research Methods in Library and Information Studies
LIBS 614	Information Ethics
LIBS 615	Action Research for School Librarians
LIBS 644	Literature and Media for Young Adults
LIBS 647	Reading and Literature for Adults
LIBS 648	Reading, Evaluating, and Selecting Graphic Novels
LIBS 649	Storytelling
LIBS 653	User Centered Design in Library and Information
LIBS 654	Information Literacy Instruction
LIBS 655	Methods and Strategies for the School Library
LIBS 656	User Services and Programming
LIBS 657	LGBTQIA+ Issues in Public Libraries
LIBS 668	Internship in Libraries and Information Workplaces
LIBS 680	Culturally Responsive Librarianship
LIBS 681	Assessment and Evaluation in Library and Information Science
LIBS 684	Advanced Library Management
LIBS 687	Cataloging and Classification
LIBS 690	Seminar in Academic Libraries
LIBS 691	Seminar in Public Libraries
LIBS 694	Seminar in Social Justice in Library and Information Work
LIBS 693	Seminar in Archives and Special Collections

* LIBS 669 is taken after completion of all Library Science courses.

Additional Requirements

Master of Library and Information Studies

School Librarianship (for Licensed Teachers) Concentration

Continuance

Students must:

1. maintain a grade point average of 3.00;
2. have a criminal background check completed prior to placement in any field experience. For more information please review the policy in the Teacher Education Services website: <https://www.odu.edu/clinical-experiences> (<https://www.odu.edu/clinical-experiences/>).
3. complete the Responsible Conduct of Research (RCR) modules during the first twelve graduate credit hours at Old Dominion University. For more information review the instructions at: <https://www.odu.edu/impact/responsible-conduct-of-training>, (<https://www.odu.edu/impact/responsible-conduct-of-training/>)
4. earn at least a "B-" in courses; any courses in which the student has made below a "B-" must be repeated or, if applicable, substituted.

Exit

Students must:

1. have a 3.00 grade point average;
2. earn at least a B- in courses. No courses in which the student has made below a "B-" will be accepted for the degree.
3. complete all course and credit hour requirements;
4. submit an application for graduation; and

- Submission of an electronic portfolio (E-portfolio) will serve as the comprehensive exam in the program. Students are expected to develop an E-portfolio that represents their mastery of standards, examples of projects completed in the program, and a focus on their individual strengths and beliefs about the profession including a resume and statement of philosophy.

No courses in the academic major or professional education in which the student has made below a "B-" will be accepted for licensure requirements in the Darden College of Education.

Master of Science Occupational and Technical Studies (MS)

Mickey Kosloski, Graduate Program Director

This program has been recommended for closure to the State Council for Higher Education of Virginia. Pending their approval and SACSCOC approval, all degrees for the program must be earned by August 2025. Students will not be able to select the program as their major after August 28, 2020.

This is an advanced master's degree and requires prior academic work associated with workforce development or a related area. The degree is designed to help workforce educators and trainers upgrade their knowledge and skills and prepare for leadership roles in adult and career and technical education, training, and/or the Navy's Education and Training Subspecialty (ETMS). The program is delivered at the Norfolk campus and through ODUGlobal.

Master of Science in Education Secondary Education with a Concentration in Instructional Design and Technology (MSEd)

John Baaki, Graduate Program Director

The Master of Science in Education – Secondary - instructional design and technology concentration is designed to meet the needs of professionals interested or involved in the design, development, and delivery of instruction. The courses are appropriate for a variety of venues, including preK-12, higher education, military, and business. In this specialization, student's select 24 to 30 credits in instructional design and technology plus the problems paper or seminar research option. Working with an advisor, students select courses that complement their backgrounds and professional goals. *The MSEd - Secondary -- instructional design and technology concentration is offered on-campus and online.*

Admission

Students must:

- hold a bachelor's degree from a regionally accredited college/university;
- have a cumulative undergraduate grade point average of 2.80;
- take and receive satisfactory scores on either the Graduate Record Examination (score of 290 combined on verbal and quantitative with a minimum of 140 verbal for regular admission) or Miller Analogies Test (minimum score of 45 or 399 for regular admission); and
- have an interview with the graduate program director or his/her designee.

Performance in classes taken as a non-degree graduate student will not be taken into consideration in the admission process.

Curriculum Requirements

Area I: Emphasis Courses

Introductory Courses

IDT 617	Foundations of Instructional Technology (*)	3
IDT 749	Instructional Systems Design	3

Elective Courses *

Complete elective courses	18-24

Theory:

Select at least one of the following:

IDT 746	Foundations of Distance Education
IDT 760	Cognition and Instructional Design
IDT 763	Instructional Design Theory
IDT 764	Instructional Message Design

Design:

IDT 725	Human Performance Assessment
IDT 761	Applied Instructional Design Tools
IDT 773	Advanced Instructional Design Techniques

Technology:

Select at least one of the following:

IDT 735	Noninstructional Interventions
IDT 751	Computer-Based Multi-Media Design
IDT 752	Diffusion and Adoption of Instructional Technology Innovations
IDT 755	Theory and Design of Instructional Simulation
IDT 756	Instructional Gaming: Theories and Practice
IDT 775	Designing Online Instruction

Human Performance Technology:

Select at least one of the following:

IDT 730	Principles and Practices of Human Performance Technology
IDT 737	Consulting Skills for Instructional Designers
IDT 739	Needs Analysis and Assessment

Electives: From above, or from related areas (e.g., Modeling & Simulation, Psychology, Engineering, Speech-communications, Business, I/O Psychology) with approval of advisor and GPD

Area II: Research Core Courses Required

Problem Paper Option

FOUN 612	Applied Research Methods in Education	3
SEPS 636	Problems in Occupational and Technical Studies	3

Total Credit Hours	30-36

Additional Requirements

Continuance

Students must:

- maintain a grade point average of 3.00;
- maintain a grade point average of 3.00 in the major.

All ID&T students are expected to have regular and reliable access to a multimedia computer (headphones, microphone, and web cam) and a high speed internet connection.

Exit

Students must:

- have a 3.00 grade point average;
- pass a written comprehensive examination;
- have an exit interview;
- have completed all course requirements; and
- submit an application for graduation.

Program Requirements

All courses in the core and elective blocks are offered via synchronous and asynchronous format.

Certificate

Human Performance Technology Certificate

Human performance technology involves systematic and systemic approaches to identifying how work performance improvement can be measured, and most critically applied in real environments to solve actual problems. The certificate provides the student with a fundamental understanding of human technology coupled with targeted coursework in the design and implementation of instructional and non-instructional performance interventions to contribute to performance improvement, strategic planning, and organizational change initiatives. This certificate represents a synthesis in instructional design and technology with business education that benefits performance in a variety of organizations.

Graduate of the program will have the knowledge and skills to contribute to large scale projects that impact multiple facets of an organization. They will also be able to work on performance improvement initiatives.

Admission

Degree-seeking students may enroll in certificate courses with advisor's approval.

Non-degree seeking students seeking admission into the certificate program must:

- Submit a non-degree seeking-certificate/life learner application.
- Have an earned undergraduate degree from a regionally-accredited institution, or an equivalent degree from a foreign institution, with a GPA of 3.0 or higher.
- For those whose native language is not English, submit TOEFL scores with a minimum of 230 on the computer-based TOEFL or 80 on the TOEFL iBT.

Curriculum Requirements

Required Courses

IDT 630	Foundations of Human Performance Technology	3
IDT 735	Noninstructional Interventions	3
IDT 739	Needs Analysis and Assessment	3

Restricted Electives

IDT 737 or IDT 752	Consulting Skills for Instructional Designers Diffusion and Adoption of Instructional Technology Innovations	3

Total Credit Hours 12

Certificate

Online Teaching for K-12 Teachers Certificate

Dr. Xinyue Ren - Certificate Program Coordinator

This certificate provides K-12 teachers with a fundamental understanding of online learning pedagogies, strategies, management, designs, and resources to better prepare them to teach in an exclusively online environment. This certificate combines the Instructional Design & Technology, Library Science, and Teaching and Learning department faculty. Courses focus on the unique pedagogical structures of online learning environments, methods for selecting, evaluating, and integrating available instructional resources and tools for online learning and approaches to management and assessment in online learning environments.

Admission and Continuance

Students seeking admission to the certificate program must meet and maintain program requirements

- Submission an application and application fee
- Submission of an undergraduate degree transcript demonstrating an earned degree from a regionally-accredited institution, or an equivalent degree from a foreign institution.
- For those whose native language is not English, submit TOEFL scores with a minimum of 230 on the computer-based TOEFL or 80 on the TOEFL iBT.

Curriculum Requirements

Curriculum

IDT 647	Online Learning	3
IDT 764	Instructional Message Design	3
LIBS 603	Online Resources for Teaching	3
TLCI 731	Instructional Technology Trends in Curriculum and Instruction	3

Total Credit Hours 12

Additional Requirements

Courses are all taught asynchronously or synchronously online

**This certificate equips students with knowledge and skills to teach online. This is not a state-approved endorsement program.*

Certificate

School Library Practice Certificate

Dr. Elizabeth Burns - School Library Program Director

The Library and Information Studies Program offers a School Library Practice Certificate assists those individuals already holding an MLIS degree (or equivalent) and interested in school librarianship to meet licensure requirements.

The School Library Practice Certificate consists of four courses, 12 semester hours, that address the competencies required for school library media licensure. Students who complete the certificate coursework will have the knowledge and skills to fulfill the roles and responsibilities of teacher, instructional partner, information specialist, program manager, and leader in a school setting.

Admission and Continuance

Students seeking admission to the certificate program must meet and maintain program requirements

- Submission of a graduate transcript demonstrating earned a MLIS degree (or equivalent) with minimum 3.0 GPA
- Submission of written essay with application
- Students must maintain a minimum grade of B- in all LIBS coursework

Curriculum Requirements

Curriculum

LIBS 602	Production of Instructional Materials	3
LIBS 642 or LIBS 644	Children's Literature PREK-8 Literature and Media for Young Adults	3
LIBS 655	Methods and Strategies for the School Library	3
LIBS 676	Library Media Services and the Curriculum	3

Total Credit Hours 12

Additional Requirements

Courses are all taught asynchronously online

**This certificate facilitates the transition to working in a school library setting. This is not a state-approved endorsement program. Individuals will be responsible for submitting transcripts/proof of certificate to state department of education for licensure. Licensure requirements vary from state to state.*

Post-Baccalaureate Endorsement Industrial Cooperative Training Post-Baccalaureate Endorsement

The endorsement program in industrial cooperative training is designed to prepare a licensed teacher to be endorsed to teach industrial cooperative training in the public schools.

Admission

Students may enroll in this teaching endorsement program as a non-degree student. If an MS degree is sought, some graduate level courses may be applied toward professional technical studies in this component of the degree. Admission should be sought into the M.S. program in occupational and technical studies with a concentration in career and technical education teaching. Graduate students can complete up to 12 graduate hours with a non-degree application. Students should contact the program coordinator to discuss admissions options. Prior to entering this program, students must have or qualify for a Virginia Collegiate Professional or Postgraduate Professional License. Secondly, they must be interviewed and accepted by the program coordinator.

Curriculum Requirements

Complete the following courses:

SEPS 401/501	Foundations of Career and Technical Education	3
SEPS 788	Instructional Strategies for Innovation in Training and Occupational Education	3
SEPS 408/508	Advanced Classroom Issues and Practices in Career and Technical Education	3
SEPS 450/550	Assessment, Evaluation and Improvement	3
SEPS 400	Instructional Systems Development	3
SEPS 503	Methods in Career and Technical Education	3
Total Credit Hours		18

Additional Requirements

Continuance and Exit

Students must:

1. earn a 2.75 cumulative grade point average, if licensure is at the undergraduate level, and a 3.00 cumulative grade point average, if licensure is at the graduate level; and
2. document at least 4000 clock hours of acceptable employment in a trade, technical, or industrial education subject area completed within the past five years.

Twelve hours of 500/600 level courses may be applied toward the Master of Science in occupational and technical studies, career and technical education teaching concentration.

Post-Baccalaureate Endorsement Teacher Education Post-Baccalaureate Endorsement

The Post-Baccalaureate Endorsement program is an approved teacher education program for individuals who have completed a bachelor's degree from a regionally accredited institution and wish to qualify for a Virginia teaching license. Students applying for admission into this approved teacher education program are considered graduate non-degree status and must

meet the college's requirements for admitting students into an approved teacher education program. Admission to Old Dominion University does not guarantee admission into degree and/or teacher preparation programs in the Darden College of Education and Professional Studies. Program sheets for the Post-Baccalaureate Endorsement programs are available in the Office of Clinical Experiences.

Admission

Students seeking admission into the post-baccalaureate endorsement program must:

1. apply for admission to Old Dominion University as graduate non-degree seeking student;
2. have achieved an overall GPA of 2.75 in the baccalaureate degree official transcript for post-baccalaureate programs offered at the undergraduate level and 2.80 for post-baccalaureate programs offered at the graduate level;
3. have earned a grade of C or C- (as determined by the specific academic department);
4. interview with and receive recommendation for admittance from a department representative, Career and Advising Resource Center advisor, or distance learning representative;
5. submit the Post-Baccalaureate Endorsement Program Application (<http://www.odu.edu/content/dam/odu/col-dept/teacher-education-services/docs/post-baccalaureate-endorsement-program-application.pdf>);
6. be aware that only 12 hours of professional education courses from another institution may transfer into a post-baccalaureate endorsement program and that practicum and/or student teaching courses are not eligible for transfer;
7. complete the professional dispositions self-survey;
8. attach the completed authorization for the release of any disciplinary action on file with the Office of Student Conduct and Academic Integrity.

Students who do not meet regular admission requirements may meet provisional admission into the post-baccalaureate endorsement program. For provisional status, a student must:

1. apply for admission to Old Dominion University as a graduate non-degree seeking student;
2. have achieved an overall GPA of 2.5-2.74 in the baccalaureate degree official transcript;
3. have earned a grade of C or C- (as determined by the specific academic department);
4. interview with and receive recommendation for admittance from a department representative, Career and Advising Resource Center advisor, or distance learning representative;
5. submit the Post-Baccalaureate Endorsement Program Application (<http://www.odu.edu/content/dam/odu/col-dept/teacher-education-services/docs/post-baccalaureate-endorsement-program-application.pdf>);
6. be aware that only 12 hours of professional education courses from another institution may transfer into a post-baccalaureate endorsement program and that practicum and/or student teaching courses are not eligible for transfer;
7. complete the professional dispositions self-survey;
8. attach the completed authorization for the release of any disciplinary action on file with the Office of Student Conduct and Academic Integrity.

Students who wish to apply to a graduate program while in the post-baccalaureate endorsement program must meet all graduate program entry requirements. Only 12 credit hours of professional education course work from a post-baccalaureate endorsement program will transfer into a graduate program.

In order to student teach, all approved teacher education program requirements must be completed, to include all content and professional education course work with the appropriate grade and GPA as outlined in the respective curriculum and passing scores on Praxis Subject Area

Assessment, the Virginia Communication and Literacy Assessment (VCLA), and the Virginia Reading Assessment (if required by the program).

Additional Requirements

Continuance

To continue in the respective post-baccalaureate teacher education program, the student must:

1. For undergraduate post-baccalaureate teacher education programs, maintain a 2.75 minimum grade point average overall (or as outlined in the specific curriculum), in the major and in the content and professional education core courses;
2. For graduate post-baccalaureate teacher education programs, maintain a 3.0 minimum grade point average overall (or as outlined in the specific curriculum), in the major and in the content and professional education core courses;
3. Continue to earn at least a grade of C or C- (depending on the program) in all courses specified in the major curriculum to include content and professional education core courses for continuance in the teacher education program;
4. Have taken ACT, SAT, Praxis Core, or equivalent math test scores prescribed by the Virginia Board of Education assessment for admission to an approved teacher education program; and
5. Have achieved passing scores in the prescribed Virginia Board of Education professional assessments for licensure described in this section of the catalog, prior to the start of the teacher candidate internship orientation.
6. Have obtained certificate of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training. These must be on file with the Office of Clinical Experiences.

Score reports for all examinations must be on file in the Teacher Education Services & Advising Office in room 2345 of the Education Building. These score reports are to be provided by the candidate and will not be returned. For the most current information on prescribed Virginia Board of Education professional assessments for each individual passing score, visit the Teacher Education Services & Advising Office (<http://education.odu.edu/tes/>) website and review the *required assessments*.

Prior to placement in early field experiences, practica and/or internships, students are required to have a completed Clearance Background Check search, which consists of: *National Criminal Background Check for Employee or Volunteer Providing Care to Children, the Elderly and Disabled* (SP-24 Form), the Child Protective Service's *Central Registry Release of Information* (032-02-1515-11-eng, 02/14), a fingerprint check using the APPLICANT FD258 (REV 3-1-10) 1110-0046 fingerprinting card, and the National Sex Offender Registry and/or the Virginia State Police: Sex Offender Registry search. Students are liable for all costs incurred.

Exit

Students must have:

1. For undergraduate post-baccalaureate teacher education programs, maintain a 2.75 minimum grade point average overall (or as outlined in the specific curriculum), in the major and in the content and professional education core courses;
2. For graduate post-baccalaureate teacher education programs, maintain a 3.0 minimum grade point average overall (or as outlined in the specific curriculum), in the major and in the content and professional education core courses;
3. Achieved grades of C or C- (as determined by the specific academic department) in all courses specified in the major curriculum to include content and professional education core courses; and
4. Earned a passing grade in student teaching.

For more information review the initial licensure required assessments on the Clinical Experiences Office (<http://www.odu.edu/success/academic/teacher-education/val/#tab74=2>) website or visit the office in the Education Building Room 1107.

The Virginia Department of Education requires all initially licensed teachers, school counselors, administrators, and other school personnel to receive training in the area of technology. This training is received through specific courses in the approved professional education programs.

Due to changing University requirements, national accreditation standards, and Commonwealth licensure regulations, the programs in the Darden College of Education and Professional Studies are under constant revision. Any changes resulting from these factors supersede the program requirements described in this Catalog. Students should obtain current program information from their advisors and the Darden College of Education and Professional Studies' website at <http://www.odu.edu/eps>.

For more information on requirements in specific programs, students should refer to the individual program listings in this Catalog or contact the Office of Teacher Education Services & Advising or the appropriate academic department in the College of Arts and Letters (<http://catalog.odu.edu/undergraduate/collegeofartsletters/>), the College of Sciences (<http://www.odu.edu/sci/prospective.html>), or the Darden College of Education (<http://www.odu.edu/education/departments/>) and Professional Studies.

Clearance Background Check Process For All Licensure Programs

Old Dominion University requires a background clearance check of candidates interested in professional education programs. Professional education programs have several field experiences that are required for continuance and graduation from the program. The clearance background check (<http://www.odu.edu/success/academic/teacher-education/placement/background-checks/>) must be successfully completed prior to a field experience placement. Students will be provided a field experience placement when the background check process is completed with resolution of any issues. *Candidates interested in the professional education programs are advised to complete this clearance background check process immediately upon entering a program. This clearance process takes a minimum of eight weeks to complete.*

This clearance background check process (<http://www.odu.edu/success/academic/teacher-education/placement/background-checks/>) includes:

- Fingerprinting
- A social service/child protective service check
- A review of each candidate's name through the National Sex Offender Registry and/or Virginia State Police: Sex Offender Registry

Candidates are liable for all fees incurred when completing the clearance background check process (<http://www.odu.edu/success/academic/teacher-education/placement/background-checks/>). ALL clearance search results must be received and reviewed by Old Dominion University, Teacher Education Services & Advising Office to determine successful completion of the clearance process and approval for placement in a school. The completed clearance check will be posted to the student's Leo Online secure page under Test Scores. *A score of 1 means the student is cleared for placement*

Early Field Experiences

The college is committed to developing candidates skilled in teaching students of all cultural and socioeconomic backgrounds and with diverse learning needs in a fair and equitable manner. Thus, candidates must complete their early field experiences in a public or private school accredited by the Virginia Department of Education. Teacher candidates may request specific schools and districts. However, these requests are informal and ARE NOT guaranteed. Candidates may not contact school district personnel in order to request or obtain placement. Candidates may not complete their field experience at a school where an immediate relative is attending or working. Candidates are required to disclose this information on the on-line placement request.

Prior to placement, students are required to have a completed Clearance Background Check search, which consists of: the Virginia State Police Criminal History Check (State Police Form 230), the Child Protective Service Central Registry Release of Information (032-02-1515/1), a fingerprint check, and the National Sex Offender Registry and/or the Virginia State Police: Sex Offender Registry. Students are liable for all costs incurred.

A candidate may participate in a course with a field experience through one of two tracks:

Option A

A candidate may be eligible to participate in the early field experience course if s/he has been admitted into an approved teacher education program. This requires that candidates achieve the Prescribed Virginia Board of Education Assessment for Admission to an Approved Teacher Education Program. In addition, candidates must meet the GPA for their individual programs, professional education courses, and minimum grade requirements, along with any other course prerequisites.

Option B

A provisionally licensed teacher may participate in a course if s/he is currently employed with a school division, has a letter from the Virginia Department of Education listing the course as a needed requirement, and has passing Virginia Communication and Literacy Assessment (VCLA) scores. The provisionally licensed teacher will have to meet all the requirements of the course as stated in the syllabus.

Prescribed Virginia Board of Education Professional Assessments for Licensure

Old Dominion University teacher candidates seeking initial licensure through the completion of an approved teacher education program must successfully pass the Prescribed Virginia Board of Education Professional Assessments for Licensure prior to the start of the teacher candidate internship. The following assessments must be completed with a passing score:

1. Virginia Communication and Literacy Assessment (VCLA) passing composite score of 470;
2. Praxis Subject Area Assessment exam passing score approved by the Virginia Board of Education; and
3. Praxis Teaching Reading: Elementary. The passing score required for prek-3, prek-6, and k-12 special education general curriculum endorsement is 157. The required passing score for Reading Specialist is 162.

For the most current information on the prescribed Virginia Board of Education professional assessments for each individual passing score, visit the Office of Clinical Experience website, and review the Required Assessments.

Department of Teaching & Learning

3101 Education Building
757-683-3283, 757 683-3284

Angela Eckhoff, Chair

The Department of Teaching and Learning offers programs leading to the Master of Science in Education Degree with majors in Early Childhood Education, Elementary Education, Reading, and Secondary Education; and the Doctor of Philosophy in Education Degree with a concentration in Curriculum and Instruction that includes a variety of curriculum areas. Programs leading to the Master of Science in Education Degree include the 5-year undergraduate/graduate program leading to the Bachelor of Science in Interdisciplinary Studies through the College of Arts and Letters with continuation into the Master of Science in Education Degree with initial teacher licensure in Elementary Education. State-approved teacher preparation programs at the graduate level are also available for individuals with non-teaching bachelor degrees interested in licensure at the Elementary,

Middle, or Secondary school grade levels. Additionally, the Department of Teaching & Learning offers advanced programs such as Reading Specialist and Mathematics Specialist.

Due to changing University requirements, national accreditation standards, and Commonwealth licensure regulations, the programs in the Darden College of Education and Professional Studies are under constant revision. Any changes resulting from these factors supersede the program requirements described in the catalog. Students are encouraged to obtain current program information from their advisors and the Darden College of Education and Professional Studies website at <https://www.odu.edu/eps> (<https://www.odu.edu/eps/>).

Programs

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Master of Science in Education Early Childhood Education with a Concentration in Initial Licensure - Pre-K-3 (MSEd)

3101 Education Building
757-683-3284

Angela Eckhoff, Graduate Program Director

This program is designed for prospective teachers who have completed the undergraduate program in teacher education primary/elementary offered by the Department of Interdisciplinary Studies in the College of Arts and Letters at Old Dominion University.

Admission

All students must apply for and be admitted into the approved M.S.Ed. with initial licensure program for Early Childhood Education (grades PreK-3). The following admission criteria must be met:

1. The Bachelor of Science Degree in Interdisciplinary Studies with a concentration in teacher education, primary/elementary from the College of Arts and Letters at Old Dominion University is required.
2. Students must meet the criteria for admission by passing the Virginia Board of Education prescribed assessments and earning the minimum required grade point averages (GPA). To review more information on the Virginia Board of Education prescribed assessments, visit the Office of Clinical Experiences website, <http://www.odu.edu/oce> (<http://www.odu.edu/oce/>).
3. A cumulative undergraduate GPA of 2.80 is required for admission.
4. No courses in the academic major in which the student has made below a C will be accepted for admission in the Darden College of Education and Professional Studies.
5. Satisfactory scores must be submitted on either the Graduate Record Examination or Miller Analogies Test. A combined verbal and quantitative score of 290 is required on the GRE, with at least a minimum score of 146 on the verbal section. A minimum score of 399 is required on the MAT.
6. An application for graduate studies and official transcripts must be submitted by the appropriate deadline for admission. Under certain circumstances, applicants who do not fully meet the requirements for regular admission to the program may be admitted on a provisional basis subject to conditions specified by the graduate program director for early childhood, PreK-3, education.

Please note: admissions is on hold for program review.

Curriculum Requirements

Prerequisite *

TLED 474/574	Foundations and Contemporary Issues in Early Childhood Education (if not completed in BS program)	3

Required Courses

READ 683	Diagnostic Teaching of Reading in the Classroom	3
SPED 500	Foundations of Special Education: Legal Aspects and Characteristics	3
FOUN 641	Assessment and Evaluation of Student Learning	3
TLED 677	Learning and Development Across Historical and Contemporary Educational Environments	3

TLED 690	The Child and the Family	3
TLED 679	Advanced Classroom Management and Practicum in PreK-6	3
TLED 583	Seminar in Teacher Education	1
TLED 668	Internship/Student Teaching and Seminar	9
Total Credit Hours		31

* If not completed in the BS IDS Teacher Preparation Concentration program.

Due to changing University requirements, national standards, and the Virginia Board of Education licensure regulations, the programs in the Darden College of Education and Professional Studies are under constant revision. Any changes resulting from these factors supersede the program requirements described in this Catalog. Students are encouraged to obtain current program information from their advisors and from the Teacher Education Services website: <http://www.odu.edu/tes> (<http://www.odu.edu/oce/>).

Additional Requirements

Continuance

1. Students must maintain a cumulative GPA of 3.00 and a minimum of 3.00 GPA in the major.
2. A grade of "B" or higher is required in all practicum coursework.
3. Complete the Responsible Conduct of Research (RCR) modules during the first twelve graduate credit hours at Old Dominion University. For more information review the instructions at: <https://www.odu.edu/impact/responsible-conduct-of-training>. (<https://www.odu.edu/impact/responsible-conduct-of-training/>)
4. Students must take and pass all Virginia Board of Education prescribed assessments including the Praxis Teaching Reading: Elementary (Test 5205) and the Praxis Elementary: Multiple Subjects (Test code 5001) computer delivered, prior to or while enrolled in the Seminar in Teacher Education (TLED 583) course.
5. All course work in the program must be completed with at least a 3.00 graduate GPA, a grade of B in the advanced graduate practicum, and all assessments must be passed prior to attending the Teacher Candidate Internship Orientation session.
6. A grade of B- or higher is required in all professional education courses in the master's degree.
7. A clearance background check process must be completed prior to placement in a field experience required for practicum courses and for the teacher candidate internship. For more information, please review the policy in the Office of Clinical Experiences website <http://www.odu.edu/oce> (<http://www.odu.edu/oce/>).
8. Certificate of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.

To review more information on the Virginia Board of Education prescribed assessments visit the Teacher Education Services website, <http://www.odu.edu/oce> (<http://www.odu.edu/oce/>).

Exit

Requirements for graduation include:

1. Passage of the written comprehensive exam;
2. Completion of the Graduate Assessment;
3. A minimum cumulative 3.00 GPA, successful completion of the Teacher Candidate Internship, an completion of an exit interview, and submission of an application for graduation. No courses in the academic major in which the student earned below a C and no courses in professional education in which the student earned below a B- will

Doctor of Philosophy Education with a Concentration in Curriculum and Instruction (PhD)

3101 Education Building
757-683-3284

Angela Eckhoff, Graduate Program Director

The Doctor of Philosophy, Education, Curriculum and Instruction Concentration, with a concentration in Curriculum and Instruction prepares scholarly leaders to identify and examine the problems and possibilities associated with curriculum and instruction in schools and other institutions within a multicultural democratic society. The program focuses on curricular issues as a field of inquiry and develops students' abilities to address the questions that influence curriculum theory, design, development, delivery, assessment, and evaluation.

Program graduates go on to become leaders in our nation's schools, colleges, universities, and related agencies such as business, government, and research institutions. Our curriculum is solidly grounded in interpreting and producing research and scholarship, with particular attention paid to the philosophical, theoretical, historical, socio-cultural, ethical and political constructs and issues that affect curriculum and instruction.

We welcome students with interests in all institutional settings serving students across their lifespan (early childhood through adulthood). As part of their study, students in curriculum and instruction may pursue an area of specialization in:

- childhood studies;
- curriculum studies;
- elementary education;
- history and social studies education;
- instructional technology;
- literacy, language, and culture;
- mathematics education;
- multicultural education;
- science education;
- STEM education; or
- secondary education.

Admission

Admission to the Ph.D. programs in the Department of Teaching & Learning is competitive. Applicants should have a completed master's degree in an appropriate discipline from a regionally accredited university. Degrees that are equivalent to a master's degree such as L.L.B., J.D., and D.D.S., will be considered. A number of criteria are considered including graduate and undergraduate GPAs, GRE scores, writing ability, a personal interview, and the match between student interests and faculty expertise. Meeting the minimum requirements established by the department does not ensure admission to the program. A minimum undergraduate GPA of 2.8 and a minimum graduate GPA of 3.25 are recommended.

Application requirements for the Ph.D. - Education - Curriculum and Instruction Concentration are as follows:

1. A completed online application from the Office of Graduate Admissions (<http://www.odu.edu/admission/graduate/>);
2. A completed master's degree in an appropriate discipline from a regionally accredited university;
3. Three letters of reference from sources including employment supervisors and/or university faculty members capable of commenting on the applicant's current readiness for advanced graduate study;

4. Statement of intent for study in the PhD program in Curriculum and Instruction (limit 1,000 words). In this statement, address the following questions:
 - a. Describe your understanding of and your interest in the Curriculum and Instruction program.
 - b. How will the Curriculum and Instruction program help you achieve your long-term professional goals?
5. Submission of a professional curriculum vitae. Three years of teaching experience are preferred;
6. Official transcripts of all undergraduate and graduate courses and degrees completed;
7. Academic writing sample - Choose and submit one of the following options:
 - a. Previous academic writing sample (e.g., thesis, major paper, culminating project from previous graduate work), or
 - b. Develop a brief (four double-spaced pages response to the following prompt using a minimum of three academic sources): Identify and analyze an issue related to education in your local context.
8. Applicants whose native language is not English must submit a current score for the Test of English as a Foreign Language (TOEFL) of at least 600 (written) or 250 (computer based).

Applications must be complete and submitted to the ODU Office of Graduate Admissions by October 15 for spring admissions, and March 1 for Summer and Fall admissions (dates subject to change). Note: If you wish to apply for Financial Aid, deadlines for application are as much as six months earlier. Contact the Financial Aid office at 757-683-3683. Financial aid is awarded only to regularly admitted graduate students.

Completed applications will be reviewed by the Ph.D. Curriculum and Instruction Admissions and Continuance Committee. Selected applicants will be invited to campus to participate in various activities including an on-campus interview, writing sample, and a class visit.

Curriculum Requirements

Prerequisite Coursework *

Students must have taken ONE of the following research courses or equivalent:

ELS 660	Program Evaluation, Research and Planning
FOUN 611	Introduction to Research Methods in Education
FOUN 612	Applied Research Methods in Education

Students must also have the following or equivalent:

FOUN 722	Introduction to Applied Statistics and Data Analysis

Research Core (required) **

FOUN 812	Research Design and Analysis	3
TLCI 814	Qualitative Research Design in Education	3
Choose one course from EACH of the following bound pairs		9

FOUN 822	Applied Linear Models in Educational Research
or FOUN 823	Analysis of Variance Applied to Educational Research
FOUN 840	Educational Measurement and Assessment
or FOUN 870	Formative Assessment of Student Learning
TLCI 815	Advanced Qualitative Research
or FOUN 813	Program Evaluation in Education

Note: A research cognate can be earned by taking an additional four courses beyond the required 15 hours.

Common Core (Required by all C&I Concentrations) **

TLCI 802	Historical and Contemporary Perspectives on Education	3
TLCI 803	Theoretical Perspectives in Curriculum and Instruction	3
TLCI 888	Seminar in the Multicultural Environment	3

TLCI 805	Critical Issues in Curriculum Research	3
Curriculum and Instruction Concentration		
C&I Approved Course 1		3
C&I Approved Course 2		3
C&I Approved Course 3		3
C&I Approved Course 4		3
C&I Approved Course 5		3
C&I Approved Course 6		3
C&I Approved Course 7		3
Dissertation		12
TLCI 899	Dissertation	
Total Credit Hours		60

- * All students admitted into the Ph.D. program in curriculum and instruction must complete these prerequisite courses unless they have previously completed equivalent graduate level coursework or have appropriate educational experience.
- ** Course substitutions must be approved by advisor.

Due to changing University requirements, national accreditation standards, and Commonwealth licensure regulations, the programs in the Darden College of Education and Professional Studies are under constant revision. Any changes resulting from these factors supersede the program requirements described in the catalog. Students are encouraged to obtain current program information from their advisors and the Darden College of Education and Professional Studies website: <https://www.odu.edu/eps> (<https://www.odu.edu/eps/>).

Additional Requirements

Prerequisite Coursework

Prospective students should also have prior course work in statistics, and curriculum and instruction. If this requirement is not met, then additional course work will be added to the student's graduate program of study.

All students admitted into the Ph.D. program must complete the following prerequisite courses unless they have previously completed equivalent graduate level coursework or expertise.

- Introduction to Research in Education (FOUN 611) or Applied Research Methods in Education (FOUN 612) or equivalent; FOUN 611 is recommended.
- Statistics Applied to Research in Education (FOUN 722 or equivalent).

Degree Requirements

The Ph.D. in Education, Curriculum and Instruction Concentration is comprised of courses totaling a minimum of 60 academic credit hours beyond the master's degree. The curriculum includes a 15-hour research/foundations block, a 12 hour "common core" taken by all Ph.D. students in Curriculum and Instruction regardless of interest area, a 21-hour concentration core consisting of courses that reflect the student's interest area, and a 12-hour dissertation block. The dissertation will often require more than 12 credit hours depending on the length of time necessary for completion. Students entering the program may also need to complete introductory research methods statistics courses (FOUN 611 [recommended], FOUN 612 or equivalent), and Statistics Applied to Research in Education (FOUN 722 or equivalent), if they have not had such courses or cannot demonstrate competency at a satisfactory level. Students who come into the Ph.D. program with a master's degree in an academic field that is unrelated to curriculum and instruction and/or who have not completed courses to develop competency in specified areas may need to complete these courses in addition to the required courses. Students must complete the Responsible Conduct of Research (RCR) modules during the first twelve graduate credit hours at Old Dominion University. For more information review the instructions at: <https://www.odu.edu/impact/>

responsible-conduct-of-training. (<https://www.odu.edu/impact/responsible-conduct-of-training/>)

Program Continuance, Completion and Exit

It is the expectation that Curriculum and Instruction faculty will prepare Ph.D. candidates to become competent professionals with the knowledge, skills, and dispositions necessary to assume positions as researchers, teacher leaders, advocates, and scholars. On an annual basis, the Curriculum & Instruction Ph.D. Admissions and Continuance Committee and each student's advisor will formally convene to discuss the continuance of each student in the doctoral degree program.

To complete the program, students must fully comply with the curriculum below, and all requirements noted elsewhere in the University catalog for graduate students and within the Ph.D. in Education Handbook. It is the responsibility of the student to obtain these materials and adhere to program requirements.

Master of Science in Education Elementary Education with a Concentration in Elementary Education Pre-K-6 (MSEd)

General Description of Elementary Education

Elementary programs include the Master of Science in Education degree program and four post-baccalaureate licensure programs. Within the Master of Science in elementary education degree program there are a number of concentrations and emphasis area choices for both licensed teachers as well as those seeking initial licensure or endorsement. For those seeking initial licensure there are the following concentration areas: PreK-6 and middle school 6-8. For licensed teachers seeking additional education there are the following concentration areas: math specialist PK-8 and elementary generalist. Post-baccalaureate endorsement programs are designed for individuals with a non-teaching B.S. or B.A. degree who want to obtain licensure or for those with a teaching license who want to be licensed in an additional teaching area. The three endorsement programs offered in elementary education are PreK-6, Middle School 6-8, and Mathematics Specialist PreK-8.

Master of Science in Education, Elementary Education, Pre-K-6, Initial Licensure

3101 Education Building
757-683-3284

Judith Dunkerly-Bean, Graduate Program Director

The master's program in elementary school education (PreK-6) is designed for individuals with a non-teaching B.S. or B.A. degree who want to obtain licensure as a teacher in preschool through grade six and earn a master's degree at the same time. The Pre-K-6 initial licensure concentration offers two different emphasis areas: Interdisciplinary Studies (those getting a B.S. degree in Interdisciplinary Studies from ODU) or Non-Interdisciplinary Studies (those with other non-teaching undergraduate degrees).

Note to students in Washington State from the Student Achievement Council (SAC) concerning the Master of Science in Education, Elementary Education, PreK-6: Eligibility for initial educator certification in Washington is based on completion of a state approved educator preparation program. This program is approved in Virginia by the Virginia Department of Education and is authorized for field placements in Washington by the Professional Educators Standards Board. Even though you may be residing in Washington while in this program, your application for educator certification in Washington will be processed as an out-of-state application. Go to <http://pathway.pesb.wa.gov/archive/outofstate> (<http://pathway.pesb.wa.gov/archive/outofstate/>) for more information. Teachers are advised to contact their individual school districts as to whether or not

this program may qualify for teacher advancement. This program is available on-campus and online.

Non-Interdisciplinary Studies Emphasis Area

This curriculum is designed for individuals with a non-teaching BS or BA degree who want to obtain the Virginia teaching license to become a teacher in pre-k-6 grades and earn the master's degree at the same time.

Admission

All students must apply for and be admitted into the approved M.S. Ed with initial licensure program for Elementary Education (grades Pre-K-6). Admission criteria include the following

1. A Bachelor of Science from a regionally accredited college/university is required.
2. A minimum cumulative GPA of 2.80 in the bachelor's degree.
3. Students must meet the Virginia Board of Education prescribed assessments passing scores as outlined in the Office of Clinical Experiences section of this catalog. *For the most current information on the prescribed Virginia Board of Education admission assessment, visit the Office of Clinical Experiences website, <http://www.odu.edu/oce> (<http://www.odu.edu/oce/>) and review the Teacher Education Handbook.*
4. No courses in the academic major in which the student has earned a grade below "C" will be accepted for admission in the Darden College of Education and Professional Studies.
5. No course in professional education in which the student has earned a grade below a "B-" will be accepted in the Darden College of Education and Professional Studies.
6. An application for graduate studies, and official transcripts must be submitted by the appropriate deadline for admission. Under certain circumstances, applicants who do not fully meet the requirements for regular admission to the program may be admitted on a provisional basis subject to conditions specified by the elementary education graduate program director.

Curriculum

Prerequisite Undergraduate Professional Education Classes

TLED 532	Developing Instructional Strategies PreK-6: Language Arts	
TLED 535	Developing Instructional Strategies PreK-6: Social Studies	
TLED 568	Language Acquisition and Reading for Students with Diverse Learning Needs	
TLED 608	Foundations of Education and Instructional Assessment	
SPED 613	Human Growth and Development	
STEM 533	Developing Instructional Strategies PreK-6: Mathematics	
IDT 618	Digital Age Teaching and Learning	3
STEM 534	Developing Instructional Strategies PreK-6: Science	

Graduate Professional Education Courses

TLED 579	Classroom Management and Practice PreK-3; PreK-6	3
TLED 690	The Child and the Family	3
READ 680	Literacy Across the Curriculum	3
SPED 620	Advanced Foundations of Special Education: Legal Aspects and Characteristics	3
LIBS 642	Children's Literature PREK-8	3
FOUN 641	Assessment and Evaluation of Student Learning	3
TLED 677	Learning and Development Across Historical and Contemporary Educational Environments	3

TLED 679	Advanced Classroom Management and Practicum in PreK-6	3
TLED 583	Seminar in Teacher Education	1
TLED 668	Internship/Student Teaching and Seminar	9
Total Credit Hours		37

Due to changing University requirements, national standards, and the Virginia Board of Education licensure regulations, the teacher education programs in the Darden College of Education and Professional Studies are under constant revision. Any changes resulting from these factors supersede the program requirements described in this Catalog. Students are encouraged to obtain current program information from their advisors and from the Teacher Education Services website: <http://www.odu.edu/tes> (<http://www.odu.edu/oce/>).

Additional Requirements

Continuance

1. A clearance background check process must be completed when registering for a course that requires a field experience. The clearance background check search results must be on file prior to placement in the field experience. For more information, please review the policy in the Office of Clinical Experiences website: <http://www.odu.edu/oce> (<http://www.odu.edu/oce/>).
2. Students must maintain GOOD ACADEMIC standing as noted on the academic transcript.
3. A grade of B- or higher is required in all graduate professional education coursework (excluding graduate practicum coursework).
4. A grade of "B" or higher is required in all graduate practicum coursework.
5. Students must complete the Responsible Conduct of Research (RCR) Social and Behavioral modules during the first twelve graduate credit hours at Old Dominion University. For more information review the instructions at: <https://www.odu.edu/impact/responsible-conduct-of-training>. (<https://www.odu.edu/impact/responsible-conduct-of-training/>)
6. Students must take and pass all Virginia Board of Education prescribed assessments for licensure including the Virginia Communication and Literacy Assessment (VCLA), the Praxis Teaching Reading: Elementary (Test Code 5205), and the Praxis Elementary Education: Multiple Subjects (Test code 5001), prior to or while enrolled in TLED 583-Seminar in Teacher Education.
7. Submit the Teacher Candidate Internship application for placement by the established deadline.
8. All course work, content knowledge and professional education, must be completed with appropriate grades prior to the Teacher Candidate Internship Orientation.
9. All assessments must be passed prior to the Teacher Candidate Internship Orientation. For more information on the Virginia Board of Education prescribed professional assessments, visit the Office of Clinical Experiences website, <http://www.odu.edu/oce> (<http://www.odu.edu/oce/>).
10. Certificate of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.

Exit

Requirements for graduation include:

1. Submit an application for graduation;
2. Passage of the teaching portfolio comprehensive exam;
3. Completion of the Graduate Assessment;
4. A minimum cumulative 3.00 graduate GPA;
5. Successful completion of the Teacher Candidate Internship;
6. Completion of an exit interview;
7. Completion of all course requirements; and

8. No courses in the professional education area with a grade below "B-" will be accepted toward licensure requirements in the Darden College of Education and Professional Studies.

Program Requirements

Students seeking a master's degree in elementary education (grades Pre-K-6) with initial licensure must meet the academic content requirements with a minimum grade of "C" in addition to the professional education course work listed below. Transcripts will be evaluated by the teacher education advisor to determine whether academic content requirements have been met by previous course work. Subject area specific course work that was not met with previous course work must be completed prior to the Teacher Candidate Internship (student teaching) orientation session.

Master of Science in Education Elementary Education with a Concentration in Elementary Education Pre-K-6 - IDS (Initial Licensure) (MSEd)

General Description of Elementary Education

Elementary programs include the Master of Science in Education degree program and four post-baccalaureate licensure programs. Within the Master of Science in elementary education degree program there are a number of concentrations and emphasis area choices for both licensed teachers as well as those seeking initial licensure or endorsement. For those seeking initial licensure there are the following concentration areas: PreK-6 and middle school 6-8. For licensed teachers seeking additional education there are the following concentration areas: math specialist PK-8. Post-baccalaureate endorsement programs are designed for individuals with a non-teaching B.S. or B.A. degree who want to obtain licensure or for those with a teaching license who want to be licensed in an additional teaching area. The three endorsement programs offered in elementary education are PreK-6, Middle School 6-8, and Mathematics Specialist PreK-8.

Master of Science in Education, Elementary Education, Pre-K-6 (Initial Licensure)

3101 Education Building
757-683-3284

Judith Dunkerly, Graduate Program Director

The master's program in elementary school education (PreK-6) is designed for individuals with a non-teaching BS or BA degree who want to obtain licensure as a teacher in preschool through grade six and earn a master's degree at the same time. The Pre-K-6 initial licensure concentration offers three different emphasis areas: Interdisciplinary Studies (those getting a B.S. degree in Interdisciplinary Studies from ODU) or Non-Interdisciplinary Studies (those with other non-teaching undergraduate degrees). Please note that this is not an appropriate program for those holding a provisional teaching license.

Note to students in Washington State from the Student Achievement Council (SAC) concerning the Master of Science in Education, Elementary Education, PreK-6: Eligibility for initial educator certification in Washington is based on completion of a state-approved educator preparation program. This program is approved in Virginia by the Virginia Department of Education and is authorized for field placements in Washington by the Professional Educators Standards Board. Even though you may be residing in Washington while in this program, your application for educator certification in Washington will be processed as an out-of-state application. Go to <http://pathway.pesb.wa.gov/archive/outofstate> (<http://pathway.pesb.wa.gov/archive/outofstate/>) for more information. Teachers are advised to contact their individual school districts as to whether or not

this program may qualify for teacher advancement. This program is available on-campus and online.

Interdisciplinary Studies Teacher Preparation Emphasis Area

This program is designed for prospective who have earned a Bachelor of Science in Interdisciplinary Studies Teacher Preparation with a concentration in primary/elementary education offered by the Department of Interdisciplinary Studies Teacher Preparation in the College of Arts and Letters at Old Dominion University. Students must meet the required criteria for admission outlined below by passing the Virginia Board of Education prescribed assessments and earning the minimum required grade point averages (GPA).

Admission

All students must apply for and be admitted into the approved MSEd with initial licensure program for Elementary Education (grades Pre-K-6). Admission criteria include the following:

1. The Bachelor of Science in Interdisciplinary Studies Teacher Preparation with a concentration in primary/elementary education offered by the Department of Interdisciplinary Studies Teacher Preparation in the College of Arts and Letters at Old Dominion University is required.
2. A minimum cumulative GPA of 2.80 in the bachelor's degree.
3. Students must meet the Virginia Board of Education prescribed assessments passing scores as outlined in the Office of Clinical Experiences section of this catalog. *For the most current information on the prescribed Virginia Board of Education admission assessment, visit the Office of Clinical Experiences website, <http://www.odu.edu/oce> (<http://www.odu.edu/oce/>) and review the Teacher Education Handbook.*
4. No courses in the academic major in which the student has earned a grade below "C" will be accepted for admission in the Darden College of Education and Professional Studies.
5. No course in professional education in which the student has earned a grade below a "B-" will be accepted in the Darden College of Education and Professional Studies.
6. An application for graduate studies, and official transcripts must be submitted by the appropriate deadline for admission. Under certain circumstances, applicants who do not fully meet the requirements for regular admission to the program may be admitted on a provisional basis subject to conditions specified by the elementary education graduate program director.
7. Applicants may not hold a provisional license in Elementary Education (not a substitute teaching license) prior to, or during this program.

Program Requirements

Students seeking initial licensure plus a master's degree in elementary education (grades Pre-K-6) must meet the academic content requirements with a minimum grade of "C". Transcripts will be evaluated by the education advisor to determine whether these academic requirements have been met by previous course work. Subject area specific course work that was not met in previous course work must be completed prior to Teacher Candidate Internship (student teaching) orientation session.

Curriculum

Graduate Professional Education Courses

SPED 620	Advanced Foundations of Special Education: Legal Aspects and Characteristics	3
TLED 690	The Child and the Family	3
READ 680	Literacy Across the Curriculum	3
LIBS 642	Children's Literature PREK-8	3
FOUN 641	Assessment and Evaluation of Student Learning	3

TLED 677	Learning and Development Across Historical and Contemporary Educational Environments	3
TLED 679	Advanced Classroom Management and Practicum in PreK-6	3
TLED 583	Seminar in Teacher Education	1
TLED 668	Internship/Student Teaching and Seminar	9
Total Credit Hours		31

Additional Requirements

Continuance

1. A clearance background check process must be completed when registering for a course that requires a field experience. The clearance background check search results must be on file prior to placement in the field experience. For more information, please review the policy in the Office of Clinical Experiences website: <http://www.odu.edu/oce> (<http://www.odu.edu/oce/>).
2. Students must maintain GOOD ACADEMIC standing as noted on the academic transcript.
3. A grade of B- or higher is required in all graduate professional education coursework (excluding graduate practicum coursework).
4. A grade of "B" or higher is required in all graduate practicum coursework.
5. Students must complete the Responsible Conduct of Research (RCR) Social and Behavioral modules during the first twelve graduate credit hours at Old Dominion University. For more information review the instructions at: <https://www.odu.edu/impact/responsible-conduct-of-training>. (<https://www.odu.edu/impact/responsible-conduct-of-training/>)
6. Students must take and pass all Virginia Board of Education prescribed assessments including the Virginia Communication and Literacy Assessment (VCLA), the Praxis Teaching Reading: Elementary (Test Code 5205), and the Praxis Elementary Education: Multiple Subjects (Test code 5001), prior to or while enrolled in TLED 583-Seminar in Teacher Education.
7. Submit the Teacher Candidate Internship application for placement by the established deadline.
8. All assessments must be passed prior to the Teacher Candidate Internship Orientation. For more information on the Virginia Board of Education prescribed professional assessments, visit the Office of Clinical Experiences website: <http://www.odu.edu/oce> (<http://www.odu.edu/oce/>).
9. Students must obtain certificates of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.

Exit

Requirements for graduation include:

1. Submit an application for graduation;
2. Passage of the teaching portfolio comprehensive exam;
3. Completion of the Graduate Assessment;
4. A minimum cumulative 3.00 graduate GPA;
5. Successful completion of the Teacher Candidate Internship;
6. Completion of an exit interview;
7. Completion of all course requirements; and
8. No courses in the professional education area with a grade below "B-" will be accepted toward licensure requirements in the Darden College of Education and Professional Studies.

Master of Science in Education Elementary Education with a Concentration in Licensed Teachers (MSEd)

General Description of Elementary Education

Elementary programs include the Master of Science in Education degree program and four post-baccalaureate licensure programs. Within the Master of Science in elementary education degree program there are a number of concentrations and emphasis area choices for both licensed teachers as well as those seeking initial licensure or endorsement. For those seeking initial licensure there are the following concentration areas: PreK-6, middle school 6-8, and library science K-12 (Note: the library science concentration may also be done through Master of Science in Education, Secondary Education). For licensed teachers seeking additional education there are the following concentration areas: math specialist PK-8, library science K-12 (Note: the library science concentration may also be done through Master of Science in Education, Secondary Education), and elementary generalist. Post-baccalaureate endorsement programs are designed for individuals with a non-teaching BS or BA degree who want to obtain licensure or for those with a teaching license who want to be licensed in an additional teaching area. The four endorsement programs offered in elementary education are PreK-6, Middle School 6-8, Library Science K-12, and Mathematics Specialist PreK-8.

Master of Science in Education, Elementary Education, for Licensed Teachers

3101 Education Building
757-683-3284

Brandon Butler, Graduate Program Director

The Master of Science in Education, Elementary Education program for licensed teachers is designed for those who wish to improve and update their professional competency in teaching and enrich their teaching expertise for becoming master teachers. Licensed teachers completing the program enhance their ability to teach effectively and to participate in educational research in their schools. Completion of the program requirements leads to the upgrade of the teaching license to the Postgraduate Professional level. The program of study consists of 30-credit hours, 18 credit hours taught in a cohort model with shared courses for students from the early childhood, elementary and secondary advanced master's degree programs. An additional three credit hours are completed as independent research/internship. The remaining nine credit hours focus explicitly on teaching and learning in the elementary grades. *The MSEd - Elementary Education program for licensed teachers is offered online only.*

The graduate program associated with this major is intended to meet the needs of the individual student. Program options are designed to accomplish three primary goals:

1. to enhance classroom instruction by enriching the knowledge and skills of practicing teachers;
2. to train and encourage classroom teachers to conduct in-school research so that significant findings in the learning-teaching process can be applied to the classroom situation; and
3. to permit teachers to upgrade their teaching credentials to the Postgraduate Professional License level.

Curricula for the program include specific courses that emphasize the interdisciplinary nature of teaching in diverse settings. Topics addressed in courses include curricular and pedagogical principles, assessment, English language learners, teaching in the digital age, and culturally responsive teaching. Students also learn to engage in reflective inquiry and how to conduct practitioner inquiry that directly transforms instructional practice and beliefs about teaching. The program has four component areas:

1. General core;
2. Research core;
3. Elementary emphasis area; and
4. Capstone experience.

Students must choose one of two capstone options – a research thesis and associated 3-credit hour thesis course (Thesis Option); or an internship experience and associated 3-credit hour internship course (Internship Option). The thesis option requires a successful defense of the thesis prospectus. The non-thesis internship option requires successful completion of a comprehensive examination covering program coursework.

Admission

Students must:

1. hold a bachelor's degree from a regionally accredited college/university;
2. hold the Virginia Collegiate Professional License or an equivalent from another state for elementary or middle school education;
3. have a general undergraduate grade point average of at least 2.80;
4. submit an application letter of interest;
5. submit official copies of all transcripts;
6. submit a written essay on career goals (two pages) that demonstrates academic writing proficiency;
7. submit two letters of professional reference for this program of study; and
8. have an interview with the graduate program director.

Program Requirements

Students enrolled in the Advanced Master's Degree program are expected to be dedicated to the goal of becoming master classroom teachers who can address dynamic issues in the profession through an in-depth understanding of research and practice. Students must successfully complete all elements of the 30 credit hour program of study. After admission to provisional or regular degree status, the student must meet with the graduate program director who will assist in the identification of a permanent advisor from the graduate faculty of the Darden College of Education and Professional Studies. It is the responsibility of the student to confer with the assigned advisor for the purpose of determining a thesis/internship committee, and preparing and defending the thesis/internship as a requisite for graduation.

Curriculum

Common Core

TLCI 731	Instructional Technology Trends in Curriculum and Instruction	3
TLED 618	Assessment and Evaluation in PK-12 Schools	3
TLED 775	English Language Learners in the PK-12 Classroom	3
TLED 701	Teacher as Leader	3

Research Core

TLED 638	Researching Teaching in Elementary and Secondary Grades	3
TLED 671	Practitioner Inquiry in Elementary and Secondary Grades	3

Electives

TLED 744	Diversity and Equity in Elementary Education	3
TLED 702	Coaching and Mentoring	3
TLED 703	Curriculum Leadership	3

Capstone Experience - Choose 1 of 2 Options

Thesis Option		
TLED 699	Thesis	
Internship Option		
TLCI 668	Internship in Curriculum and Instruction	

Total Credit Hours **30**

Licensed Teachers Concentration

The Master of Science in Education, Elementary Education program for licensed teachers is designed for those who wish to improve and update their professional competency in teaching and enrich their teaching expertise for becoming master teachers. Licensed teachers completing the program enhance their ability to teach effectively and to participate in educational research in their schools. Completion of the program requirements leads to the upgrade of the teaching license to the Postgraduate Professional level.

Students seeking this degree need to apply through the Department of Teaching and Learning.

Additional Requirements

Continuance

Students must:

1. complete the Responsible Conduct of Research (RCR) modules during the first twelve graduate credit hours at Old Dominion University;
2. maintain a grade point average of 3.00

Exit

Students must:

1. have a 3.00 grade point average;
2. pass an oral thesis proposal defense (thesis option only);
3. pass a comprehensive examination (internship option only);
4. successfully complete the thesis/internship requirement;
5. have an exit interview (online);
6. have completed all course requirements;
7. submit an application for graduation.

Master of Science in Education Elementary Education with a Concentration in Mathematics Specialist PK-8 (MSEd)

General Description of Elementary Education

Elementary programs include the Master of Science in Education degree program and four post-baccalaureate licensure programs. Within the Master of Science in elementary education degree program there are a number of concentrations and emphasis area choices for both licensed teachers as well as those seeking initial licensure or endorsement. For those seeking initial licensure there are the following concentration areas: PreK-6, middle school 6-8, and library science K-12 (Note: the library science concentration may also be done through Master of Science in Education, Secondary Education). For licensed teachers seeking additional education there are the following concentration areas: math specialist PK-8, library science K-12 (Note: the library science concentration may also be done through Master of Science in Education, Secondary Education), and elementary generalist. Post-baccalaureate endorsement programs are designed for individuals with a non-teaching BS or BA degree who want to obtain licensure or for those with a teaching license who want to be licensed in an additional teaching area. The four endorsement programs offered in elementary education are PreK-6, Middle School 6-8, Library Science K-12, and Mathematics Specialist PreK-8.

Master of Science in Education - Elementary Education - with Mathematics Specialist Endorsement (PK-8)

3101 Education Building
757-683-3284

Melva Grant, Program Director

This graduate program leads to a Master's of Science in Education degree. Elementary major, with the Mathematics Specialist (PK-8) endorsement. This program is offered in partnership with the Department of Mathematics and Statistics in the College of Sciences. *The MSED - Elementary, Mathematics Specialist (PK-8) endorsement is offered online only.*

Admission

Candidates must:

- Have 3 years of successful classroom experience in teaching mathematics;
- Hold a bachelor's degree from a regionally accredited college/university;
- Hold the Virginia Collegiate Professional License or an equivalent license from another state.
- Have an undergraduate grade point average of 2.80 and an average of 3.00 in the major; and
- Submit an application for graduate studies.

Performance in classes taken as a non-degree student will not be taken into consideration in the admission process. Under certain circumstances, applicants who do not fully meet the requirements for regular admission to the program may be admitted on a provisional basis subject to conditions specified by the graduate director for the program.

Curriculum

Education Content

TLED 650	Mathematics Specialists as Teacher Leaders	3
TLED 651	Teaching Mathematics for All Using Culturally Responsive Approaches	3
TLED 653	Participatory Action Research for Mathematics Specialists	3
TLED 654	Practicum for Mathematics Specialists	3
TLED 658	Mathematical Assessment for Data Driven Decisions	3

Mathematics Content

MAPD 601	Number and Operations for PK-8 Mathematics Specialists	3
MAPD 602	Geometry and Measurement for PK-8 Mathematics Specialists	3
MAPD 603	Rational Numbers and Proportional Reasoning for PK-8 Mathematics Specialists	3
MAPD 604	Probability and Statistics for PK-8 Mathematics Specialists	3
MAPD 605	Algebra and Functions for PK-8 Mathematics Specialists	3

Total Credit Hours **30**

Additional Requirements

Continuance

Candidates must maintain a grade point average of 3.00.

Exit

Candidates must:

- Have a 3.00 grade point average;
- Have completed all course requirements;
- Have completed a professional learning portfolio; and
- Submit an application for graduation.

Master of Arts in Teaching Master of Arts in Teaching - Elementary Education (MAT)

Overview

The Master of Arts in Teaching for Elementary Education is a 37-credit hour non-thesis degree program that includes a 9-credit hour student teaching experience in elementary education that will prepare students for licensure from the Virginia Department of Education. The program will prepare highly qualified professionals to teach in schools through a systematic approach to teacher preparation highlighting the intersections between contemporary research based teaching practices and learning, alongside supportive field experiences. This program focuses on teacher preparation for PreK-6 classrooms, which requires foundational knowledge in history, mathematics, English, and science.

Admission Criteria

Applicants for the Master of Arts in Teaching in Elementary Education are required to submit credentials to ODU for consideration. The documentation/criteria for acceptance include:

- A bachelor's degree from a regionally accredited college/university or equivalent institution in the United States;
- A minimum undergraduate GPA of 2.8 on a 4.0 scale;
- Official copies of transcripts from all regionally accredited institutions attended or equivalent institutions outside of the U.S.;
- Three academic and/or professional reference letters for the program of study; and

Non-native English speakers will also be required to provide current scores for the Test of English as a Foreign Language (TOEFL) of at least 550 (or 79 on the TOEFL iBT).

Program Requirements

Core Courses (12 Credit Hours)

READ 680	Literacy Across the Curriculum	3
SPED 620	Advanced Foundations of Special Education: Legal Aspects and Characteristics	3
TLED 618	Assessment and Evaluation in PK-12 Schools	3
TLED 677	Learning and Development Across Historical and Contemporary Educational Environments	3

Elementary Education (15 Credit Hours)

TLED 568	Language Acquisition and Reading for Students with Diverse Learning Needs	3
TLED 672	Integrating Children's Lit, Language Arts & Social Studies Across Early Child Curriculum	3
TLED 673	Integrating Science and Mathematics Across the Early Childhood and Elementary Curriculum	3

TLED 679	Advanced Classroom Management and Practicum in PreK-6	3
TLED 681	Critical Pedagogy in Early Childhood	3

Student Teaching (10 Credit Hours)

TLED 583	Seminar in Teacher Education	3
TLED 668	Internship/Student Teaching and Seminar	3

Total Credit Hours **37**

Continuance

1. A clearance background check process must be completed when registering for a course that requires a field experience. The clearance background check search results must be on file prior to placement in the field experience. For more information, please review the policy in the Office of Clinical Experiences website: <http://www.odu.edu/oce>.
2. Students must maintain GOOD ACADEMIC standing as noted on the academic transcript.
3. A grade of B- or higher is required in all graduate professional education coursework.
4. Students must complete the Responsible Conduct of Research (RCR) Social and Behavioral modules during the first twelve graduate credit hours at Old Dominion University. For more information review the instructions at: <https://www.odu.edu/impact/responsible-conduct-of-training>.
5. Students must take and pass all Virginia Board of Education prescribed assessments for licensure, prior to or while enrolled in TLED 583-Seminar in Teacher Education.
6. Submit the Teacher Candidate Internship application for placement by the established deadline.
7. All course work, content knowledge and professional education, must be completed with appropriate grades prior to the Teacher Candidate Internship Orientation.
8. All assessments must be passed prior to the Teacher Candidate Internship Orientation. For more information on the Virginia Board of Education prescribed professional assessments, visit the Office of Clinical Experiences website, <http://www.odu.edu/oce>.
9. Certificate of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.

Exit

Requirements for graduation include:

1. Submit an application for graduation;
2. Passage of the teaching portfolio comprehensive exam;
3. Completion of the Graduate Assessment;
4. A minimum cumulative 3.00 graduate GPA;
5. Successful completion of the Teacher Candidate Internship;

6. Completion of all course requirements; and

7. No courses in the professional education area with a grade below "B-" will be

accepted toward licensure requirements in the Darden College of Education and

Professional Studies.

Program Requirements

Students seeking a master's degree in elementary education (grades Pre-K-6) with initial

licensure must meet the academic content requirements with a minimum grade of "C" in

addition to the professional education course work listed below. Transcripts will be

evaluated by the teacher education advisor to determine whether academic content

requirements have been met by previous course work. Subject area specific course work

that was not met with previous course work must be completed prior to the Teacher

Candidate Internship (student teaching) orientation session

Master of Arts in Teaching Master of Arts in Teaching - Secondary Education (MAT)

Overview

This program focuses on teacher preparation for grades 6-12, spanning the pre-adolescent and the adolescent learner. Students seeking the secondary education concentration must have an understanding of the content, skills, and practices of the content area, equivalent to an undergraduate degree. Transcripts will be evaluated by the education advisor to determine whether the academic requirements have been met by previous coursework. Subject area specific course work (content) that was not met in previous coursework must be completed prior to Teacher Candidate Internship (student teaching) orientation session. Experiential learning credit may be available for some non-academic work.

Admissions

Applicants for the Master of Arts in Teaching in Secondary Education are required to submit credentials to ODU for consideration. The documentation/criteria for acceptance include:

- A bachelor's degree from a regionally-accredited college/university or equivalent institution outside of the United States;
- A minimum undergraduate GPA of 2.80 on a 4.0 scale;
- Official copies of transcripts from all regionally-accredited institutions attended or equivalent institutions outside the U.S.;
- Three academic and/or professional reference letters for the program of study; and non-native English speakers will also be required to provide current scores for the Test of English as a Foreign Language (TOEFL) of at least 550 (or 79 on the iBT).

Students with previously completed graduate-level work at a regionally-accredited institution may submit a request for a maximum of 12 credit hours to be transferred. Such transfer hours would go through the admissions committee and Graduate School for approval and, if accepted, added to the transcripts. They may be used for core classes or as concentration or restricted elective courses if content is deemed equivalent to content in the proposed courses.

Program Requirements

Core Courses (12 Credit Hours)

TLED 677	Learning and Development Across Historical and Contemporary Educational Environments	3
READ 680	Literacy Across the Curriculum (Core Courses)	3
TLED 618	Assessment and Evaluation in PK-12 Schools	3
SPED 620	Advanced Foundations of Special Education: Legal Aspects and Characteristics	3

Secondary Education (15 Credit Hours)

TLED 636	Problems in Education	3
IDT 618	Digital Age Teaching and Learning	3
TLED 640	The Management of Learning and Instruction	3
SPED 622	Advanced Collaboration and Transitions	3
Select one of the following:		3

TLED 551	Developing Instructional Strategies for Teaching in the Middle/High School: English	
TLED 555	Developing Instructional Strategies for Teaching in the Middle/High School: Social Studies	
TLED 552	Developing Instructional Strategies for Teaching in Middle/High School: Math and Science	

Student Teaching (10 Credit Hours) 10

TLED 583	Seminar in Teacher Education	
TLED 668	Internship/Student Teaching and Seminar	

Total Credit Hours 37

Continuance

- Students must complete the Responsible Conduct of Research (RCR) modules during the first twelve graduate credit hours at Old Dominion University.
- Students must maintain a cumulative GPA of 3.00 with a minimum grade requirement of B or higher required in all practicum coursework and a minimum B grade in the remaining graduate professional education courses.
- Students must take and pass the Praxis Subject Assessment (formerly Praxis II) examination for the appropriate specialty area prior to or while enrolled in the instructional strategies course and the seminar in teacher education (TLED 583).
- A clearance background check must be completed prior to placement in a field experience required for observation and practicum courses and for the teacher candidate internship. For more information on the criminal background check process please review the information on the Office of Clinical Experiences website.
- All assessments must be passed prior to the start of the Teacher Candidate Internship Orientation session. For more information please review the information on the Office of Clinical Experiences website.

- Students must obtain certificates of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.
- To review more information on the Virginia Board of Education prescribed professional assessments visit the Office of Clinical Experiences website.

Exit

- Requirements for graduation include the following:
1. Passage of the teaching portfolio comprehensive exam,
 2. completion of the Graduate Assessment,
 3. a minimum cumulative 3.00 GPA, with a minimum grade requirement of B or higher required in all practicum coursework and a grade of B-or higher in the remaining graduate professional education courses.
 4. successful completion of the Teacher Candidate Internship,
 5. completion of all course requirements, and
 6. submission of an application for graduation.

Only courses that meet the grade required for the academic major or professional education will be accepted toward licensure requirements in the Darden College of Education and Professional Studies.

Program Requirements

Students seeking initial licensure plus a master’s degree in secondary education (grades 6-12) must meet the grade required for the academic major and professional education in order to complete the master's degree. Transcripts will be evaluated by the education advisor to determine whether the academic requirements have been met by previous course work. Subject area specific course work (content) that was not met in previous course work must be completed prior to Teacher Candidate Internship (student teaching) orientation session. Experiential learning credit may be available for some non-academic work.

Master of Science in Education Reading (MSEd)

Master of Science in Education, Reading (Non-Licensure, Online Master's Only)

3101 Education Building
757-683-3284

For program information, please contact reading@odu.edu

The program is designed for those candidates who do not necessarily have a teaching license but want to get a master's degree in reading. The master's only program is designed to provide professional training in literacy for administrators, literacy coaches, elementary and secondary-level teachers in private schools that do not require a teaching license, and policy makers. The non-licensure track is for students who are not interested in obtaining reading specialist endorsement. This track is designed for those students who seek to work in schools, institutions and agencies that do not require state licensure or certification. As many literacy specialists work outside of the traditional K-12 public school classroom. Program study may include an intensive search of the professional literature on literacy or selected field experiences in public, private or governmental reading program that provide literacy services to clients. In addition, candidates tutor struggling readers and aid in the diagnosis and remediation of reading problems. The program is offered online only. This degree does not provide a Reading Specialist Endorsement.

The MSED - Reading (Master's only) is offered online.

Admission

Students must:

1. Hold a bachelor's degree or higher from an accredited college/university;
2. Have an undergraduate grade point average of 2.80 and an average of 3.00 in the major, preferably education;
3. Have two letters of recommendation from former professors or principals;
4. Submit an essay;
5. Have an interview with the graduate program director;
6. Have official copies of all transcripts of undergraduate and graduate coursework and degrees sent to Graduate Admissions; and
7. Submit an online application (<https://www.odu.edu/admission/graduate>) (<https://www.odu.edu/admission/graduate/>), which includes an essay and recommendations, an official transcripts to the MSED in Reading Education program.

Performance in classes taken as a non-degree student will not be taken into consideration in the admission process. Under certain circumstances, applicants who do not fully meet the requirements for regular admission to the program may be admitted on a provisional basis subject to conditions specified by the graduate program director for reading education.

Curriculum

Course requirements for completion of the degree program are listed below.

READ 612	Action Research in Reading	3
READ 614	Foundations of Literacy Learning	3
READ 619	Word Study, Phonics, and Linguistics	3
READ 622	Culturally Responsive Literacy for All Learners	3
READ 628	New Literacies, Digital Technologies, and Learning	3
READ 683	Diagnostic Teaching of Reading in the Classroom	3
READ 685	Organizing and Supervising Reading Program Development	3
READ 686	Advanced Language Development and Reading	3
READ 693	Practicum in Reading	3
TLED 775	English Language Learners in the PK-12 Classroom	3

Total Credit Hours **30**

Additional Requirements

Continuance

Students must

1. complete the Responsible Conduct of Research (RCR) modules during the first twelve graduate credit hours at Old Dominion University. For more information review the instructions at: <https://www.odu.edu/impact/responsible-conduct-of-training>; (<https://www.odu.edu/impact/responsible-conduct-of-training/>)
2. maintain a grade point average of 3.00 overall.

Exit

Students must

1. have a 3.00 grade point average;
2. submit and pass cumulative Literacy Professional Portfolio (e-Portfolio)
3. complete an exit survey;
4. have completed all course requirements;
5. submit an application for graduation.

Program Requirements

A minimum of 30 semester credits is required for the Master's Degree in Reading Education.

Master of Science in Education Reading with a Reading Specialist Endorsement (MSEd)

Master of Science in Education, Reading with Reading Specialist Endorsement (for licensed teachers)

3101 Education Building
757-683-3284

Abha Gupta, Program Director

The program is designed to provide professional training for prospective reading specialists, literacy coaches, and elementary- and secondary-level reading teachers or a general master's degree in reading.

Extensive course offerings permit the graduate student to pursue an area of interest, such as elementary school reading, secondary school reading, college reading, literacy coaching, and reading in clinical settings. As a culminating experience, each student investigates a problem area and prepares a formal research paper or project on a topic of interest.

Candidate study may include an intensive search of the professional literature on reading or selected field experiences in public, private, or governmental reading programs that provide reading services to clients. In addition, candidates tutor children and aid in the diagnosis and remediation of reading problems. Candidates who have three years of satisfactory experience in teaching reading, completed the entire degree program, and satisfactorily completed the Reading for Virginia Educators: Reading Specialists-coded 5304 may obtain the reading specialist endorsement. *The MSED - Reading with Reading Specialist endorsement is offered online only.*

Admission

Students must:

1. Hold a bachelor's degree from a regionally accredited college/university;
2. Have an teaching license prior to beginning this program. In Virginia this is called a Collegiate Professional License or a Post-Graduate Professional License. You must send a copy of your teaching license to Graduate Admissions as part of your admissions packet; or you may hold and submit a copy of the Virginia Collegiate Professional License or an equivalent license from another state;

3. Have an undergraduate grade point average of 2.80 and an average of 3.00 in the major;
4. Have two letters of recommendation from former professors or principals;
5. Submit an essay;
6. Have an interview with the graduate program director;
7. Have official copies of all transcripts of undergraduate and graduate coursework and degrees sent to Graduate Admissions; and
8. Submit an online application (<https://www.odu.edu/admission/graduate>), which includes an essay and recommendations, an official transcripts to the MSED in Reading Education program.

Performance in classes taken as a non-degree student will not be taken into consideration in the admission process. Under certain circumstances, applicants who do not fully meet the requirements for regular admission to the program may be admitted on a provisional basis subject to conditions specified by the graduate program director for reading education.

READ 612	Action Research in Reading	3
READ 614	Foundations of Literacy Learning	3
READ 619	Word Study, Phonics, and Linguistics	3
READ 622	Culturally Responsive Literacy for All Learners	3
READ 628	New Literacies, Digital Technologies, and Learning	3
READ 680	Literacy Across the Curriculum	3
READ 683	Diagnostic Teaching of Reading in the Classroom	3
READ 685	Organizing and Supervising Reading Program Development	3
READ 686	Advanced Language Development and Reading	3
READ 693	Practicum in Reading	3
Total Credit Hours		30

Additional Requirements

Continuance

Students must

1. complete the Responsible Conduct of Research (RCR) modules during the first twelve graduate credit hours at Old Dominion University. For more information review the instructions at: <https://www.odu.edu/impact/responsible-conduct-of-training>; (<https://www.odu.edu/impact/responsible-conduct-of-training/>)
2. maintain a grade point average of 3.00 overall; and
3. maintain a grade point average of 3.00 in the major.

Exit

Students must

1. have a 3.00 grade point average;
2. have a 3.00 grade point average in the major;
3. complete an exit survey;
4. have completed all course requirements;
5. submit an application for graduation; and
6. The degree candidates in the Reading Specialist program must successfully pass the Virginia Reading Specialist Licensure Exam (RVE-5304). Candidates receiving the master's degree only without the Reading Specialist endorsement are not required to take the Reading for Virginia Educators exam.

Program Requirements

A minimum of 30 semester credits is required for the Master's Degree in Reading Education. The Reading Specialist degree candidate must successfully pass the Virginia Reading Specialist Licensure examination

(RVE-5304), usually taken in the last semester of the program. Candidates receiving the master's degree only without the Reading Specialist endorsement are not required to take the Reading for Virginia Educators exam.

Course requirements for completion of the degree program are listed below.

Master of Science in Education Secondary Education for Licensed Teachers (MSEd)

3101 Education Building
757-683-3284

General Description of Secondary Education

Secondary programs include the Master of Science in Education degree program and three Post-baccalaureate licensure programs. Within the Master of Science in secondary education degree program there are a number of concentrations and content area choices for both licensed teachers as well as those seeking initial licensure or endorsement.

For those seeking initial licensure there are the following content areas: 6-12 (content areas: biology, chemistry, earth science, English, mathematics, physics, social studies), library science K-12 (Note: the library science concentration may also be done through Master of Science in Education, Elementary Education), and Teachers of English to Speakers of Other Languages K-12 (TESOL).

For licensed teachers seeking additional education there are the following concentration areas: 6-12 and library science K-12 (Note: the library science concentration may also be done through Master of Science in Education - Elementary). Post-baccalaureate endorsement programs are designed for individuals with a non-teaching BS or BA degree who want to obtain licensure, or for those with a teaching license who want to be licensed in an additional teaching area. The three endorsement programs offered in secondary education are 6-12, Library Science K-12, and Teachers of English to Speakers of Other Languages K-12 (TESOL).

Please note that there are secondary education programs for earning a bachelor's degree with initial licensure in grades 6-12 described in the ODU Undergraduate Catalog.

Master of Science in Education, Secondary Education, for Licensed Teachers

3101 Education Building
757-683-3284

Brandon Butler, Graduate Program Director

The Master of Science in Education, Secondary Education program for licensed teachers is designed for those who wish to improve and update their professional competency in teaching and enrich their teaching expertise for becoming master teachers. Licensed teachers completing the program enhance their ability to teach effectively and to conduct powerful educational research that has a direct impact upon their individual practice and school settings. Completion of the program requirements leads to the upgrade of the teaching license to the Postgraduate Professional level. The program of study consists of 30-credit hours, with 18 credit hours taught in a cohort model with shared courses for students from the early childhood, elementary and secondary advanced master's degree programs. An additional three credit hours are completed as independent research/internship. The remaining nine credit hours focus explicitly on teaching and learning in the secondary grades. *The MSEd - Secondary Education program for licensed teachers is offered online only.*

The graduate program associated with this major is intended to meet the needs of the individual student. Program options are designed to accomplish three primary goals:

1. to enhance classroom instruction by enriching the knowledge and skills of practicing teachers;
2. to train and encourage classroom teachers to conduct in-school research so that significant findings in the learning-teaching process can be applied to the classroom situation; and
3. to permit teachers to upgrade their teaching credentials to the Postgraduate Professional License level.

Curricula for the program include specific courses that emphasize the interdisciplinary nature of teaching in diverse settings. Topics addressed in courses include curricular and pedagogical principles, assessment, English language learners, teaching in the digital age, and culturally responsive teaching. Students also learn to engage in reflective inquiry and how to conduct practitioner inquiry that directly transforms instructional practice and beliefs about teaching. The program has four component areas:

1. General core;
2. Research core;
3. Elementary emphasis area; and
4. Capstone experience.

Students must choose one of two capstone options – a research thesis and associated 3-credit hour thesis course (Thesis Option); or an internship experience and associated 3-credit hour internship course (Internship Option). The thesis option requires a successful defense of the thesis prospectus. The non-thesis internship option requires successful completion of a comprehensive examination covering program coursework.

Admission

Students must:

1. hold a bachelor's degree from a regionally accredited college/university;
2. hold the Virginia Collegiate Professional License or an equivalent from another state for middle school or secondary education;
3. have a general undergraduate grade point average of at least 2.80;
4. submit an application letter of interest;
5. submit official copies of all transcripts;
6. submit a written essay on career goals (two pages) that demonstrates academic writing proficiency;
7. submit two letters of professional reference for this program of study; and
8. have an interview with the graduate program director.

Curriculum

Common Core

TLCI 731	Instructional Technology Trends in Curriculum and Instruction	3
TLED 618	Assessment and Evaluation in PK-12 Schools	3
TLED 775	English Language Learners in the PK-12 Classroom	3
TLED 701	Teacher as Leader	3

Research Core

TLED 638	Researching Teaching in Elementary and Secondary Grades	3
TLED 671	Practitioner Inquiry in Elementary and Secondary Grades	3

Electives

TLED 745	Diversity and Equity in Secondary Education	3
TLED 702	Coaching and Mentoring	3
TLED 703	Curriculum Leadership	3

Capstone Experience - Choose 1 of 2 Options

<i>Thesis Option</i>		
TLED 699	Thesis	
<i>Internship Option</i>		

Additional Requirements

Continuance

Students must:

1. complete the Responsible Conduct of Research (RCR) modules during the first twelve graduate credit hours at Old Dominion University;
2. maintain a grade point average of 3.00

Exit

Students must:

1. have a 3.00 grade point average;
2. pass an oral thesis proposal defense (thesis option only);
3. pass a comprehensive examination (internship option only);
4. successfully complete the thesis/internship requirement;
5. have an exit interview (online);
6. have completed all course requirements; and
7. submit an application for graduation.

Program Requirements

Students enrolled in the Advanced Master's Degree program are expected to be dedicated to the goal of becoming master classroom teachers who can address dynamic issues in the profession through an in-depth understanding of research and practice. Students must successfully complete all elements of the 30 credit hour program of study. After admission to provisional or regular degree status, the student must meet with the graduate program director who will assist in the identification of a permanent advisor from the graduate faculty of the Darden College of Education and Professional Studies. It is the responsibility of the student to confer with the assigned advisor for the purpose of determining a thesis/internship committee, and preparing and defending the thesis/internship as a requisite for graduation.

Master of Science in Education Secondary Education for Licensed Teachers, 6-12 - Science (MSEd)

Master of Science in Education, Secondary Education

3101 Education Building
757-683-3284

Secondary programs include the Master of Science in Education degree program and three Post-baccalaureate licensure programs. Within the Master of Science in secondary education degree program there are a number of concentrations and content area choices for both licensed teachers as well as those seeking initial licensure or endorsement.

For those seeking initial licensure there are the following content areas: 6-12 (content areas: biology, chemistry, earth science, English, mathematics, physics, social studies), library science K-12 (Note: the library science concentration may also be done through Master of Science in Education, Elementary Education), and Teachers of English to Speakers of Other Languages K-12 (TESOL).

For licensed teachers seeking additional education there are the following concentration areas: 6-12 and library science K-12 (Note: the library science concentration may also be done through Master of Science in Education - Elementary). Post-baccalaureate endorsement programs are designed for individuals with a non-teaching BS or BA degree who want to obtain licensure, or for those with a teaching license who want to be licensed in an additional teaching area. The three endorsement programs offered in secondary education are 6-12, Library Science K-12, and Teachers of English to Speakers of Other Languages K-12 (TESOL).

Please note that there are secondary education programs for earning a bachelor's degree with initial licensure in grades 6-12 described in the ODU Undergraduate Catalog.

Master of Science in Education for Licensed Teachers, 6-12 - Science

The Master of Science in Education, Secondary Education program for licensed teachers is designed for those who wish to improve and update their professional competency in teaching and enrich their teaching expertise for becoming master teachers. Licensed teachers completing the program enhance their ability to teach effectively and to conduct powerful educational research that has a direct impact upon their individual practice and school settings. Completion of the program requirements leads to the upgrade of the teaching license to the Postgraduate Professional level.

Students seeking this degree need to apply through the Department of Teaching and Learning.

Master of Science in Education Secondary Education with a Concentration in Initial Licensure 6-12 Mathematics (MSEd)

Master of Science in Education, Secondary Education

3101 Education Building
757-683-3284

Secondary programs include the Master of Science in Education degree program and three Post-baccalaureate licensure programs. Within the Master of Science in secondary education degree program there are a number of concentrations and content area choices for both licensed teachers as well as those seeking initial licensure or endorsement.

For those seeking initial licensure there are the following content areas: 6-12 (content areas: biology, chemistry, earth science, English, mathematics, physics, social studies), and Teachers of English to Speakers of Other Languages K-12 (TESOL).

For licensed teachers seeking additional education there are the following concentration areas: 6-12 . Post-baccalaureate endorsement programs are designed for individuals with a non-teaching BS or BA degree who want to obtain licensure, or for those with a teaching license who want to be licensed in an additional teaching area. The two endorsement programs offered in secondary education are 6-12 and Teachers of English to Speakers of Other Languages K-12 (TESOL).

Please note that there are secondary education programs for earning a bachelor's degree with initial licensure in grades 6-12 described in the ODU Undergraduate Catalog.

Master of Science in Education, Secondary Education, for Licensed Teachers

3101 Education Building
757-683-3284

Tom Bean, Graduate Program Director

The Master of Science in Education, Secondary Education program for licensed teachers is designed for those who wish to improve and update their professional competency in teaching and enrich their teaching expertise for becoming master teachers. Licensed teachers completing the program enhance their ability to teach effectively and to conduct powerful educational research that has a direct impact upon their individual practice and school settings. Completion of the program requirements leads to the upgrade of the teaching license to the Postgraduate Professional level. The program of study consists of 30-credit hours, with 18 credit hours taught in a cohort model with shared courses for students from the early childhood, elementary and

secondary advanced master's degree programs. An additional three credit hours are completed as independent research/internship. The remaining nine credit hours focus explicitly on teaching and learning in the secondary grades. *The MSEd - Secondary Education program for licensed teachers is offered online only.*

The graduate program associated with this major is intended to meet the needs of the individual student. Program options are designed to accomplish three primary goals:

1. to enhance classroom instruction by enriching the knowledge and skills of practicing teachers;
2. to train and encourage classroom teachers to conduct in-school research so that significant findings in the learning-teaching process can be applied to the classroom situation; and
3. to permit teachers to upgrade their teaching credentials to the Postgraduate Professional License level.

Curricula for the program include specific courses that emphasize the interdisciplinary nature of teaching in diverse settings. Topics addressed in courses include curricular and pedagogical principles, assessment, English language learners, teaching in the digital age, and culturally responsive teaching. Students also learn to engage in reflective inquiry and how to conduct practitioner inquiry that directly transforms instructional practice and beliefs about teaching. The program has four component areas:

1. General core;
2. Research core;
3. Elementary emphasis area; and
4. Capstone experience.

Students must choose one of two capstone options – a research thesis and associated 3-credit hour thesis course (Thesis Option); or an internship experience and associated 3-credit hour internship course (Internship Option). The thesis option requires a successful defense of the thesis prospectus. The non-thesis internship option requires successful completion of a comprehensive examination covering program coursework.

Admission

All students must apply for and be admitted into the approved MSEd in Secondary Education, 6-12, with initial licensure program. For admission to the Campus-Based emphasis area, the following criteria must be met:

1. A bachelor's degree from a regionally accredited college/university is required in the liberal arts and sciences (or equivalent). The degree must include semester hours (which meet Virginia's stated coursework competencies) in one of the following content areas: English, mathematics, earth science, chemistry, biology, or physics, and history/social studies, which will be listed on the license.
2. Students must meet the required criteria for admission by passing the Virginia Board of Education prescribed assessments and earning the minimum required grade point averages (GPA). *For the most current information on the prescribed Virginia Board of Education admission assessment, visit the Office of Clinical Experiences website, <http://www.odu.edu/oce> (<http://www.odu.edu/oce/>) and review the Teacher Education Handbook.*
3. A cumulative undergraduate GPA of 2.80 is required for admission.
4. Only courses that meet the grade required for the academic major or professional education will be accepted for admission in the Darden College of Education and Professional Studies.
5. An application for graduate studies and official transcripts must be submitted by the appropriate deadline for admission. Under certain circumstances, applicants who do not fully meet the requirements for regular admission to the program may be admitted on a provisional basis subject to conditions specified by the graduate program director for secondary education.

Curriculum

Initial Licensure 6-12 Mathematics Concentration

There are a number of individuals who have earned BS or BA degrees who now want to obtain a master's degree leading to licensure as a secondary school teacher. In the program, students complete (or have completed) a minimum of 32 credits of undergraduate courses in one endorsement area (mathematics) and an additional 31-34 credits of education courses at the graduate level.

Students seeking this degree need to apply through the Department of Teaching and Learning.

Additional Requirements

Continuance

1. Students must complete the Responsible Conduct of Research (<https://www.odu.edu/impact/responsible-conduct-of-training/>) (RCR) modules during the first twelve graduate credit hours at Old Dominion University.
2. Students must maintain a cumulative GPA of 3.00 with a minimum grade requirement of B or higher required in all practicum coursework and a minimum B- grade in the remaining graduate professional education courses.
3. Students must take and pass the Praxis Subject Assessment (formerly Praxis II) examination for the appropriate specialty area prior to or while enrolled in the instructional strategies course and the seminar in teacher education (TLED 583).
4. A clearance background check must be completed prior to placement in a field experience required for observation and practicum courses and for the teacher candidate internship. For more information on the criminal background check process please review the information on the Office of Clinical Experiences (<http://www.odu.edu/oce/>) website.
5. All assessments must be passed prior to the start of the Teacher Candidate Internship Orientation session. For more information please review the information on the Office of Clinical Experiences (<http://www.odu.edu/oce/>) website.
6. Students must obtain certificates of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.

To review more information on the Virginia Board of Education prescribed professional assessments visit the Office of Clinical Experiences (<http://www.odu.edu/oce/>) website.

Exit

Requirements for graduation include the following:

1. Passage of the teaching portfolio comprehensive exam,
2. completion of the Graduate Assessment,
3. a minimum cumulative 3.00 GPA, with a minimum grade requirement of B or higher required in all practicum coursework and a grade of B-or higher in the remaining graduate professional education courses.
4. successful completion of the Teacher Candidate Internship,
5. completion of an exit interview,
6. completion of all course requirements, and
7. submission of an application for graduation.

Only courses that meet the grade required for the academic major or professional education will be accepted toward licensure requirements in the Darden College of Education.

Program Requirements

Students seeking initial licensure plus a master's degree in secondary education (grades 6-12) must meet the grade required for the academic major

and professional education in order to complete the master's degree.

Transcripts will be evaluated by the education advisor to determine whether the academic requirements have been met by previous course work. Subject area specific course work (content) that was not met in previous course work must be completed prior to Teacher Candidate Internship (student teaching) orientation session. Experiential learning credit may be available for some non-academic work.

Master of Science in Education Secondary Education with a Concentration in Secondary Education - 6-12 (MSEd)

3101 Education Building
757-683-3284

Secondary programs include the Master of Science in Education degree program and three Post-baccalaureate licensure programs. Within the Master of Science in secondary education degree program there are a number of concentrations and content area choices for both licensed teachers as well as those seeking initial licensure or endorsement.

For those seeking initial licensure there are the following content areas: 6-12 (content areas: biology, chemistry, earth science, English, mathematics, physics, social studies) and Teachers of English to Speakers of Other Languages K-12 (TESOL).

For licensed teachers seeking additional education there are the following concentration areas: 6-12 . Post-baccalaureate endorsement programs are designed for individuals with a non-teaching BS or BA degree who want to obtain licensure, or for those with a teaching license who want to be licensed in an additional teaching area. The two endorsement programs offered in secondary education are 6-12 and Teachers of English to Speakers of Other Languages K-12 (TESOL).

Please note that there are secondary education programs for earning a bachelor's degree with initial licensure in grades 6-12 described in the ODU Undergraduate Catalog.

Master of Science in Education, Secondary Education, 6-12 with Initial Licensure

3101 Education Building
757-683-3284

Jori Beck, Graduate Program Director

This master's program in secondary education (grades 6-12) with initial licensure is designed for individuals with a non-teaching BS or BA degree who want to obtain licensure as a teacher in grades 6 through 12 and earn a master's degree at the same time. *This program is available on-campus and online.*

Note: This program is no longer accepting applications. Please refer to the Master of Arts in Teaching - Secondary Education page (<https://catalog.odu.edu/graduate/education/teaching-learning/teaching-secondary-mat/>) for degree information regarding initial licensure in secondary education at the graduate level.

Admission

All students must apply for and be admitted into the approved MSEd in Secondary Education, 6-12, with initial licensure program. For admission to the Campus-Based emphasis area, the following criteria must be met:

1. A bachelor's degree from a regionally accredited college/university is required in the liberal arts and sciences (or equivalent). The degree must include semester hours (which meet Virginia's stated coursework competencies) in one of the following content areas: English, mathematics, earth science, chemistry, biology, or physics, and history/social studies, which will be listed on the license.

- Students must meet the required criteria for admission by passing the Virginia Board of Education prescribed assessments and earning the minimum required grade point averages (GPA). *For the most current information on the prescribed Virginia Board of Education admission assessment, visit the Office of Clinical Experiences website, <http://www.odu.edu/oce/> and review the Teacher Education Handbook.*
- A cumulative undergraduate GPA of 2.80 is required for admission.
- Only courses that meet the grade required for the academic major or professional education will be accepted for admission in the Darden College of Education and Professional Studies.
- An application for graduate studies and official transcripts must be submitted by the appropriate deadline for admission. Under certain circumstances, applicants who do not fully meet the requirements for regular admission to the program may be admitted on a provisional basis subject to conditions specified by the graduate program director for secondary education.

Curriculum

Graduate Professional Education courses

TLED 608	Foundations of Education and Instructional Assessment	3
SPED 613	Human Growth and Development	3
SPED 620	Advanced Foundations of Special Education: Legal Aspects and Characteristics	3
IDT 618	Digital Age Teaching and Learning	3
TLED 640	The Management of Learning and Instruction	3
READ 680	Literacy Across the Curriculum	3
SPED 622	Advanced Collaboration and Transitions	3
TLED 583	Seminar in Teacher Education (co-requisite with Instructional Strategies)	1
FOUN 641	Assessment and Evaluation of Student Learning	3
TLED 669	Internship/Student Teaching and Seminar	3-9
Select one of the following four that corresponds to subject (content) area:		3
TLED 551	Developing Instructional Strategies for Teaching in the Middle/High School: English	
TLED 555	Developing Instructional Strategies for Teaching in the Middle/High School: Social Studies	
TLED 552	Developing Instructional Strategies for Teaching in Middle/High School: Math and Science	

Total Credit Hours **31-37**

Due to changing University requirements, national standards, and the Virginia Board of Education licensure regulations, the programs in the Darden College of Education and Professional Studies are under constant revision. Any changes resulting from these factors supersede the program requirements described in this Catalog. Students are encouraged to obtain current program information from their advisors and from the Office of Clinical Experiences (<http://www.odu.edu/oce/>) website.

Additional Requirements

Continuance

- Students must complete the Responsible Conduct of Research (<https://www.odu.edu/impact/responsible-conduct-of-training/>) (RCR) modules during the first twelve graduate credit hours at Old Dominion University.
- Students must maintain a cumulative GPA of 3.00 with a minimum grade requirement of B or higher required in all practicum coursework and a minimum B- grade in the remaining graduate professional education courses.

- Students must take and pass the Praxis Subject Assessment (formerly Praxis II) examination for the appropriate specialty area prior to or while enrolled in the instructional strategies course and the seminar in teacher education (TLED 583).
- A clearance background check must be completed prior to placement in a field experience required for observation and practicum courses and for the teacher candidate internship. For more information on the criminal background check process please review the information on the Office of Clinical Experiences (<http://www.odu.edu/oce/>) website.
- All assessments must be passed prior to the start of the Teacher Candidate Internship Orientation session. For more information please review the information on the Office of Clinical Experiences (<http://www.odu.edu/oce/>) website.
- Students must obtain certificates of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.

To review more information on the Virginia Board of Education prescribed professional assessments visit the Office of Clinical Experiences (<http://www.odu.edu/oce/>) website.

Exit

Requirements for graduation include the following:

- Passage of the teaching portfolio comprehensive exam,
- completion of the Graduate Assessment,
- a minimum cumulative 3.00 GPA, with a minimum grade requirement of B or higher required in all practicum coursework and a grade of B-or higher in the remaining graduate professional education courses.
- successful completion of the Teacher Candidate Internship,
- completion of an exit interview,
- completion of all course requirements, and
- submission of an application for graduation.

Only courses that meet the grade required for the academic major or professional education will be accepted toward licensure requirements in the Darden College of Education.

Program Requirements

Students seeking initial licensure plus a master's degree in secondary education (grades 6-12) must meet the grade required for the academic major and professional education in order to complete the master's degree. Transcripts will be evaluated by the education advisor to determine whether the academic requirements have been met by previous course work. Subject area specific course work (content) that was not met in previous course work must be completed prior to Teacher Candidate Internship (student teaching) orientation session. Experiential learning credit may be available for some non-academic work.

Master of Science in Education Secondary Education with Initial Licensure 6-12 - Science (MSEd)

Master of Science in Education, Secondary Education

3101 Education Building
757-683-3284

The Department of Teaching and Learning has developed a new master's program in secondary school licensure: the Master of Arts in Teaching, Secondary Education, with concentrations in 6-12 Biology, Chemistry, Computer Science, Earth Science, English, History & Social Studies, Mathematics, and Physics. This state-approved program prepares individuals with the equivalent of an undergraduate degree in one of the content areas for VA licensure at the secondary level. For more information, please

see <https://catalog.odu.edu/graduate/education/teaching-learning/teaching-secondary-mat/#text>

Secondary programs include the Master of Science in Education degree program and three Post-baccalaureate licensure programs. Within the Master of Science in secondary education degree program there are a number of concentrations and content area choices for both licensed teachers as well as those seeking initial licensure or endorsement.

For those seeking initial licensure there are the following content areas: 6-12 (content areas: biology, chemistry, earth science, English, mathematics, physics, social studies) and Teachers of English to Speakers of Other Languages K-12 (TESOL).

For licensed teachers seeking additional education there are the following concentration areas: 6-12 . Post-baccalaureate endorsement programs are designed for individuals with a non-teaching BS or BA degree who want to obtain licensure, or for those with a teaching license who want to be licensed in an additional teaching area. The two endorsement programs offered in secondary education are 6-12 and Teachers of English to Speakers of Other Languages K-12 (TESOL).

Please note that there are secondary education programs for earning a bachelor's degree with initial licensure in grades 6-12 described in the ODU Undergraduate Catalog.

Master of Science in Education with Initial Licensure 6-12 - Science

There are a number of individuals who have earned BS or BA degrees who now want to obtain a master's degree leading to licensure as a secondary school teacher. In the program, students complete (or have completed) a minimum of 32 credits of undergraduate courses in one endorsement area (earth science, chemistry, biology, or physics) and an additional 31-34 credits of education courses at the graduate level.

Students seeking this degree need to apply through the Department of Teaching and Learning.

Certificate Literacy Coaching Certificate

3101 Education Building
757-683-3284

Jamie Colwell, Certificate Coordinator

The purpose of this certificate is to prepare literacy coaches in understanding literacy development among children using research-based theories in literacy methods and instructional design. Graduates of this program will be able to use such methods in coaching children who require enhanced instruction related to reading and writing. They will also be prepared to assess learning outcomes in literacy and to supervise classroom literacy programs. Three courses from this certificate may be counted toward the MSED in Reading.

Admission

Students must:

1. Hold a bachelor's degree from a regionally accredited college/university;
2. Have an initial teaching license prior to beginning this program. In Virginia this is called a Collegiate Professional License or a Post-Graduate Professional License. You must send a copy of your teaching license to Graduate Admissions as part of your admissions packet; or you may hold and submit a copy of the Virginia Collegiate Professional License or an equivalent license from another state;
3. Have an undergraduate grade point average of 2.80 and an average of 3.00 in the major;
4. Have official copies of all transcripts of undergraduate and graduate coursework and degrees sent to Graduate Admissions; and

5. Submit an online nondegree application (<https://www.odu.edu/admission/graduate> (<https://www.odu.edu/admission/graduate/>)).

Curriculum

This graduate certificate is comprised of four required courses that encompass the key areas of literacy coaching: foundations of literacy learning, assessment, new literacy forms, and supervision of literacy program. The four courses are:

READ 614	Foundations of Literacy Learning
READ 627	School-Wide Assessment and Professional Development
READ 628	New Literacies, Digital Technologies, and Learning
READ 685	Organizing and Supervising Reading Program Development

Total Hours 12

Certificate Secondary Education Professional Studies Certificate

Kelly Rippard, Coordinator

This certificate program is designed to support provisionally licensed teachers, who are employed by a school division in the Commonwealth, in meeting teacher licensure requirements. The certificate consists of four courses—12 semester hours—that move toward meeting the professional studies competency areas described by the Virginia Department of Education and required by all fully licensed teachers. It is not a state-approved endorsement education program.

Admission

1. Degree seeking graduate-level students admitted to the certificate program must have an earned baccalaureate degree from a regionally-accredited institution or an equivalent degree from a foreign institution.
2. Non-degree-seeking students may take a maximum of 12 credit hours prior to seeking admission.
3. Those whose native language is not English must submit a minimum score of 230 on the computer-based TOEFL or 80 on TOEFL iBT.

Curriculum Requirements

This certificate is designed to support provisionally licensed teachers, who are employed by school division in the Commonwealth of Virginia, in meeting teacher licensure requirements. The certificate consists of a four course sequence—12 semester hours—that moves toward meeting the professional studies competency areas described by the Virginia Department of Education and required by all fully licensed teachers. It is not a state-approved endorsement education program.

The professional studies certificate will be comprised of the following courses. All of these courses are currently taught at ODU as part of the MSED in Secondary Education.

**Required Courses (12 hours)*

READ 680	Literacy Across the Curriculum	3
SPED 613	Human Growth and Development	3
TLED 608	Foundations of Education and Instructional Assessment	3
TLED 640	The Management of Learning and Instruction	3
Total Credit Hours		12

**Additional course work might be necessary to fully meet teacher licensure requirements*

Additional Requirements

Course Delivery Format

The courses are all currently available in both traditional face-to-face and web-based formats. This certificate will be available in both formats.

Certificate

Teacher Leadership Certificate

Brandon Butler, Program Director

The purpose of this certificate is to prepare educators as teacher leaders in school settings. Graduates of this program will have training in how to mentor and coach teacher candidates, novice, and experienced teachers; operate as curriculum leaders at the school and division level; provide effective professional development and participate/lead professional learning communities; empower stakeholders and advocate for/participate in educational improvement.

Admission

Students must:

1. Hold a bachelor's degree from a regionally accredited college/university;
2. Hold a valid Virginia professional teaching license or an equivalent from another state;
3. Submit official copies of all transcripts of undergraduate and graduate coursework and degrees to Graduate Admissions;
4. Have successfully completed three years of teaching in private or public school settings;
5. Submit a reference letter from a school or division administrator noting support for enrollment in the certificate program;
6. Submit a written essay (approximately 500 words) describing their interest in teacher leadership and their recent experiences as a teacher leader; and
7. Submit an online non-degree application.

Curriculum Requirements

This graduate certificate is comprised of four required courses that provide a foundational knowledge of teacher leadership and encompass key areas of teacher leadership including coaching, mentoring, advocacy, curriculum leadership, and collaboration. The courses included here were designed based on a state-wide survey of teacher leadership needs as well as alignment with the Teacher Leader Model Standards (ETS, n. d.). The four courses are:

TLED 701	Teacher as Leader	3
TLED 702	Coaching and Mentoring	3
TLED 703	Curriculum Leadership	3
TLED 704	Collaboration and Advocacy	3
Total Credit Hours		12

Certificate

Teaching English to Speakers of other Languages (TESOL) Certificate

Abha Gupta, Coordinator

Lea Lee, Coordinator

This certificate would be of interest to students who want to teach English to speakers of other languages. There are two concentrations for this certificate. The first one is the Adult Learner concentration which can be used for teaching English to adult learners or for teaching English as an additional language abroad. The second concentration is designed for teachers in K-12 who may want to pursue an added endorsement in ESL.

Each concentration is a total of 15 credit hours, with the option of being completed online or traditionally.

Curriculum Requirements

Core Course

ENGL 679	First and Second Language Acquisition	3

Concentrations

Select one of the following:	12

Post-Baccalaureate K-12 Endorsement Concentration

READ 619	Word Study, Phonics, and Linguistics
READ 622	Culturally Responsive Literacy for All Learners
READ 686	Advanced Language Development and Reading
TLED 775	English Language Learners in the PK-12 Classroom

Adult Learner Concentration

ENGL 540	General Linguistics
or ENGL 672	Language Structure Analysis
ENGL 670	Methods and Materials in TESOL
or TLED 775	English Language Learners in the PK-12 Classroom
ENGL 675	Practicum in TESOL
or ENGL 722/822	Multilingualism and Writing Instruction
ENGL 677	Language and Communication Across Cultures
or ENGL 705/805	Discourse and Rhetoric Across Cultures

Total Credit Hours	15

The certificate may be taken independently of the degree, but students must be either admitted to the graduate program or as non-degree graduate certificate seeking students. A maximum of 6 semester hours of graduate credit may be transferred into the TESOL certificate program.

Post-Baccalaureate Endorsement Early Childhood Education, PreK-3 Post-Baccalaureate Endorsement

3101 Education Building
757-683-3284

Angela Eckhoff, Graduate Program Director

This program is available only to students who already possess an undergraduate degree from Old Dominion University in Interdisciplinary Studies (IDS) Teacher Preparation concentration and who want to obtain a Virginia teaching license with an endorsement in preschool through grade three.

Admission

All students must apply for and be admitted into the approved post-baccalaureate endorsement program for Early Childhood Education (grades PreK-3). The following admission criteria must be met:

1. A bachelor's degree from Old Dominion University in Interdisciplinary Studies (IDS) Teacher Preparation concentration is required to be considered for admission in this program.
2. Students must meet the required criteria for admission by passing the Virginia Board of Education prescribed assessments. Virginia Board of Education prescribed entry assessments are outlined in the Office of Clinical Experiences section of the catalog. ****For the most current information on the prescribed Virginia Board of Education admission assessment, visit the Office of Clinical Experiences website, <http://>**

www.odu.edu/oce (<http://www.odu.edu/oce/>) and review the *Teacher Education Handbook*.

3. A cumulative undergraduate GPA of 2.75 is required for admission.
4. No courses in the academic major or professional education in which the student has made below a C will be accepted for admission in the Darden College of Education and Professional Studies.
5. An application for non-degree admission must be submitted by the appropriate deadline for admission.

Curriculum Requirements

Prerequisite Courses

TLED 430W or IDT 618	PK-12 Instructional Technology Digital Age Teaching and Learning
TLED 301	Foundations and Introduction to Assessment of Education
SPED 313	Fundamentals of Human Growth and Development: Birth through Adolescence
TLED 468/568	Language Acquisition and Reading for Students with Diverse Learning Needs

Required Courses

SPED 406/506	Students with Diverse Learning Needs in the General Education Classroom	3
TLED 474/574	Foundations and Contemporary Issues in Early Childhood Education	3
TLED 690	The Child and the Family	3
TLED 679	Advanced Classroom Management and Practicum in PreK-6	3
READ 683	Diagnostic Teaching of Reading in the Classroom	3
TLED 583	Seminar in Teacher Education	1
TLED 669	Internship/Student Teaching and Seminar	6
Total Credit Hours		22

In order for a student to move from the post-baccalaureate endorsement program into the master's program in early childhood, graduate admission must be granted prior to completing 12 semester hours of graduate work. If accepted into the program, only up to 12 semester hours can be counted toward the graduate degree.

Due to changing University requirements, national standards, and the Virginia Board of Education licensure regulations, the programs in the Darden College of Education and Professional Studies are under constant revision. Any changes resulting from these factors supersede the program requirements described in this Catalog. Students are encouraged to obtain current program information from their advisors and from the Office of Clinical Experiences (<http://www.odu.edu/oce/>) website.

Additional Requirements

Continuance

1. Students must maintain GOOD ACADEMIC standing as noted on the academic transcript.
2. A grade of "B" or higher is required in all practicum coursework.
3. Students must complete the Responsible Conduct of Research (RCR) modules during the first twelve graduate credit hours at Old Dominion University. For more information review the instructions at: <https://www.odu.edu/impact/responsible-conduct-of-training> (<https://www.odu.edu/impact/responsible-conduct-of-training/>).
4. Students must take and pass all Virginia Board of Education prescribed assessments including the Praxis Teaching Reading: Elementary (Test code 5205), the Virginia Communication and Literacy Assessment (VCLA), and the Praxis Elementary Multiple Subjects (Test code 5001), prior to or while enrolled in the Seminar in Teacher Education (TLED 583) course.

5. All assessments must be passed prior to the Teacher Candidate Internship Orientation session. A clearance background check process must be completed prior to placement in a field experience required for practicum courses and for the teacher candidate internship. For more information, please review the policy in the Office of Clinical Experiences website: <http://www.odu.edu/oce> (<http://www.odu.edu/oce/>). To review more information on the Virginia Board of Education prescribed professional assessments, visit the Office of Clinical Experiences website, <http://www.odu.edu/oce> (<http://www.odu.edu/oce/>).
6. Students must obtain certificates of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.

Exit

Requirements for completion are:

1. GOOD ACADEMIC standing, successful completion of the Teacher Candidate Internship, completion of all course requirements, and submission of an application for Virginia licensure.
2. No courses in the academic major or professional education in which the student earned below a C will be accepted toward licensure requirements in the Darden College of Education and Professional Studies.

Program Requirements

Students seeking initial licensure for grades PreK-3 must meet the academic content knowledge requirements with a minimum grade of C. Transcripts will be evaluated by the teacher education advisor to determine whether these academic requirements have been met by previous course work at the undergraduate level. Subject area specific course work that was not met in previous course work must be completed prior to Teacher Candidate Internship (student teaching) orientation session.

Post-Baccalaureate Endorsement Elementary Education (PreK-6) Post-Baccalaureate Endorsement

3101 Education Building
757-683-3284

Judith Dunkerly-Bean, Graduate Program Director

Many students who already possess an undergraduate degree enter Old Dominion University for the sole purpose of meeting Virginia's teaching licensure standards. When these students apply for admission into an approved teacher education program, they are considered to be post-baccalaureate endorsement program candidates and must meet the college's policy for admitting students into an approved teacher education program. Admission to Old Dominion University does not guarantee admission into the post-baccalaureate endorsement teacher preparation programs in the Darden College of Education and Professional Studies. The Pre-K-6 post-baccalaureate endorsement option is available for those students who wish to pursue licensure and do not meet the master's degree admission requirements or who do not wish to pursue the master's degree.

This licensure program in elementary education (Pre-K-6) is designed for individuals with a non-teaching BS or BA degree, or for those with a teaching license in another teaching area, who want to obtain licensure to teach in grade Pre-K through grade six.

Admission

All students must apply for and be admitted into the approved post-baccalaureate endorsement program for Elementary Education (grades Pre-K-6). The following admission criteria must be met:

1. A bachelor's degree from a regionally accredited college/university is required in the liberal arts and sciences (or equivalent) including specific course work to meet Virginia's stated coursework competencies for elementary education (Pre-K-6) subject area preparation.
2. Students must meet the required criteria for admission by passing the Virginia Board of Education prescribed assessments and earning the minimum required grade point averages (GPA). Virginia Board of Education prescribed entry assessments are outlined in Office of Clinical Experiences section of the catalog. *For the most current information on the prescribed Virginia Board of Education admission assessment, visit the Office of Clinical Experiences website, <http://www.odu.edu/oce> (<http://www.odu.edu/oce/>) and review the Teacher Education Handbook.*
3. Cumulative undergraduate GPA of 2.75 is required for admission.
4. No courses in the academic major or professional education in which the student has made below a "C" will be accepted in the Darden College of Education and Professional Studies.
5. An application for non-degree admission must be submitted by the appropriate deadline for admission. Under certain circumstances, applicants who do not fully meet the requirements for regular admission to the program may be admitted on a provisional basis subject to conditions specified by the graduate program director for elementary/middle education.

Program Requirements

Students seeking initial licensure for grades PreK-6 must meet the academic concentration requirements with a minimum grade of "C". Transcripts will be evaluated by the education advisor to determine whether these academic requirements have been met by previous course work. Subject area specific course work that was not met in previous course work must be completed prior to Teacher Candidate Internship (student teaching) orientation session.

Curriculum

Prerequisite Courses

TLED 568	Language Acquisition and Reading for Students with Diverse Learning Needs	
TLED 608	Foundations of Education and Instructional Assessment	
SPED 613	Human Growth and Development	
IDT 617	Foundations of Instructional Technology	3

Graduate Professional Education Courses

STEM 533	Developing Instructional Strategies PreK-6: Mathematics	3
SPED 620	Advanced Foundations of Special Education: Legal Aspects and Characteristics	3
STEM 534	Developing Instructional Strategies PreK-6: Science	3
READ 680	Literacy Across the Curriculum	3
TLED 532	Developing Instructional Strategies PreK-6: Language Arts	3
TLED 535	Developing Instructional Strategies PreK-6: Social Studies	3
TLED 583	Seminar in Teacher Education	1
TLED 669	Internship/Student Teaching and Seminar	6
TLED 679	Advanced Classroom Management and Practicum in PreK-6	3

Total Credit Hours	31

Due to changing University requirements, national standards, and the Virginia Board of Education licensure regulations, the programs in the Darden College of Education and Professional Studies are under constant revision. Any changes resulting from these factors supersede the program requirements described in this Catalog. Students are encouraged to obtain current program information from their advisors and from the Office of

Clinical Experiences website: <http://www.odu.edu/oce> (<http://www.odu.edu/oce/>).

Additional Requirements

Continuance

1. Students must maintain a cumulative graduate GPA of 3.00. A grade of "B" or higher is required in all practicum coursework.
2. A grade of "C" or higher is required in all undergraduate content knowledge and professional education courses.
3. A grade of "B" or higher is required in all graduate practicum courses.
4. A grade "B-" or higher is required in all graduate professional education courses (excluding graduate practicum coursework).
5. Students must complete the Responsible Conduct of Research (RCR) modules during the first twelve graduate credit hours at Old Dominion University. For more information review the instructions at: <https://www.odu.edu/impact/responsible-conduct-of-training> (<https://www.odu.edu/impact/responsible-conduct-of-training/>).
6. Students must take and pass all Virginia Board of Education prescribed assessments including the Virginia Communication and Literacy Assessment (VCLA), the Praxis Teaching Reading: Elementary (Test Code 5205), and the Praxis Elementary Education: Multiple Subjects code 5001, prior to or while enrolled in TLED 583-Seminar in Teacher Education.
7. All assessments must be passed prior to the start of the Teacher Candidate Internship Orientation session.
8. A clearance background check process must be completed prior to placement in a field experience required for practicum courses and for the teacher candidate internship. For more information please review the policy in the Office of Clinical Experiences website: <http://www.odu.edu/oce> (<http://www.odu.edu/oce/>).
9. Students must obtain certificates of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.

To review more information on the Virginia Board of Education prescribed professional assessments visit the Office of Clinical Experiences website: <http://www.odu.edu/oce> (<http://www.odu.edu/oce/>).

Exit

Requirements for completion are:

1. A minimum cumulative 3.00 graduate GPA
2. Successful completion of the Teacher Candidate Internship
3. Completion of all course requirements
4. Submission of an application for Virginia licensure.
5. No courses in the academic major or professional education in which the student earned below a "C" will be accepted toward licensure requirements in the Darden College of Education and Professional Studies.

Post-Baccalaureate Endorsement Mathematics Specialist (PK-8) Post-Baccalaureate Endorsement

Melva Grant, Program Director

This endorsement program leads to a Mathematics Specialist (PK-8) endorsement for individuals with a current Virginia license for teaching elementary or middle school mathematics. This program is offered in partnership with the Department of Mathematics and Statistics in the College of Sciences.

Admission

Candidates must:

- Have 3 years of successful classroom experience in teaching mathematics;
- Hold a bachelor's degree from a regionally accredited college/university;
- Hold the Virginia Collegiate Professional License or an equivalent license from another state.
- Have an undergraduate grade point average of 2.80 and an average of 3.00 in the major; and
- Submit an application for graduate studies.

Performance in classes taken as a non-degree student will not be taken into consideration in the admission process. Under certain circumstances, applicants who do not fully meet the requirements for regular admission to the program may be admitted on a provisional basis subject to conditions specified by the graduate director for the program.

Curriculum

A minimum of 21 semester credits are required. The courses for completion of the endorsement program are:

MAPD 601	Number and Operations for PK-8 Mathematics Specialists	3
MAPD 602	Geometry and Measurement for PK-8 Mathematics Specialists	3
MAPD 603	Rational Numbers and Proportional Reasoning for PK-8 Mathematics Specialists	3
MAPD 604	Probability and Statistics for PK-8 Mathematics Specialists	3
MAPD 605	Algebra and Functions for PK-8 Mathematics Specialists	3
TLED 650	Mathematics Specialists as Teacher Leaders	3
TLED 654	Practicum for Mathematics Specialists	3
Total Credit Hours		21

Additional Requirements

Continuance

Candidates must maintain a grade point average of 3.00.

Exit

Candidates must:

- Have a 3.00 grade point average;
- Have completed all course requirements;
- Have completed a professional learning portfolio; and
- Submit an application for graduation.

Post-Baccalaureate Endorsement Secondary Education, 6-12 Post-Baccalaureate Endorsement

3101 Education Building
757-683-3284

Secondary programs include the Master of Science in Education degree program and three Post-baccalaureate licensure programs. Within the Master of Science in secondary education degree program there are a number of concentrations and content area choices for both licensed teachers as well as those seeking initial licensure or endorsement.

For those seeking initial licensure there are the following content areas: 6-12 (content areas: biology, chemistry, earth science, English, mathematics, physics, social studies) and Teachers of English to Speakers of Other Languages K-12 (TESOL).

For licensed teachers seeking additional education there are the following concentration areas: 6-12. Post-baccalaureate endorsement programs are designed for individuals with a non-teaching BS or BA degree who want to obtain licensure, or for those with a teaching license who want to be licensed in an additional teaching area. The two endorsement programs offered in secondary education are 6-12 and Teachers of English to Speakers of Other Languages K-12 (TESOL).

Please note that there are secondary education programs for earning a bachelor's degree with initial licensure in grades 6-12 described in the ODU Undergraduate Catalog.

Secondary Education, 6-12, Post-Baccalaureate Endorsement

This Post-Baccalaureate endorsement program in secondary education (grades 6-12) is designed for individuals with a non-teaching BS or BA degree who want to obtain licensure as a teacher in grades 6 through 12 in the following content areas: English, mathematics, earth science, chemistry, biology or physics, and history/social studies, which will be listed on the license.

Admission

1. All students must apply for and be admitted into the approved post-baccalaureate endorsement program for Secondary Education (grades 6-12).
2. Students must meet the required criteria for admission by passing the Virginia Board of Education prescribed assessments and earning the minimum required Grade point averages (GPA). *For the most current information on the prescribed Virginia Board of Education admission assessment, visit the Office of Clinical Experiences website, <http://www.odu.edu/oce> (<http://www.odu.edu/oce/>) and review the Teacher Education Handbook.*
3. A cumulative undergraduate GPA of 2.75 is required for admission.
4. Only courses that meet the grade required in the academic major or professional education will be accepted for admission in the Darden College of Education and Professional Studies.
5. An application for non-degree admission must be submitted by the appropriate deadline for admission. Under certain circumstances, applicants who do not fully meet the requirements for regular admission to the program may be admitted on a provisional basis subject to conditions specified by the graduate program director for secondary education.

Additional Requirements

Continuance

1. Students must complete the Responsible Conduct of Research (<https://www.odu.edu/impact/responsible-conduct-of-training/>) (RCR) modules during the first twelve graduate credit hours at Old Dominion University.
2. Students must maintain a cumulative GPA of 3.0 in the graduate professional education coursework.
3. A grade of "B" or higher is required in all practicum coursework and a grade of B- or higher required in the remaining graduate professional education courses.
4. Students must take and pass all Virginia Board of Education prescribed assessments including the Praxis Subject Assessment (formerly Praxis II) examination for the appropriate secondary endorsement prior to or while enrolled in the instructional strategies course and the Seminar in Teacher Education (TLED 583) course.
5. A clearance background check must be completed prior to placement in a field experience required for an observation or practicum courses and for the teacher candidate internship. For more information please review the clearance background clearance process on the Office of Clinical Experiences (<http://www.odu.edu/oce/>) website.

- All assessments must be passed prior to the start of the Teacher Candidate Internship Orientation session.
- Students must obtain certificate of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.

To review more information on the Virginia Board of Education prescribed professional assessments visit the Office of Clinical Experiences (<http://www.odu.edu/oce/>) website.

Exit

Requirements for completion are as follows:

- a minimum cumulative 3.0 GPA, with a minimum "B" grade for the practicum courses, and a minimum "B-" grade for the remaining graduate professional education courses required.
- successful completion of the Teacher Candidate Internship,
- completion all course requirements, and
- submission of an application for Virginia licensure.

Only courses that meet the grade required for the academic major or professional education will be accepted toward licensure requirements in the Darden College of Education and Professional Studies.

Program Requirements

Students seeking initial licensure for grades 6-12 must meet the grade required for the academic concentration and professional education courses. Transcripts will be evaluated by the education advisor to determine whether the academic requirements have been met by previous course work. Subject area specific course work that was not met in previous course work must be completed prior to Teacher Candidate Internship (student teaching) orientation session.

Post-Baccalaureate Endorsement Elementary Education, Middle School (Grades 6-8) Post-Baccalaureate Endorsement

3101 Education Building
757-683-3284

Judith Dunkerly-Bean, Graduate Program Director

This post-baccalaureate endorsement program in elementary education with a middle school concentration (grades 6-8) is designed for prospective teachers who want to obtain an initial middle school teaching license. Available to students who have a non-teaching BS or BA degree or to those having a teaching license in another area and are seeking an additional teaching license; the program requires students to take courses that meet the Commonwealth of Virginia's stated academic competency requirements and leads to two undergraduate endorsement areas selected from the following:

Mathematics *	23-29
English *	21
Science *	21
Social Studies *	21
Education Courses taken at the graduate level	38

* Minimum hours to satisfy requirement.

Please note: Advisors in the Career and Advising Resource Center will evaluate an individual's undergraduate transcript to determine which, if any, undergraduate academic content courses are needed to meet state requirements for licensure. No courses in the academic major classes in

which the student has made below a C will be accepted toward licensure in the Darden College of Education and Professional Studies.

Admission

All students must apply for and be admitted into the approved post-baccalaureate endorsement program for Elementary/Middle School Education (grades 6-8). The following criteria must be met:

- A bachelor's degree from a regionally accredited college/university is required in the liberal arts and sciences (or equivalent) to meet Virginia's stated coursework competencies for middle school education (6-8) subject areas, including a minimum of 21 semester hours (which meet Virginia's stated coursework competencies) in two content areas (English, mathematics, science, and history/social studies) which will be listed on the license.
- Students must meet the required criteria for admission by passing the Virginia Board of Education prescribed assessments and earning the minimum required Grade point averages (GPA). *For the most current information on the prescribed Virginia Board of Education admission assessment, visit the Office of Clinical Experiences website, <http://www.odu.edu/oce/> (<http://www.odu.edu/oce/>) and review the Teacher Education Handbook.*
- A cumulative undergraduate GPA of 2.75 is required for admission.
- No courses in the academic major in which the student has made below a C will be accepted for admission in the Darden College of Education and Professional Studies.
- An application for non-degree admission must be submitted by the appropriate deadline for admission. Under certain circumstances, applicants who do not fully meet the requirements for regular admission to the program may be admitted on a provisional basis subject to conditions specified by the graduate program director for elementary/middle education.

Program Requirements

Students seeking initial licensure for grades 6 - 8 must meet the academic concentration requirements in two of the following content areas with a minimum grade of "C". Transcripts will be evaluated by the education advisor to determine whether the academic requirements have been met by previous course work. Subject area specific course work that was not met in previous course work must be completed prior to Teacher Candidate Internship (student teaching) orientation session.

English: English content must include coursework in language (history, structure or grammar), literature, advanced composition, and interpersonal communication or speech; 21 credit hours.

Mathematics: Mathematics content must include coursework in college algebra, probability and statistics, pre-calculus I and II, calculus I, number systems & discrete math, geometry, linear algebra and computer programming to satisfy the requirements for the Algebra I endorsement; 23-29 credit hours

Science: Science content must include courses in each of the following: biology, chemistry, physics, and earth and space science (a laboratory course is required in two of the four science areas); 21 credit hours.

History/Social Science: History/social science content must include courses in American History, world history, economics, geography, international affairs, and current events; 21 credit hours.

All students, regardless of which two content areas selected, are required to take a Government/Civics course or complete the state and local civic education module.

Curriculum

Prerequisite Courses

TLED 568	Language Acquisition and Reading for Students with Diverse Learning Needs
TLED 608	Foundations of Education and Instructional Assessment

SPED 613	Human Growth and Development	
IDT 617	Foundations of Instructional Technology	
Graduate Professional Education Courses		
READ 680	Literacy Across the Curriculum	3
SPED 620	Advanced Foundations of Special Education: Legal Aspects and Characteristics	3
TLED 583	Seminar in Teacher Education	1
TLED 615	Teaching in the Middle School	4
Select two of the following:		6
TLED 551	Developing Instructional Strategies for Teaching in the Middle/High School: English	
TLED 555	Developing Instructional Strategies for Teaching in the Middle/High School: Social Studies	
TLED 552	Developing Instructional Strategies for Teaching in Middle/High School: Math and Science	
TLED 666	Internship/Student Teaching and Seminar	9
Total Credit Hours		26

Due to changing University requirements, national standards, and the Virginia Board of Education licensure regulations, the programs in the Darden College of Education and Professional Studies are under constant revision. Any changes resulting from these factors supersede the program requirements described in this Catalog. Students are encouraged to obtain current program information from their advisors and from the Office of Clinical Experiences (<http://www.odu.edu/oce/>) website.

Additional Requirements

Continuance

1. Students must maintain a cumulative GPA of 3.0 in the graduate professional education courses.
2. A grade of "B" or higher is required in all practicum coursework. A grade of "B-" is required for the remaining graduate professional education courses.
3. Students must complete the Responsible Conduct of Research (<https://www.odu.edu/impact/responsible-conduct-of-training/>) (RCR) modules during the first twelve graduate credit hours at Old Dominion University.
4. Students must take and pass the Virginia Communication and Literacy Assessment (VCLA) and the Praxis subject assessment examination for the appropriate Middle School content area prior to or while enrolled in the instructional strategies course.
5. All assessments must be passed prior to the start of the Teacher Candidate Internship Orientation session.
6. A clearance background check must be completed prior to placement in a field experience required for practicum courses and for the teacher candidate internship. For more information please review the policy on the Office of Clinical Experiences (<http://www.odu.edu/oce/>) website.
7. Students must obtain certificate of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.

Virginia Board of Education prescribed professional assessments:

- Virginia Communication and Literacy Assessment (VCLA) – a passing composite score of 470 is required on this reading and writing assessment
- Praxis Subject Assessment (formerly Praxis II) Middle School English/Language Arts
- Praxis Subject Assessment (formerly Praxis II) Middle School Mathematics
- Praxis Subject Assessment (formerly Praxis II) Middle School Science

- Praxis Subject Assessment (formerly Praxis II) Middle School Social Studies

To review more information on the Virginia Board of Education prescribed assessments visit the Office of Clinical Experiences (<http://www.odu.edu/oce/>) website.

Exit

Requirements for completion are as follows:

1. a minimum cumulative 3.0 GPA
2. a grade of "B" or higher is required in all practicum coursework,
3. a grade of "B-" is required for the remaining graduate professional education courses,
4. a minimum grade of "C" in all academic major courses to be accepted toward licensure requirements in the Darden College of Education and Professional Studies,
5. successful completion of the Teacher Candidate Internship,
6. completion of all course requirements, and
7. submission of an application for Virginia licensure.

Post-Baccalaureate Endorsement Secondary Education, Teachers of English to Speakers of Other Languages (TESOL), K-12 Post- Baccalaureate Endorsement

3101 Education Building
757-683-3284

Secondary programs include the Master of Science in Education degree program and three Post-baccalaureate licensure programs. Within the Master of Science in secondary education degree program there are a number of concentrations and content area choices for both licensed teachers as well as those seeking initial licensure or endorsement.

For those seeking initial licensure there are the following content areas: 6-12 (content areas: biology, chemistry, earth science, English, mathematics, physics, social studies) and Teachers of English to Speakers of Other Languages K-12 (TESOL).

For licensed teachers seeking additional education there are the following concentration areas: 6-12. Post-baccalaureate endorsement programs are designed for individuals with a non-teaching BS or BA degree who want to obtain licensure, or for those with a teaching license who want to be licensed in an additional teaching area. The two endorsement programs offered in secondary education are 6-12 and Teachers of English to Speakers of Other Languages K-12 (TESOL).

Please note that there are secondary education programs for earning a bachelor's degree with initial licensure in grades 6-12 described in the ODU Undergraduate Catalog.

Secondary Education, Teachers of English to Speakers of Other Languages (TESOL), K-12, Post-Baccalaureate Endorsement

3101 Education Building
757-683-3284

Jori Beck, Graduate Program Director

This Post-Baccalaureate endorsement program in Teaching English as a Second Language (K-12) is designed for individuals with a non-teaching BS or BA degree who want to obtain licensure as a teacher in TESOL.

Admission

1. All students must apply for and be admitted into the approved post-baccalaureate endorsement program for TESOL (K-12).
2. Students must meet the required criteria for admission by passing the Virginia Board of Education prescribed assessments and earning the minimum required Grade point averages (GPA). *For the most current information on the prescribed Virginia Board of Education admission assessment, visit the Office of Clinical Experiences website, <http://www.odu.edu/oce> (<https://www.odu.edu/oce/>) and review the Teacher Education Handbook.*
3. A cumulative undergraduate GPA of 2.75 is required for admission.
4. Only courses that meet the grade required for the academic major or professional education will be accepted for admission in the Darden College of Education and Professional Studies.
5. An application for non-degree admission must be submitted by the appropriate deadline for admission. Under certain circumstances, applicants who do not fully meet the requirements for regular admission to the program may be admitted on a provisional basis subject to conditions specified by the graduate program director for TESOL education.

Curriculum

Prerequisite Courses

ENGL 440/540	General Linguistics	3
Select one of the following:		3
Foreign Language		
English for foreign speakers		

Academic Content courses in English

ENGL 677	Language and Communication Across Cultures	3
ENGL 679	First and Second Language Acquisition	3
ENGL 670	Methods and Materials in TESOL	3
Select one of the following:		3
ENGL 542	English Grammar	
ENGL 550	American English	
ENGL 672	Language Structure Analysis	
ENGL 678	Sociolinguistics	

Professional Education

TLED 608	Foundations of Education and Instructional Assessment	3
SPED 613	Human Growth and Development	3
TLED 640	The Management of Learning and Instruction	3
READ 680	Literacy Across the Curriculum	3
SPED 506	Students with Diverse Learning Needs in the General Education Classroom	3
READ 683	Diagnostic Teaching of Reading in the Classroom	3
READ 686	Advanced Language Development and Reading	3
TLED 669	Internship/Student Teaching and Seminar	3
IDT 618	Digital Age Teaching and Learning	3

Total Credit Hours 45

Due to changing University requirements, national standards, and the Virginia Board of Education licensure regulations, the programs in the Darden College of Education and Professional Studies are under constant revision. Any changes resulting from these factors supersede the program requirements described in this Catalog. Students are encouraged to obtain current program information from their advisors and from the Office of Clinical Experiences (<http://www.odu.edu/oce/>) website.

Additional Requirements

Continuance

1. Students must complete the Responsible Conduct of Research (<https://www.odu.edu/impact/responsible-conduct-of-training/>) (RCR) modules during the first twelve graduate credit hours at Old Dominion University.
2. Students must maintain a cumulative graduate GPA of 3.00.
3. A grade of "B" or higher is required in all practicum coursework. A minimum grade of "B-" is required for the remaining graduate professional education courses.
4. Students must take and pass all Virginia Board of Education prescribed assessments including the Praxis Subject Assessment (formerly Praxis II) English as a second language (TESOL) test code #5362, passing score of 149.
5. A clearance background check must be completed prior to placement in a field experience required for observation and practicum courses and for the teacher candidate internship. For more information on the clearance background check please review the policy in the Office of Clinical Experiences (<http://www.odu.edu/oce/>) website.
6. All assessments must be passed prior to the start of the Teacher Candidate Internship Orientation session. For more information please review the policy on the Office of Clinical Experiences (<http://www.odu.edu/oce/>) website.
7. Students must obtain certificates of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.

To review more information on the Virginia Board of Education prescribed professional assessments visit the Office of Clinical Experiences (<http://www.odu.edu/oce/>) website.

Exit

Requirements for completion are as follows:

1. a minimum cumulative 3.00 graduate GPA,
2. successful completion of the Teacher Candidate Internship,
3. completion of all course requirements with a grade of "B" or higher required in all practicum coursework and a minimum grade of "B-" required for the remaining graduate professional education courses.
4. submission of an application for Virginia licensure.

Only courses that meet the grade required for the academic major or professional education will be accepted toward licensure requirements in the Darden College of Education and Professional Studies.

Program Requirements

Students seeking initial licensure for TESOL K-12 grades must meet the grade required for the academic concentration and professional education courses. Transcripts will be evaluated by the education advisor to determine whether the academic requirements have been met by previous course work. Subject area specific course work that was not met in previous course work must be completed prior to Teacher Candidate Internship (student teaching) orientation session.

Post-Baccalaureate Endorsement Teacher Education Post-Baccalaureate Endorsement Teacher Education Programs

The Post-Baccalaureate Endorsement program is an approved teacher education program for individuals who have completed a bachelor's degree from a regionally accredited institution and wish to qualify for a Virginia

teaching license. Students applying for admission into this approved teacher education program are considered graduate non-degree status and must meet the college's requirements for admitting students into an approved teacher education program. Admission to Old Dominion University does not guarantee admission into degree and/or teacher preparation programs in the Darden College of Education and Professional Studies. Program sheets for the Post-Baccalaureate Endorsement programs are available in the Office of Clinical Experiences.

Admission

Students seeking admission into the post-baccalaureate endorsement program must:

1. apply for admission to Old Dominion University as graduate non-degree seeking student;
2. have achieved an overall GPA of 2.75 in the baccalaureate degree official transcript for post-baccalaureate programs offered at the undergraduate level and 2.80 for post-baccalaureate programs offered at the graduate level;
3. have earned a grade of C or C- (as determined by the specific academic department);
4. interview with and receive recommendation for admittance from a department representative, advisor, or distance learning representative;
5. submit the Post-Baccalaureate Endorsement Program Application (<http://www.odu.edu/content/dam/odu/col-dept/teacher-education-services/docs/post-baccalaureate-endorsement-program-application.pdf>);
6. be aware that only 12 hours of professional education courses from another institution may transfer into a post-baccalaureate endorsement program and that practicum and/or student teaching courses are not eligible for transfer;
7. complete the professional dispositions self-survey;
8. attach the completed authorization for the release of any disciplinary action on file with the Office of Student Conduct and Academic Integrity.

Students who do not meet regular admission requirements may meet provisional admission into the post-baccalaureate endorsement program. For provisional status, a student must:

1. apply for admission to Old Dominion University as a graduate non-degree seeking student;
2. have achieved an overall GPA of 2.5-2.74 in the baccalaureate degree official transcript;
3. have earned a grade of C or C- (as determined by the specific academic department);
4. interview with and receive recommendation for admittance from a department representative, Teacher Education Services advisor, or distance learning representative;
5. submit the Post-Baccalaureate Endorsement Program Application (<http://www.odu.edu/content/dam/odu/col-dept/teacher-education-services/docs/post-baccalaureate-endorsement-program-application.pdf>);
6. be aware that only 12 hours of professional education courses from another institution may transfer into a post-baccalaureate endorsement program and that practicum and/or student teaching courses are not eligible for transfer;
7. complete the professional dispositions self-survey;
8. attach the completed authorization for the release of any disciplinary action on file with the Office of Student Conduct and Academic Integrity.

Students who wish to apply to a graduate program while in the post-baccalaureate endorsement program must meet all graduate program entry requirements. Only 12 credit hours of professional education course work from a post-baccalaureate endorsement program will transfer into a graduate program.

In order to student teach, all approved teacher education program requirements must be completed, to include all content and professional education course work with the appropriate grade and GPA as outlined in

the respective curriculum and passing scores on Praxis II and the Virginia Reading Assessment (if required by the program).

Additional Requirements

Continuance

To continue in the respective post-baccalaureate teacher education program, the student must:

1. For post-baccalaureate teacher education programs, maintain a 2.75 minimum grade point average overall (or as outlined in the specific curriculum), in the major and in the content and professional education core courses;
2. For graduate post-baccalaureate teacher education programs, maintain a 3.0 minimum grade point average overall (or as outlined in the specific curriculum), in the major and in the content and professional education core courses;
3. Continue to earn at least a grade of C or C- (depending on the program) in all courses specified in the major curriculum to include content and professional education core courses for continuance in the teacher education program;
4. Have achieved passing scores in the prescribed Virginia Board of Education professional assessments for licensure described in this section of the catalog, prior to the start of the teacher candidate internship orientation.
5. Students must obtain certificate of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.

Score reports for all examinations must be on file in the Office of Clinical Experiences in room 1107 in the Education Building. These score reports are to be provided by the candidate and will not be returned. For the most current information on prescribed Virginia Board of Education professional assessments for each individual passing score, visit the Office of Clinical Experiences (<http://www.odu.edu/oce/>) website and review the *required assessments*.

Prior to placement in early field experiences, practica and/or internships, students are required to have a completed Clearance Background Check search, which consists of: *National Criminal Background Check for Employee or Volunteer Providing Care to Children, the Elderly and Disabled* (SP-24 Form), the Child Protective Service's *Central Registry Release of Information* (032-02-1515-11-eng, 02/14), a fingerprint check using the APPLICANT FD258 (REV 3-1-10) 1110-0046 fingerprinting card, and the National Sex Offender Registry and/or the Virginia State Police: Sex Offender Registry search. Students are liable for all costs incurred.

Exit

Students must have:

1. For post-baccalaureate teacher education programs, maintain a 2.75 minimum grade point average overall (or as outlined in the specific curriculum), in the major and in the content and professional education core courses;
2. For graduate post-baccalaureate teacher education programs, maintain a 3.0 minimum grade point average overall (or as outlined in the specific curriculum), in the major and in the content and professional education core courses;
3. Achieved grades of C or C- (as determined by the specific academic department) in all courses specified in the major curriculum to include content and professional education core courses; and
4. Earned a passing grade in student teaching.

The Virginia Department of Education requires all initially licensed teachers, school counselors, administrators, and other school personnel to receive training in the area of technology. This training is received through specific courses in the approved professional education programs.

Due to changing University requirements, national accreditation standards, and Commonwealth licensure regulations, the programs in the Darden College of Education and Professional Studies are under constant revision. Any changes resulting from these factors supersede the program requirements described in this Catalog. Students should obtain current program information from their advisors and the Darden College of Education and Professional Studies website at <https://www.odu.edu/eps> (<https://www.odu.edu/eps/>).

For more information on requirements in specific programs, students should refer to the individual program listings in this Catalog or contact the Office of Clinical Experiences or the appropriate academic department in the College of Arts and Letters (<http://catalog.odu.edu/undergraduate/collegeofartsletters/>), the College of Sciences (<http://www.odu.edu/sci/>), or the Darden College of Education and Professional Studies (<http://www.odu.edu/education/departments/>).

Clearance Background Check Process For All Licensure Programs

Old Dominion University requires a background clearance check of candidates interested in professional education programs. Professional education programs have several field experiences that are required for continuance and graduation from the program. The clearance background check (<http://www.odu.edu/success/academic/teacher-education/placement/background-checks/>) must be successfully completed prior to a field experience placement. Students will be provided a field experience placement when the background check process is completed with resolution of any issues. *Candidates interested in the professional education programs are advised to complete this clearance background check process immediately upon entering a program. This clearance process takes a minimum of eight weeks to complete.*

This clearance background check process (<http://www.odu.edu/success/academic/teacher-education/placement/background-checks/>) includes:

- Fingerprinting
- A social service/child protective service check
- A review of each candidate's name through the National Sex Offender Registry and/or Virginia State Police: Sex Offender Registry

Candidates are liable for all fees incurred when completing the clearance background check process (<http://www.odu.edu/success/academic/teacher-education/placement/background-checks/>). ALL clearance search results must be received and reviewed by Old Dominion University, Teacher Education Services & Advising Office to determine successful completion of the clearance process and approval for placement in a school. The completed clearance check will be posted to the student's Leo Online secure page under Test Scores. *A score of 1 means the student is cleared for placement*

Early Field Experiences

The college is committed to developing candidates skilled in teaching students of all cultural and socioeconomic backgrounds and with diverse learning needs in a fair and equitable manner. Thus, candidates must complete their early field experiences in a public or private school accredited by the Virginia Department of Education. Teacher candidates may request specific schools and districts. However, these requests are informal and ARE NOT guaranteed. Candidates may not contact school district personnel in order to request or obtain placement. Candidates may not complete their field experience at a school where an immediate relative is attending or working. Candidates are required to disclose this information on the on-line placement request.

Prior to placement, students are required to have a completed Clearance Background Check search, which consists of: the Virginia State Police Criminal History Check (State Police Form 230), the Child Protective Service Central Registry Release of Information (032-02-1515/1), a fingerprint check, and the National Sex Offender Registry and/or the Virginia State Police: Sex Offender Registry. Students are liable for all costs incurred.

A candidate may participate in a course with a field experience through one of two tracks:

Option A

A candidate may be eligible to participate in the early field experience course if s/he has been admitted into an approved teacher education program. This requires that candidates achieve a passing Praxis Core score or the Prescribed Virginia Board of Education Assessment for Admission to an Approved Teacher Education Program. In addition, candidates must meet the GPA for their individual programs, professional education courses, and minimum grade requirements, along with any other course prerequisites.

Option B

A provisionally licensed teacher may participate in a course if s/he is currently employed with a school division, has a letter from the Virginia Department of Education listing the course as a needed requirement, and has passing Virginia Communication and Literacy Assessment (VCLA) scores. The provisionally licensed teacher will have to meet all the requirements of the course as stated in the syllabus.

Prescribed Virginia Board of Education Professional Assessments for Licensure

Old Dominion University teacher candidates seeking initial licensure through the completion of an approved teacher education program must successfully pass the Prescribed Virginia Board of Education Professional Assessments for Licensure prior to the start of the teacher candidate internship.

For the most current information on the prescribed Virginia Board of Education admission assessment, visit the Office of Clinical Experiences website, <http://www.odu.edu/oce> (<http://www.odu.edu/oce/>) and review the Teacher Education Handbook.

Teacher Education Educator Preparation

The major purpose in its teacher education programs is to prepare teachers who have knowledge of their teaching disciplines, abilities to practice state-of-the-art instruction to students of various cultural and socioeconomic backgrounds, and demonstrate dispositions that reflect commitment to teaching and learning as well as lifelong professional growth and development. The Darden College of Education and Professional Studies offers post-baccalaureate and master's programs that lead to licensure in the following areas:

- Early Childhood Education PreK-3
- Elementary Education PreK-6
- Middle Level Education (6-8)
- Special Education:
 - Adapted Curriculum
 - Early Childhood
 - General Curriculum
- Secondary Education
 - Biology
 - Career & Technical Education: Marketing Education
 - Career & Technical Education: Technology Education
 - Chemistry
 - Earth Science
 - English
 - History & Social Studies
 - Mathematics
 - Physics
- PreK-12 Endorsements:
 - English as a Second Language
 - Health and Physical Education
 - Library Media

- Art Education
- World Languages (French, German, Spanish)
- Administration and Supervision & Personnel Support:
 - Educational Leadership
 - Math Specialist
 - Reading Specialist
 - School Counseling

All licensure programs require school-based field experiences. For additional information about the clearance background check process and other requirements, contact the Office of Clinical Experiences (<https://www.odu.edu/oce> (<https://www.odu.edu/oce/>)), which facilitates field experiences and licensure processes for all students who want to become teachers.

Professional Studies Certificate

<https://www.odu.edu/teaching/academics/professional-studies-certificate> (<https://www.odu.edu/teaching/academics/professional-studies-certificate/>)

This certificate is designed to support provisionally licensed teachers, who are employed by a school division in the Commonwealth, in meeting teacher licensure requirements.

Master's Degree Teacher Education Programs

The master's degree licensure programs are for individuals who have a bachelor's degree but have not earned a Virginia teaching license. Students applying for admission into master's with licensure programs must meet the college's requirements for admitting students into an approved teacher education program. Admission to Old Dominion University does not guarantee admission into degree and/or teacher preparation programs in the Darden College of Education and Professional Studies. Refer to the admissions, continuance, and exit requirements for each licensure area specified in the catalog sections of the appropriate departmental offices in the Darden College of Education and Professional Studies (links provided at the top of the page).

Programs

Post-Baccalaureate Endorsement Program

- Teacher Education Post-Baccalaureate Endorsement (p. 222)

Post-Baccalaureate Endorsement Teacher Education Post-Baccalaureate Endorsement Post-Baccalaureate Teacher Education Programs

The Post-Baccalaureate Endorsement program is an approved teacher education program for individuals who have completed a bachelor's degree from a regionally accredited institution and wish to qualify for a Virginia teaching license. Students applying for admission into this approved teacher education program are considered graduate non-degree status and must meet the college's requirements for admitting students into an approved teacher education program. Admission to Old Dominion University does not guarantee admission into degree and/or teacher preparation programs in the Darden College of Education and Professional Studies. Program sheets for the Post-Baccalaureate Endorsement programs are available in the Office of Clinical Experiences.

Admission

Students seeking admission into the post-baccalaureate endorsement program must:

1. apply for admission to Old Dominion University as graduate non-degree seeking student

2. have achieved an overall GPA of 2.75-2.80 (as outlined in the specific curriculum);
3. have earned a grade of C or C- (as determined by the specific academic department);
4. interview with and receive recommendation for admittance from a department representative, graduate program director, or ODUGlobal representative;
5. submit the Post-Baccalaureate Endorsement Program Application (<http://www.odu.edu/content/dam/odu/col-dept/teacher-education-services/docs/post-baccalaureate-endorsement-program-application.pdf>);
6. be aware that only 12 hours of professional education courses from another institution may transfer into a post-baccalaureate endorsement program and that practicum and/or student teaching courses are not eligible for transfer;
7. complete the professional dispositions self-survey;
8. attach the completed authorization for the release of any disciplinary action on file with the Office of Student Conduct and Academic Integrity.

Students who do not meet regular admission requirements may meet provisional admission into the post-baccalaureate endorsement program. For provisional status, a student must:

1. apply for admission to Old Dominion University as a graduate non-degree seeking student;
2. have achieved an overall GPA of 2.5-2.74 in the baccalaureate degree official transcript;
3. have earned a grade of C or C- (as determined by the specific academic department);
4. interview with and receive recommendation for admittance from a department representative, or distance learning representative;
5. submit the Post-Baccalaureate Endorsement Program Application (<http://www.odu.edu/content/dam/odu/col-dept/teacher-education-services/docs/post-baccalaureate-endorsement-program-application.pdf>);
6. be aware that only 12 hours of professional education courses from another institution may transfer into a post-baccalaureate endorsement program and that practicum and/or student teaching courses are not eligible for transfer;
7. complete the professional dispositions self-survey;
8. attach the completed authorization for the release of any disciplinary action on file with the Office of Student Conduct and Academic Integrity.

Students who wish to apply to a graduate program while in the post-baccalaureate endorsement program must meet all graduate program entry requirements. Only 12 credit hours of professional education course work from a post-baccalaureate endorsement program will transfer into a graduate program.

In order to student teach, all approved teacher education program requirements must be completed, to include all content and professional education course work with the appropriate grade and GPA as outlined in the respective curriculum and passing scores on Praxis II, the Virginia Communication and Literacy Assessment (VCLA), and the Virginia Reading Assessment (if required by the program).

Additional Requirements

Continuance

To continue in the respective post-baccalaureate teacher education program, the student must:

1. Maintain a 2.75-2.80 minimum grade point average overall (or as outlined in the specific curriculum), in the major and in the content and professional education core courses;
2. Maintain a 3.0 minimum grade point average overall (or as outlined in the specific curriculum), in the major and in the content and professional education core courses;

3. Continue to earn at least a grade of C or C- (depending on the program) in all courses specified in the major curriculum to include content and professional education core courses for continuance in the teacher education program;
4. Have achieved passing scores in the prescribed Virginia Board of Education professional assessments for licensure described in this section of the catalog, prior to the start of the teacher candidate internship orientation.
5. Have obtained certificate of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training. These must be on file with the Office of Clinical Experiences.

Score reports for all examinations must be on file in the Career and Academic Resource Center and Office of Clinical Experiences. These score reports are to be provided by the candidate and will not be returned. For the most current information on prescribed Virginia Board of Education professional assessments for each individual passing score, visit the Office of Clinical Experiences (<https://www.odu.edu/oce/>) website and review the *required assessments*.

Prior to placement in early field experiences, practica and/or internships, students are required to have a completed Clearance Background Check search, which consists of: *National Criminal Background Check for Employee or Volunteer Providing Care to Children, the Elderly and Disabled* (SP-24 Form), the Child Protective Service's *Central Registry Release of Information* (032-02-1515-11-eng, 02/14), a fingerprint check using the APPLICANT FD258 (REV 3-1-10) 1110-0046 fingerprinting card, and the National Sex Offender Registry and/or the Virginia State Police: Sex Offender Registry search. Students are liable for all costs incurred.

Exit

Students must have:

1. For undergraduate post-baccalaureate teacher education programs, maintain a 2.75 minimum grade point average overall (or as outlined in the specific curriculum), in the major and in the content and professional education core courses;
2. Maintain a 3.0 minimum grade point average overall (or as outlined in the specific curriculum), in the major and in the content and professional education core courses;
3. Achieved grades of C or C- (as determined by the specific academic department) in all courses specified in the major curriculum to include content and professional education core courses; and
4. Earned a passing grade in student teaching.

Due to changing University requirements, national accreditation standards, and Commonwealth licensure regulations, the programs in the Darden College of Education and Professional Studies are under constant revision. Any changes resulting from these factors supersede the program requirements described in this Catalog. Students should obtain current program information from their advisors and the Darden College of Education and Professional Studies website at www.education.odu.edu (<https://www.odu.edu/education/>).

For more information on requirements in specific programs, students should refer to the individual program listings in this catalog or contact the Office of Clinical Experiences or the appropriate academic department in the Darden College of Education and Professional Studies (<http://www.odu.edu/education/departments/>).

Teacher Candidate Dispositions

All teacher candidates are expected to demonstrate behaviors that are indicative of the following dispositions characteristic of effective educators. All candidates will be assessed a minimum of three times throughout their program, including entry. Any teacher candidate who is not displaying these dispositions will be subject to the disposition policy found at Office

of Clinical Experiences website (<https://www.odu.edu/oce/>). Demonstrated professional dispositions are expected for continuance in the program.

Prescribed Virginia Board of Education Professional Assessments for Licensure

Old Dominion University teacher candidates seeking initial licensure through the completion of an approved teacher education program must successfully pass the Prescribed Virginia Board of Education Professional Assessments for Licensure prior to the start of the teacher candidate internship. The following assessments must be completed with a passing score:

1. Virginia Communication and Literacy Assessment (VCLA) passing composite score of 470;
2. Praxis subject assessment passing score approved by the Virginia Board of Education; and
3. Praxis Teaching Reading: Elementary. The passing score required for prek-3, prek-6, and k-12 special education general curriculum endorsement is 159.

For the most current information on the prescribed Virginia Board of Education professional assessments for each individual passing score, visit the Office of Clinical Experiences website, and review the Required Assessments.

Frank Batten College of Engineering and Technology

Web Site: <http://www.odu.edu/eng> (<http://www.odu.edu/eng/>)

1105 Engineering Systems Building
757-683-3789

Jeffrey Fergus, Dean

Jeffrey LaCombe, Associate Dean for Undergraduate and Graduate Education

Stacie Ringleb, Associate Dean for Faculty Affairs and Student Engagement

Yuzhong Shen, Interim Associate Dean for Research & Innovation

Anthony Dean, Assistant Dean for Maritime and Defense Initiatives

Mission Statement

In accordance with the mission of Old Dominion University, the Frank Batten College of Engineering and Technology promotes the advancement of engineering knowledge, both by its creation and dissemination and by providing successful graduates and a continuously improving learning environment to its constituents, while maintaining ethical, multicultural and global standards.

Overview

The Frank Batten College of Engineering and Technology at Old Dominion University offers degrees in engineering and engineering technology.

The graduate engineering programs at Old Dominion University are specifically designed to take advantage of and enhance unique assets in the Hampton Roads area, a complex of seven major cities. These assets include: 1) a strong military presence with multiple high technology facilities, particularly as it relates to modeling and simulation; 2) the NASA Langley Research Center with its focus on aeronautics and space exploration; 3) the Jefferson Laboratories, a major center of nuclear physics and home of a major Free Electron Laser; 4) one of the major international deep-water ports on the east coast of the United States; 5) a major ship building and ship repair industry, including Newport News Shipbuilding, the only builder of nuclear aircraft carriers in the U.S.; 6) a major high technology industry base; and 7) a variety of commercial enterprises. These assets have enabled the development of distinctive engineering curricula.

Master's Programs

The Batten College of Engineering and Technology grants the following master's degrees: Master of Science in Engineering, Master of Engineering, Master of Science in Engineering Management, and Master of Engineering Management. For program options, admission information and degree requirements, interested students should refer to the list available on the Programs tab as well as the individual program descriptions in this catalog.

Doctoral Programs

The Batten College of Engineering and Technology grants degrees of Doctor of Philosophy in Engineering and Doctor of Engineering. For program options, admission information and degree requirements, interested students should refer to the below list of programs as well as the individual program descriptions in this catalog.

Linked Bachelor's/Master's Degree Programs

Linked Bachelor's/Master's programs are designed to allow qualified students to secure a space in a master's program available in the Frank Batten College of Engineering and Technology while they are still pursuing their undergraduate degrees. An eligible student can choose a master's program in the same discipline as his/her bachelor's program or in a complementary discipline. Subject to the approval of the undergraduate and graduate program directors, a student enrolled in a linked program can count up to six credit hours of course work towards both the undergraduate and the graduate degrees. Full-time students may be able to complete the requirements for the bachelor's degree in four years and the master's degree in one additional

year. Students in linked programs must earn a minimum of 150 credit hours (120 discrete credit hours for the undergraduate degree and 30 discrete credit hours for the graduate degree).

Students who are matriculated in an undergraduate major in the Frank Batten College of Engineering and Technology with a GPA of at least 3.00 overall and 3.00 in the major are eligible to apply for admission to a Linked Bachelor's/Master's program. Transfer students who desire to be admitted to a linked program at the time they join an undergraduate major at Old Dominion University are eligible to apply if their overall GPA at their previous institution is 3.25 or higher. Prerequisite courses may be required for engineering technology majors to pursue a master's degree in engineering.

Continuance in a Linked Bachelor's/Master's program requires maintenance of a GPA of 3.00 or higher overall and in the major.

Linked Bachelor-to-PhD Programs

For a select number of exceptionally well-qualified students, the college has established a linked doctoral program that enables students to be admitted directly into the PhD program upon completion of the baccalaureate degree. A select number of exceptionally well-qualified students can be admitted to the Bachelor/PhD program in their junior year while they are pursuing one of the undergraduate programs at Old Dominion University. This program encourages admitted students to work closely with faculty members and pursue a research experience. Just as in the Linked Bachelor/Masters program, six credit hours of graduate course work may again be counted towards the undergraduate degree and doctoral course work mentioned above for the Bachelor/PhD program. For linked bachelor's to doctoral programs, students must earn a minimum of 198 credit hours (120 discrete credit hours for the undergraduate degree and 78 discrete credit hours for the graduate degree). Students in these programs must maintain a GPA of 3.50 or better throughout their bachelor's and doctoral studies.

The student may opt to obtain the master's degree along the way to the doctorate. To obtain the master's degree, the student must utilize the six graduate credits obtained as part of their undergraduate program, use 18 credits of the graduate course work that is part of the PhD, and work with the Graduate Program Director to plan the final 6 credits.

Interdisciplinary Graduate Certificate Programs

The college has established several certificate programs that enable students to specialize in technical areas of current interest to industry, government and academia. Both non-degree and degree-seeking students can enroll in the certificate programs. The programs provide the opportunity for practicing engineers to further their knowledge and become more competent in their profession.

Departments

- Department of Civil and Environmental Engineering (p. 230)
- Department of Electrical and Computer Engineering (p. 234)
- Department of Engineering Management and Systems Engineering (p. 246)
- Department of Mechanical and Aerospace Engineering (p. 252)

Programs

Doctor of Engineering Programs

- Engineering with a Concentration in Cybersecurity (DEng) (p. 239)
- Engineering with a Concentration in Electrical and Computer Engineering (DEng) (p. 241)
- Engineering with a Concentration in Engineering Management and Systems Engineering (DEng) (p. 249)
- Engineering with a Concentration in Modeling and Simulation (DEng) (p. 244)

Doctor of Philosophy Programs

- Engineering with a Concentration in Aerospace Engineering (PhD) (p. 254)
- Engineering with a Concentration in Biomedical Engineering (PhD) (p. 238)
- Engineering with a Concentration in Civil and Environmental Engineering (PhD) (p. 234)
- Engineering with a Concentration in Electrical and Computer Engineering (PhD) (p. 242)
- Engineering with a Concentration in Engineering Management and Systems Engineering (PhD) (p. 250)
- Engineering with a Concentration in Mechanical Engineering (PhD) (p. 257)
- Engineering with a Concentration in Modeling and Simulation Engineering (PhD) (p. 245)

Master of Engineering Programs

- Engineering with a Concentration in Aerospace Engineering (ME) (p. 253)
- Engineering with a Concentration in Biomedical Engineering (ME) (p. 235)
- Engineering with a Concentration in Mechanical Engineering (ME) (p. 255)
- Engineering with a Concentration in Systems Engineering (ME) (p. 249)

Master of Engineering Management Program

- Engineering Management (MEM) (p. 247)

Master of Science Programs

- Engineering Management (MS) (p. 248)
- Engineering with a Concentration in Aerospace Engineering (MS) (p. 254)
- Engineering with a Concentration in Biomedical Engineering (MS) (p. 236)
- Engineering with a Concentration in Civil Engineering (MS) (p. 230)
- Engineering with a Concentration in Electrical and Computer Engineering (MS) (p. 240)
- Engineering with a Concentration in Environmental Engineering (MS) (p. 233)
- Engineering with a Concentration in Mechanical Engineering (MS) (p. 256)
- Engineering with a Concentration in Modeling and Simulation (MS) (p. 243)

Certificate Programs

- Advanced Engineering with a Concentration in Biomedical Engineering Certificate (p. 227)
- Advanced Engineering with a Concentration in Cyber Systems Security Certificate (p. 227)
- Advanced Engineering with a Concentration in Energy Systems Certificate (p. 228)
- Coastal Engineering Certificate (p. 228)
- Engineering Management Certificate (p. 228)
- Entrepreneurship and Innovation for Engineers Certificate (p. 229)
- Mission Analysis and Engineering Certificate (p. 229)
- Modeling and Simulation - Engineering Certificate (p. 246)
- Naval Architecture and Marine Engineering Certificate (p. 258)
- Project Management Certificate (p. 229)

Collaborative Programs

Cardinal Education

Stacie Ringleb, Associate Dean for Faculty Affairs and Student Engagement, ODU Cardinal Education Site Director

The Cardinal Education Program offers ODU engineering graduate students a selection of online graduate courses and programs to compliment the on-campus course offerings. It is a unique cooperative agreement that enables engineering students at ODU to enroll (and receive credit for) select online courses from six respected Virginia universities. The Cardinal Program (formerly CGEP) has a 35+ year record of leadership in distance learning.

Partnering engineering schools in the Commonwealth of Virginia include: Old Dominion University, Polytechnic Institute and State University, The University of Virginia, George Mason University, Virginia Virginia State University, and Virginia Commonwealth University. The program also serves the diverse continuing education needs of students working in industry and government.

Students seeking course registration via the Cardinal Education Program should contact the Cardinal Education Program Office in the Batten College of Engineering and Technology at Old Dominion University: <https://www.odu.edu/engineering/programs/cardinal-education> (<https://www.odu.edu/engineering/programs/cardinal-education/>)

Enterprise Centers

The Batten College of Engineering and Technology is a catalyst for the economic development of Hampton Roads. To this end, the college has established a number of centers to serve as engines for enterprise development. These centers utilize all University resources, including students and faculty.

Applied Research Center (ARC)

Hani Elsayed-Ali, Director

ARC is an advanced materials engineering and laser technology research center. Staffed with industry/university teams utilizing the Jefferson Lab technologies, ARC provides commercial product-related research in the areas of thin-film technology, laser and plasma processing of materials, materials analysis, and devices and sensor fabrication. For more information: www.odu.edu/engineering/applied-research-center (<https://www.odu.edu/engineering/applied-research-center/>).

Frank Reidy Research Center for Bioelectronics

Andrei Pakhomov, Executive Director

The mission of the Center is to increase scientific knowledge and understanding of the interaction of electromagnetic fields and ionized gases with biological cells and to apply this knowledge to the development of medical diagnostics, therapeutics, and environmental contamination. The objectives of the Center are to perform leading-edge interdisciplinary and multi-institutional research, recruit top faculty and exceptional graduate students, support regional, national, and international programs, and increase external funding and institutional visibility. For more information: www.odu.edu/bioelectronics (<https://www.odu.edu/frank-reidy-research-center-bioelectronics/>).

Affiliated Centers

Center for Secure and Intelligent Critical Systems

Sachin Shetty, Director

The Center for Secure and Intelligent Critical Systems (CSICS) conducts research on developing and integrating secure and intelligent technologies to ensure safe, reliable, and resilient infrastructure for the future. CSICS focuses on both theoretical and practical research in computational modeling, simulation, and analysis. For more information: <https://sics-c.org/>

Institute for Coastal Adaptation and Resilience

Jessica Whitehead, Director

ICAR's mission is to advance the practice of coastal resilience and adaptation by engaging with communities, organizations, and businesses to develop and deploy solutions based on integrated, innovative, and applied research. For more information: <https://oduadaptationandresilience.org/>.

Commonwealth Center for Recurrent Flooding

Carol Considine, ODU Contact

The Commonwealth Center for Recurrent Flooding Resiliency engages the expertise, resources, and intellectual vibrancy of William & Mary and Old Dominion University in support of building resilience to rising waters. The Center serves, advises, and supports Virginia by conducting interdisciplinary studies and providing training, technical and non-technical services, and policy guidance in the area of recurrent flooding resilience to the Commonwealth and its local governments, state agencies, industries, and citizens.. For more information: <https://www.floodingresiliency.org/>

Mission Engineering Center

Thomas Irwin, Director

The Center for Mission Engineering (CME) is an interdisciplinary applied research center focused on advancement in designing, analyzing, integrating, and improving the ability of systems to deliver desired mission outcomes. For more information: <https://oduinnovate.org/research-enterprise/center-for-mission-engineering/>

Virginia Digital Maritime Center

Mark Whitney, Executive Director

The Virginia Digital Maritime Center's mission is to support Virginia's maritime enterprise by leveraging applied research & cutting-edge technology to advance the maritime workforce, foster collaborative partnerships, and drive economic growth in Hampton Roads. For more information: <https://digitalmaritime.org/>

Virginia Institute for Spaceflight and Autonomy

Yiannis Papelis, Executive Director

The Virginia Institute for Spaceflight and Autonomy cultivates partnerships between governments, industry, and academia to grow the spaceflight and autonomy ecosystems on the Eastern Shore. For more information: <https://visaatodu.org/>

Virginia Modeling, Analysis, and Simulation Center

Eric Weisel, Associate Vice President for Applied Research and Executive Director, VMASC

The Virginia Modeling, Analysis, and Simulation Center (VMASC) is an enterprise center of Old Dominion University, supporting the University's research mission through innovation, workforce development, and industry ecosystem engagement programs that create and integrate digital technologies into everyday practice. The Center performs applied research leading to digital transformation. For more information: www.vmasc.org (<http://www.vmasc.org/>).

Virginia Beach Institute of Data Science

Khan Iftekharruddin, Director

The Virginia Beach Data Science Institute is at the forefront of education, research and collaboration for Hampton Roads region, state and globally. The Institute aims to be a driving force for building a vibrant academic community that will educate new generations of builders, thinkers, and leaders.

College Institutes

Institute for Autonomous and Connected Systems: The mission of IACS is to bring together faculty and students across campus from the Colleges of Engineering & Technology, Arts & Letters, and Sciences who have mutual interest in advancing the interdisciplinary research and development of autonomous and connected systems including un-crewed and autonomous

vehicles in air, land, space, and maritime applications. Interim Director: Thomas Alberts

Institute for Engineering in Medicine, Health, and Human

Performance: The Institute for Engineering in Medicine, Health, and Human Performance (EnMed) is the trans-disciplinary home for innovative biomedical research, founded on unique academic, industrial, and military footprints at ODU and in Hampton Roads, to improve patient and community health outcomes and advance human performance. Director: Lobat Tayebi

Departmental Centers and Institutes

Sustainable Development Institute promotes and provides engineering, ecological, environmental, and economic assistance to local, regional, and national governmental agencies, as well as international organizations and businesses. The institute actively participates in community service by conducting waste minimization and pollution prevention assistance to local businesses. Director: Mujde Erten-Unal.

Transportation Research Institute collaborates with centers and departments across the ODU campus to conduct innovation-based research in the core areas of transportation operations, transportation safety, transportation planning, freight transportation, and environment, energy, and sustainable transport. Director: Mecit Cetin.

Virginia Institute for Photovoltaics research spans from the Nanoscale (Fundamental Sciences and Engineering) through the Devices and balance of systems, to the deployment of Gigascale commercial power generation. The current focus is to research and develop the Science and Engineering of Photovoltaic Devices (or Solar cells) and bring them from the laboratory to the industry. Director: Sylvain Marsillac.

Virginia Institute for Image and Vision Analysis aims to leverage complimentary expertise of faculty in computer vision, signal/image processing and machine learning to become one of the leading institutes in the field. Research focuses on novel theory, state-of-art algorithms, architectures, real-time implementations for biomedical engineering, human and machine-centric recognition, environmental and geoscience applications and computer-aided medical diagnosis systems. Director: Khan Iftekharruddin.

Center for Bioelectronics: The mission of the Center is to lead the effort of advancing scientific frontiers, ensuring educational accessibility for underrepresented students in STEM, and securing research leadership in critical areas, such as smart health and biomedical research. The ODU Center for Bioelectronics is dedicated to the mission of diversity, equity, and inclusion in education and the workforce. Director: Gymama Slaughter.

Batten College of Engineering Dean's Office Programs

Certificate Programs

- Advanced Engineering with a Concentration in Biomedical Engineering Certificate (p. 227)
- Advanced Engineering with a Concentration in Cyber Systems Security Certificate (p. 227)
- Advanced Engineering with a Concentration in Energy Systems Certificate (p. 228)
- Coastal Engineering Certificate (p. 228)
- Engineering Management Certificate (p. 228)
- Entrepreneurship and Innovation for Engineers Certificate (p. 229)
- Mission Analysis and Engineering Certificate (p. 229)
- Project Management Certificate (p. 229)

Certificate

Advanced Engineering with a Concentration in Biomedical Engineering Certificate

The Graduate Certificate in Biomedical Engineering Program offers students and professionals the opportunity to further their knowledge with advanced study in the growing area of Biomedical Engineering. The program is designed to provide well-rounded instruction in several key facets of Biomedical Engineering. Those who complete the Program receive the Advanced Engineering Certificate in Biomedical Engineering from Old Dominion University and a letter of recognition from the Batten College of Engineering and Technology. Courses taken for the certificate program may later be applied to the Ph.D. degree in Biomedical Engineering.

Certificate Program Admission Requirements

- Bachelor of Science degree (or equivalent) in an engineering field or undergraduate degree in another relevant STEM field.
- Prerequisites for applicants from non-engineering fields include college-level mathematics, calculus-based physics, and chemistry or biology.

Certificate Program Curriculum Requirements

- Twelve credit hours of graduate course work
- A grade point average of 3.0 or better

BME Fundamentals

Complete the following Core Courses (9CH) 9

BME 711	Biological Mechanisms for Biomedical Engineers
BME 712	Engineering Fundamentals in Biomedicine
BME 740	Regenerative Medicine

BME Electives ¹

Complete a 3CH BME elective course selected from the following: 3

BME 530	Therapy and Function Models for Medical Simulation
BME 554	Introduction to Bioelectrics
BME 562	Introduction to Medical Image Analysis
BME 564	Biomedical Applications of Low Temperature Plasmas
BME 612	Digital Signal Processing I
BME 695	Topics in Biomedical Engineering
BME 700	Cardiovascular Physiology
BME 702	Biomedical Sciences Journal Club
BME 710	Advanced Cell Biology
BME 720	Modern Biomedical Instrumentation
BME 721	Mathematical Modeling in Physiology
BME 726	Biomaterials
BME 731	Finite Element Analysis
BME 741	Principles of Visualization
BME 751	Computational and Statistical Methods in Biomedical Engineering
BME 754	Advanced Bioelectrics
BME 755	Biomembranes and Ion Channels
BME 760	Autonomous and Robotic Systems Analysis and Control
BME 762	Applied Medical Image Analysis
BME 770	Advanced Study in Biology
BME 775	Grant Writing in Biology

BME 783	Digital Image Processing
BME 785	Advanced Manufacturing Technology
BME 792	Biomechanics
BME 794	Cellular Biomechanics
BME 795	Special Topics in Biomedical Engineering
BME 797	Independent Study

Total Credit Hours 12

¹ Appropriate course substitutions may be considered with permission of the Graduate Program Director.

Certificate

Advanced Engineering with a Concentration in Cyber Systems Security Certificate

The certificate program aims to provide a thorough understanding the cyber security threats faced by the stand-alone computer systems, networked systems, IT infrastructure, and cyber physical systems having embedded computer systems operated by individuals, small businesses and large enterprises along with the knowledge required to defend against these threats. The course will enable participants to learn state of the art techniques necessary for analyzing cyber security risks, preventing, detecting and recovering from cyber attacks through class room instructions and hands-on lab work. The program uniquely accommodates students from engineering, math and sciences as well as practicing engineers and managers. The course will make use of ODU's multidisciplinary strengths in the fields of Cyber Systems, Computer Engineering, Software Engineering and Modeling and Simulation. This program is designed both as a complement for students working on graduate degrees and for those personnel working on information and cyber systems used in industry, small businesses, healthcare, government, military and home land security. It is anticipated that students will complete the program in 2 semesters (full time enrollment) or 2 years (part-time enrollment or working to complement an existing graduate program).

Certificate Program Admission Requirements

All applicants admitted to the certificate program must have earned a baccalaureate degree in engineering, mathematics, science, or a related STEM field from a regionally-accredited institution or an equivalent degree from a foreign institution.

Certificate Program Curriculum Requirements

The Graduate Certificate in Cyber Security requires completion of 12 credit hours of graduate course work, consisting of two core courses and two elective courses from the course list below.

Required Core Courses

MSIM 570	Foundations of Cyber Security	3
MSIM/ENMA 670	Cyber Systems Engineering	3

Electives

Select two of the following: 6

ECE 516	Cyber Defense Fundamentals
ECE 519	Cyber Physical System Security
MSIM 673	Threat Modeling and Risk Analysis

Total Credit Hours 12

Certificate Advanced Engineering with a Concentration in Energy Systems Certificate

The Graduate Certificate in Energy Systems Engineering Program offers students and professionals the opportunity to further their knowledge with advanced study in the growing area of Energy Engineering. The program is aimed at providing understanding of energy engineering and the increasing role of energy engineers in addressing growing energy needs. The new skills and advanced understanding developed in class will prepare students for employment in rapidly growing energy industries.

Those who complete the Program receive the Advanced Engineering Certificate in Energy Systems Engineering from Old Dominion University and a letter of recognition from the Batten College of Engineering and Technology. Courses taken for the certificate program may also be applied to master’s level or doctoral graduate engineering programs at ODU, where they meet the program requirements.

Certificate Program Admission Requirements

- Baccalaureate degree in engineering—or a related field—from a regionally-accredited institution or an equivalent degree from a foreign institution.
- Those whose native language is not English must submit a minimum score of 230 on the computer-based TOEFL or 80 on the TOEFL iBT.

Certificate Program Curriculum Requirements

- Twelve credit hours of graduate course work
- A grade point average of 3.0 or better

Energy Engineering Core Courses		
CEE 759	Carbon-Free Clean Energy	3
or CEE 859	Carbon-Free Clean Energy	
Energy Engineering Electives *		
Select three of the following:		9
MAE 513	Energy Conversion	
CEE 559	Biofuels Engineering	
ENGN 697	Independent Study in Energy Engineering	
ECE 772	Fundamentals of Solar Cells	
ENGN 672	Energy Systems Management	
Total Credit Hours		12

* Appropriate course substitutions may be considered with permission of the Graduate Program Director.

Certificate Coastal Engineering Certificate

CECP provides for practicing engineers the opportunity to study Coastal Engineering at the graduate level to help them in the practice of their engineering profession. The Certificate demonstrates a basic level of the physical sciences, engineering, economics, the environment, and the institutional-political-social and aesthetic constraints that influence all coastal engineering design. The Certificate may also provide the necessary credentials for continuing education by state licensing boards and professional organizations.

Graduate Certificate Admission Requirements

An undergraduate degree from an accredited university in Engineering (Civil, Environmental Ocean, etc.) or the Oceanography Sciences (Oceanography, Geology, etc.) is preferred. Experienced professionals in the Coastal Engineering field may also apply.

Graduate Certificate Course Requirements

A series of four (4) graduate level courses in the specialty area of Coastal Engineering within Civil Engineering are offered. All are offered online over the internet, in synchronous (Visual Streaming) mode, over a two year period (spring, fall semesters). The Certificate is earned after successful completion of the four courses listed below. The Cumulative Grade Point Average (GPA) of the four courses must be a minimum of a B average (3.0) to earn the Certificate. All are regularly scheduled graduate courses in the Master and Ph.D. programs at ODU.

CEE 582	Introduction to Coastal Engineering	3
CEE 787	Dredging and Beach Engineering	3
CEE 788	Coastal Hydrodynamics and Sediment Processes	3
CEE 782	Design of Coastal Structures	3
Total Credit Hours		12

An overall grade point average of 3.0 or better is required to earn the certificate.

Certificate Engineering Management Certificate

This program provides the opportunity for practicing engineers to further their knowledge and become more competent in managing socio-technical systems. The certificate program is open to both degree-seeking and non-degree-seeking graduate students. Certain courses taken for the certificate program may later be applied to the master’s degree in Engineering Management for students that get formally admitted to the master in engineering management program. The Engineering Management Certificate Program consists of 12 credit hours of graduate level course work. The four courses comprising the certificate program are offered on a regular basis to enable the completion of the program in two years.

Graduate Certificate Admission Requirements

Admission to the program requires a Bachelor of Science degree in engineering (or equivalent). The certificate consists of four pre-approved graduate level courses contributing to an emphasis area that can be interdisciplinary.

For more information please contact:

Graduate Program Director for Master's Programs
Old Dominion University
2101 Engineering Systems Building
Norfolk, VA 23529

Graduate Certificate Course Requirements

The Graduate Certificate in Engineering Management requires the completion of 12 credit hours at the graduate level. The courses are offered via ODUGlobal.

Select 4 of the following: *		12
ENMA 600	Cost Estimating and Financial Analysis	
ENMA 601	Analysis of Organizational Systems	
ENMA 602	Systems Engineering Management	
ENMA 603	Operations Research	

ENMA 604	Project Management	
ENMA 614	Quality Systems Design	
Total Credit Hours		12

* Appropriate course substitutions may be considered with permission of the Graduate Program Director.

A grade point average of 3.0 or better is required to earn the certificate.

Certificate Entrepreneurship and Innovation for Engineers Certificate

Entrepreneurship and innovation are expected to be primary forces in the creation of new business ventures that drive growth and progress in the worldwide economy. Experienced engineering professionals pursuing this certificate may seek to implement their ideas in a multitude of organizational structures. Many may seek outlets outside their current work environments where they can bring their ideas to fruition.

This certificate program provides an integrated approach to teaching, mentoring and encouraging engineering professionals. It introduces engineering students and students from other disciplines with an engineering background to a wide range of entrepreneurial approaches. The certificate's content addresses the formation of start-up ventures, the growth of existing ventures, and the continued viability of mature, technical enterprises.

Graduate Certificate Admission Requirements

All applicants admitted to the certificate program must have earned a baccalaureate degree from a regionally-accredited institution or an equivalent degree from a foreign institution. Those whose native language is not English must submit a minimum score of 230 on the computer-based TOEFL or 80 on the TOEFL iBT.

Curriculum Requirements

The Graduate Certificate in Entrepreneurship and Innovation in Engineering requires the completion of the courses listed below totaling 12 credit hours at the graduate level.

ENGN 620	The Entrepreneurial Engineer	2
ENGN 623	Leadership and Human Dynamics for the Entrepreneurial Engineer	2
ENGN 625	Business Planning for Entrepreneurial Engineers	2
Marketing and Sales Management for Entrepreneurs *		2
Operations and Supply Chain Management for Entrepreneurs *		2
Financial Management for Entrepreneurs *		2
Total Credit Hours		12

* New Strome College of Business courses.

An overall grade point average of 3.0 or better is required to earn the certificate.

Certificate Mission Analysis and Engineering Certificate

The graduate certificate in Mission Analysis and Engineering provides students and professionals with the necessary understanding to manage engineering and systems engineering activities such that mission supporting capabilities are achieved in even the most complex conditions. The program is designed to elevate understanding of the difficulties that are endemic to

working with complex, socio-technical systems, or system of systems, in extremely transient and uncertain situations. It provides the student with the opportunity to hone planning, decision-making, and/or execution skills necessary to work transformational environments. It is recommended that students intending to take the certificate contact the certificate director to develop a plan of study that will most benefit the student's goals.

Transferability of courses: The certificate is listed as a graduate certificate by the State Council for a higher Education in Virginia. The program offers "for-credit", graduate-level, courses listed in the Old Dominion University Graduate Catalog. Courses taken for the certificate may be used towards graduate studies with approval of the student's Advisor or Graduate Program Director. Non-degree seeking students completing the certificate may later apply the credit hours earned towards graduate degrees in engineering and other disciplines with approval of the Graduate Program Director of the program to which the student has been admitted or is seeking admission.

Admission Requirements

All degree-seeking applicants admitted to the certificate program must meet ODU requirements for graduate admission: an earned baccalaureate degree from a regionally accredited institution or an equivalent degree from a foreign institution in engineering or engineering technology is required. Those whose native language is not English must submit a minimum score of 230 on the computer based TOEFL or 80 on the TOEFL iBT. Non-degree seeking students are required to have these same credentials, though documentation is not required. Ultimately, students must apply to the certificate program in order to obtain the certificate.

Curriculum Requirements

Required Courses		6
ENMA 756	Mission Analysis and Engineering	3
ENMA 750	System of Systems Engineering	3
Elective Courses		6
ENMA 660	Systems Architectures	3
ENMA 715	Systems Analysis	3
ENMA 755	Human System Engineering	3
ENMA 777	Complex System Governance	3
Total Hours		12

Certificate Project Management Certificate

The project management graduate certificate program is designed to facilitate learning essential and contemporary concepts, tools, and processes to manage projects in modern organizations. Courses in the program cover a mix of technical and human topics that are needed for successful project management. Students looking to enroll in the certificate program must meet the admission requirements of Old Dominion University at the graduate level to obtain the Graduate Certificate in Project Management. Certain courses taken for the certificate program may later be applied to the master's degree in Engineering Management for students that get formally admitted to the master in engineering management program. The graduate certificate in Project Management consists of 12 credit hours of graduate level course work. The four courses comprising the certificate program are offered on a regular basis to enable the completion of the program in two years.

Graduate Certificate Admission Requirements

Admission to the program requires a Bachelor of Science degree in engineering (or equivalent). The certificate consists of four pre-approved graduate level courses contributing to an emphasis area that can be interdisciplinary. A grade point average of 3.0 or better is required to earn the certificate.

Graduate Certificate Course Requirements

The Graduate Certificate in Engineering Management requires the completion of 12 credit hours at the graduate level. The courses are offered via online format. The four required courses are listed below:

ENMA 604	Project Management	3
ENMA 780	Leadership for Engineering Managers	3
ENMA 410/510	Agile Project Management	3
ENMA 700/800	Economic Analysis of Capital Projects	3

Optional:

ENMA 601	Analysis of Organizational Systems	

Total Credit Hours	12

An overall GPA of 3.00 or better is required to earn the graduate certificate in project management.

Department of Civil and Environmental Engineering

135 Kaufman Hall
757-683-3753
<http://www.odu.edu/cee> (<http://eng.odu.edu/cee/>)

Sandeep Kumar, Chair
Mujde Erten-Unal, Graduate Program Director

Overview

The Civil and Environmental Engineering Department offers a variety of master's and doctoral degrees. The Department's graduate programs are structured to accommodate both the full-time and part-time students. Most of the graduate courses are offered in evenings, and many are offered as on-line courses. The available specialty areas include coastal, geotechnical, structural, transportation, and water resources engineering in Civil Engineering and a variety of sub-fields in Environmental Engineering.

List of Degrees and Certificates

- Master of Science, Engineering - Civil Engineering
- Master of Science, Engineering - Environmental Engineering (on-line or on-campus)
- Doctor of Philosophy, Engineering - Civil and Environmental Engineering
- Graduate Certificate in Coastal Engineering (on-line or on-campus)
- Advanced Engineering Certificate in Energy Systems

Programs

Doctor of Philosophy Program

- Engineering with a Concentration in Civil and Environmental Engineering (PhD) (p. 234)

Master of Science Programs

- Engineering with a Concentration in Civil Engineering (MS) (p. 230)
- Engineering with a Concentration in Environmental Engineering (MS) (p. 233)

Master of Science Engineering with a Concentration in Civil Engineering (MS)

Master's Degrees

In this rapidly changing technological world, graduate degrees are highly desirable and most often master's degrees are required to hold professional civil and environmental engineering positions in the industry, and in federal,

state and municipal government agencies. The department's graduate programs are designed to educate the technological leaders of the future in civil and environmental engineering, and are structured to accommodate both full-time and part-time students. The specialty areas include coastal, geotechnical, structural, transportation, and water resources engineering in civil engineering, and sub-fields in environmental engineering including water quality, water and wastewater treatment, hydrologic processes, water resources, environmental engineering microbiology, air quality, hazardous and solid waste, biofuels, nutrient cycling, and pollution prevention. [Online master's degree programs in Coastal Engineering and Environmental Engineering](#) are available with/without allowed transfer credits. For additional information, please request a departmental handbook from the graduate program director (CEGPD@odu.edu).

Admission Information

Civil and Environmental master's degree applicants must have a bachelor's degree, preferably, in civil or environmental engineering with a strong background in mathematics and physical sciences. Each applicant must submit an essay of 500 words or less describing personal and academic goals, professional objectives, preparation for graduate study, and how the chosen program will help the applicant achieve these goals and objectives. Two letters of recommendation must be submitted from former or current professors, or employment supervisors. Regular admission to a master's program generally requires an undergraduate GPA of 3.0 or higher on a 4.0 scale. Applicants with a lower undergraduate GPA may be considered for regular or provisional admission on the basis of successful engineering work experience or other credentials demonstrating potential for success in the graduate program. The submission of Graduate Record Examination (GRE) is required unless the applicant holds an ABET accredited engineering degree from an institution in the USA. TOEFL (or IELTS) is required for all applicants whose native language is not English unless their BS degrees are from USA institutions. Provisional admission may also be possible for applicants with a bachelor's degree in a field other than the applicant's intended graduate program. In such cases there will be prerequisite course requirements. Provisional admission may be given to those applicants who do not hold a bachelor's degree in civil or environmental engineering; however, these students will be required to complete undergraduate course work in addition to the graduate program requirements. Potential prerequisite courses are listed below.

Curriculum Requirements

Potential Prerequisite Courses for M.S. Engineering - Civil Engineering (other than Transportation Engr. Emphasis)

MATH 211	Calculus I	4
MATH 212	Calculus II	4
MATH 307	Ordinary Differential Equations	3
MATH 312	Calculus III	4
PHYS 231N	University Physics I	4
PHYS 232N	University Physics II	4
CEE 204	Statics	3
CEE 205	Engineering Dynamics	3
CEE 220	Mechanics of Deformable Bodies	3
CEE 305	Numerical Methods for Civil and Environmental Engineering	1
CEE 310	Structures I	3
CEE 323	Soil Mechanics	3
CEE 330	Hydromechanics	3
CEE 340	Hydraulics and Water Resources	3
CEE 410	Concrete Design	3

Potential Prerequisites Courses for M.S. Engineering - Civil Engineering (Transportation Engr. Emphasis)

MATH 211	Calculus I	4
MATH 212	Calculus II	4
MATH 312	Calculus III	4
STAT 306	Introductory Statistics	3
PHYS 231N	University Physics I	4
PHYS 232N	University Physics II	4
CEE 305	Numerical Methods for Civil and Environmental Engineering	1

Civil Engineering and Environmental Engineering Graduate Course Requirements (except Transportation Engineering Emphasis)

The graduate courses applicable towards a master's degree in the Department of Civil and Environmental Engineering are grouped into various categories listed below. The required number of the credit hours from these categories for the Master of Science (M.S.) degree in Civil Engineering (except for the transportation engineering concentration) and the Master of Science (M.S.) degree in Environmental Engineering are summarized in Table CEE-1 and CEE-2, respectively. Note that the M.S. Thesis option students must pass an oral thesis defense examination and submit a thesis, M.S. Project option students must pass an oral project defense examination, and M.S. Course option students must pass an oral (for civil engineering) or written (for environmental engineering) comprehensive examination at the end of all course work.

Category A – Upper level master degree courses in Civil Engineering

CEE 710	Structural Dynamics	3
CEE 711	Finite Element Analysis	3
CEE 712	Advanced Reinforced Concrete	3
CEE 713	Prestressed Concrete	3
CEE 714	Advanced Structural Analysis	3
CEE 715	Engineering Optimization I *	3
CEE 717	Bridge Structures Design	3
CEE 718	Flood Resistant Structural Design	3
CEE 719	Inelastic Structures	3
CEE 720	Structural Stability	3
CEE 721	Plates	3
CEE 722	Cluster Parallel Computing	3
CEE 723	Seismic Design of Steel Structures	3
CEE 724	Retrofitting Methods for Bridges and Buildings	3
CEE 725	Smart Structures	3
CEE 730	Advanced Foundation Engineering	3
CEE 731	Advanced Soil Mechanics	3
CEE 732	Engineering Behavior of Soils	3
CEE 733	Soil Dynamics	3
CEE 741	Open Channel Flow *	3
CEE 747	Groundwater Flow *	3
CEE 761	Water Resources Processes and Analysis Methods *	3
CEE 770	Transportation Safety	3
CEE 771	Transportation Operations II	3
CEE 772	Intelligent Transportation Systems	3
CEE 773	Transportation Planning	3
CEE 774	Transportation Network Flow Models	3
CEE 775	Transportation Network Algorithms	3
CEE 776	Simulation in Transportation Networks	3

CEE 777	Econometric Modeling in Transportation	3
CEE 782	Design of Coastal Structures	3
CEE 787	Dredging and Beach Engineering	3
CEE 788	Coastal Hydrodynamics and Sediment Processes *	3
CEE 789	Computational Environmental Fluid Dynamics	3

Category C – Lower level courses in Civil & Environmental Engineering

CEE 514	Masonry Structures Design	3
CEE 515	Steel Structures Design	3
CEE 516	Wood Structures Design	3
CEE 530	Foundation Engineering	3
CEE 531	Slope Stability and Earth Structures Design	3
CEE 532	Introduction to Earthquake Engineering	3
CEE 533	Geomaterials Stabilization	3
CEE 540	Hydraulic Engineering	3
CEE 546	Urban Stormwater Hydrology	3
CEE 547	Groundwater Hydraulics	3
CEE 550	Water Distribution and Wastewater Collection System Design	3
CEE 552	Air Quality	3
CEE 554	Hazardous Waste Treatment	3
CEE 555	Pollution Prevention and Green Engineering	3
CEE 558	Sustainable Development	3
CEE 571	Transportation Operations I	3
CEE 574	Transportation Data Analytics	3
CEE 575	Geometric Design of Highways	3
CEE 582	Introduction to Coastal Engineering	3

Category D – Other graduate courses

Graduate level courses offered from other departments. These courses must be related to the program of study and must be approved by the student's academic advisor.

MATH or STAT Category

CEE 700 Civil and Environmental Engineering Experimental Design

CEE 701 Applied Mathematics for Civil and Environmental Engineering

or a graduate level MATH or STAT course.

* Double listings in A and B categories.

Table CEE-1. Required Course Distributions for M.S. Engineering - Civil Engineering (except for Transportation Engineering Emphasis)

M.S. - Thesis Option

Category	Credit Hours
A	12
A,B,C, or D	9
MATH/STAT	3
Thesis	6
Total	30*

M. S. - Project Option

Category	Credit Hours
A	15
A, B, C, or D	9
MATH/STAT	3

Project	3
Total	30*

M. S. - Course Option

Category	Credit Hours
A	18
A,B,C, or D	9
MATH/STAT	3
Total	30**

* For Thesis & Project options, no more than 9 credit hours can be at the 500 level.

** For Course option, no more than 12 credit hours can be at the 500 level.

M.S. Engineering - Civil Engineering Course Requirements (in Transportation Engineering Emphasis)

The department offers a Master of Science (M.S.) degree in Engineering with a concentration in Civil Engineering with emphasis in Transportation Engineering. Table CEE-3 summarizes the requirements for the Transportation Engineering emphasis. Note that the M.S. Thesis option students must pass an oral thesis defense examination and submit thesis, Project option students must pass an oral project defense examination, and Course option students must pass an oral comprehensive examination at the end of all course work.

Table CEE-3. Required Course Distributions for M.S. Engineering - Civil Engineering – Transportation Engineering Emphasis

M.S. - Thesis Option

Category	Credit Hours
Upper-level Transportation Courses	12
CEE 700 or a Graduate Statistic Course	3
Electives from Upper-level Transportation Courses and other approved electives	9
Thesis	6
Total	30*

M.S. - Project Option

Category	Credit Hours
Upper-level Transportation Courses	12
CEE 700 or a Graduate Statistic Course	3
Electives from Upper-level Transportation Courses and other approved electives	12
Project	3
Total	30*

M.S. - Course Option

Category	Credit Hours
Upper-level Transportation Courses	12
CEE 700 or a Graduate Statistic Course	3
Electives from Upper-level Transportation Courses and other approved electives	15
Comprehensive examination	
Total	30**

* Note: For Thesis and Project options, no more than 9 credit hours can be at the 500 level.

** For Course Option, no more than 12 credits can be at the 500 level.

Master's Level Courses in Transportation Engineering Emphasis

Upper-level Transportation Courses

CEE 770	Transportation Safety
CEE 771	Transportation Operations II
CEE 772	Intelligent Transportation Systems
CEE 773	Transportation Planning
CEE 774	Transportation Network Flow Models
CEE 775	Transportation Network Algorithms
CEE 776	Simulation in Transportation Networks
CEE 777	Econometric Modeling in Transportation

Required Statistics Course

CEE 700	Civil and Environmental Engineering Experimental Design
	or Graduate STAT Course

Other Approved Elective Courses

See Table Below

Thesis/Project

CEE 699	Thesis
CEE 698	Master's Project

Other Approved Electives in Transportation Engineering Emphasis

(Note: In addition to these electives, other graduate-level courses approved by your advisor may also count towards the elective requirements.)

CEE 571	Transportation Operations I	3
CEE 574	Transportation Data Analytics	3
CEE 575	Geometric Design of Highways	3
CEE 552	Air Quality	3
CEE 558	Sustainable Development	3
CEE 715	Engineering Optimization I	3
ENMA 600	Cost Estimating and Financial Analysis	3
ENMA 603	Operations Research	3
ENMA 717	Cost Engineering	3
ENMA 724	Risk Analysis	3
MSIM 601	Introduction to Modeling and Simulation	3
MSIM 751	Advanced Analysis for Modeling and Simulation	3
PADM 634	Regional Planning	3
PADM 721	Transportation Policy	3
PORT 611	International Maritime Transport	3
PORT 612	Port Operations and Management	3
PORT 614	Port Planning and Economics	3
PSYC 870	Human Factors Psychology	3
STAT 531	Theory of Statistics	3
STAT 532	Sampling Theory	3
STAT 535	Design and Analysis of Experiments	3
STAT 537	Applied Regression and Time Series Analysis	3
STAT 549	Nonparametric Statistics	3

Master of Science Engineering with a Concentration in Environmental Engineering (MS) Master's Degrees

In this rapidly changing technological world, graduate degrees are highly desirable and most often master's degrees are required to hold professional civil and environmental engineering positions in the industry, and in federal, state and municipal government agencies. The department's graduate programs are designed to educate the technological leaders of the future in civil and environmental engineering, and are structured to accommodate both full-time and part-time students. The specialty areas include coastal, geotechnical, structural, transportation, and water resources engineering in civil engineering, and sub-fields in environmental engineering including water quality, water and wastewater treatment, hydrologic processes, water resources, environmental engineering microbiology, air quality, hazardous and solid waste, biofuels, nutrient cycling, and pollution prevention. [Online master's degree programs in Coastal Engineering and Environmental Engineering](#) are available with/without allowed transfer credits. For additional information, please request a departmental handbook from the graduate program director (CEGPD@odu.edu).

Admission Information

Civil and Environmental master's degree applicants must have a bachelor's degree, preferably, in civil or environmental engineering with a strong background in mathematics and physical sciences. Each applicant must submit an essay of 500 words or less describing personal and academic goals, professional objectives, preparation for graduate study, and how the chosen program will help the applicant achieve these goals and objectives. Two letters of recommendation must be submitted from former or current professors, or employment supervisors. Regular admission to a master's program generally requires an undergraduate GPA of 3.0 or higher on a 4.0 scale. Applicants with a lower undergraduate GPA may be considered for regular or provisional admission on the basis of successful engineering work experience or other credentials demonstrating potential for success in the graduate program. The submission of Graduate Record Examination (GRE) is required unless the applicant holds an ABET accredited engineering degree from an institution in the USA. TOEFL (or IELTS) is required for all applicants whose native language is not English unless their BS degrees are from USA institutions. Provisional admission may also be possible for applicants with a bachelor's degree in a field other than the applicant's intended graduate program. In such cases there will be prerequisite course requirements. Provisional admission may be given to those applicants who do not hold a bachelor's degree in civil or environmental engineering; however, these students will be required to complete undergraduate course work in addition to the graduate program requirements. Potential prerequisite courses are listed below.

Curriculum Requirements

Potential Prerequisite Courses for M.S. Engineering - Environmental Engineering

MATH 211	Calculus I	4
MATH 212	Calculus II	4
MATH 307	Ordinary Differential Equations	3
MATH 312	Calculus III	4
PHYS 231N	University Physics I	4
PHYS 232N	University Physics II	4
CHEM 121N	Foundations of Chemistry I Lecture	3
CHEM 122N	Foundations of Chemistry I Laboratory	1
CHEM 123N	Foundations of Chemistry II Lecture	3
CEE 204	Statics	3
CEE 305	Numerical Methods for Civil and Environmental Engineering	1

CEE 330	Hydromechanics	3
CEE 340	Hydraulics and Water Resources	3
CEE 350	Environmental Pollution and Control	3

Civil Engineering and Environmental Engineering Graduate Course Requirements (except Transportation Engineering Emphasis)

The graduate courses applicable towards a master's degree in the Department of Civil and Environmental Engineering are grouped into various categories listed below. The required number of the credit hours from these categories for the Master of Science (M.S.) degree in Civil Engineering (except for the transportation engineering concentration) and the Master of Science (M.S.) degree in Environmental Engineering are summarized in Table CEE-1 and CEE-2, respectively. Note that the M.S. Thesis option students must pass an oral thesis defense examination and submit a thesis, M.S. Project option students must pass an oral project defense examination, and M.S. Course option students must pass an oral (for civil engineering) or written (for environmental engineering) comprehensive examination at the end of all course work.

Category B – Upper level master degree courses in Environmental Engineering

CEE 715	Engineering Optimization I *	3
CEE 741	Open Channel Flow *	3
CEE 747	Groundwater Flow *	3
CEE 751	Physicochemical Treatment Processes (Env. Engr. Core Course)	3
CEE 752	Biological Wastewater Treatment (Env. Engr. Core Course)	3
CEE 753	Advanced Processes for Water and Wastewater Treatment	3
CEE 754	Environmental Engineering Microbiology	3
CEE 755	Water Quality Management (Env. Engr. Core Course)	3
CEE 756	Water Quality Modeling (Env. Engr. Core Course)	3
CEE 759	Carbon-Free Clean Energy	3
CEE 760	Managing Phosphorous in Circular Economy	3
CEE 761	Water Resources Processes and Analysis Methods *	3
CEE 762	Aquatic Chemistry in Environmental Engineering (Env. Engr. Core Course)	3
CEE 788	Coastal Hydrodynamics and Sediment Processes *	3

Category C – Lower level courses in Civil & Environmental Engineering

CEE 514	Masonry Structures Design	3
CEE 515	Steel Structures Design	3
CEE 516	Wood Structures Design	3
CEE 530	Foundation Engineering	3
CEE 531	Slope Stability and Earth Structures Design	3
CEE 532	Introduction to Earthquake Engineering	3
CEE 533	Geomaterials Stabilization	3
CEE 540	Hydraulic Engineering	3
CEE 546	Urban Stormwater Hydrology	3
CEE 547	Groundwater Hydraulics	3
CEE 550	Water Distribution and Wastewater Collection System Design	3
CEE 552	Air Quality	3
CEE 554	Hazardous Waste Treatment	3
CEE 555	Pollution Prevention and Green Engineering	3
CEE 558	Sustainable Development	3
CEE 571	Transportation Operations I	3

CEE 574	Transportation Data Analytics	3
CEE 575	Geometric Design of Highways	3
CEE 582	Introduction to Coastal Engineering	3

Category D – Other graduate courses

Graduate level courses offered from other departments. These courses must be related to the program of study and must be approved by the student's academic advisor.

MATH or STAT Category

CEE 700 Civil and Environmental Engineering Experimental Design

CEE 701 Applied Mathematics for Civil and Environmental Engineering

or a graduate level MATH or STAT course.

* Double listings in A and B categories.

Table CEE-2. Required Course Distributions for M.S. Engineering - Environmental Engineering

M.S. - Thesis Option

Category	Credit Hours
Env. Engr. Core Courses (choose 4 from 5 listed courses)	12
A,B,C, or D	9
MATH/STAT	3
Thesis	6
Total	30*

M.S. - Project Option

Category	Credit Hours
Env. Engr. Core Courses (choose 4 from 5 listed courses)	12
B	3
A,B, C, or D	9
MATH/STAT	3
Project	3
Total	30*

M.S. - Course Option

Category	Credit Hours
Env. Engr. Core Courses (choose 4 from 5 listed courses)	12
B	6
A,B, C, or D	9
MATH/STAT	3
Total	30**

* For Thesis & Project options, no more than 9 credit hours can be at the 500 level.

** For Course option, no more than 12 credit hours can be at the 500 level.

Doctor of Philosophy Engineering with a Concentration in Civil and Environmental Engineering (PhD)

Doctoral degrees in engineering that focus on civil engineering and environmental engineering are required for college-level teaching and employment in research institutions. Many leading industries and agencies also seek well-trained doctoral graduates. The specialty areas include

coastal, geotechnical, structural, transportation, and water resources engineering in civil engineering and a variety of sub-fields in environmental engineering including water quality, water and wastewater treatment, hydrologic processes, water resources, environmental engineering microbiology, air quality, hazardous and solid waste, biofuels, nutrient cycling, and pollution prevention.

Admission Requirements

A master's degree or equivalent in engineering or a related field is required for admission to the Ph.D. program; however, exceptionally well qualified students can be admitted to Ph.D. program directly without a master's degree. Each applicant must submit an essay of 500 words or less describing personal and academic goals, professional objectives, preparation for graduate study, and how the chosen program will help the applicant achieve these goals and objectives. Two letters of recommendation are required. At least one of these must be submitted from former or current professors, and one could be from employment supervisor. Regular admission to a Ph.D. program generally requires a GPA of 3.5 or higher on a 4.0 scale in their master program. Applicants with a lower GPA may be considered for regular or provisional admission on the basis of successful engineering work experience or other credentials demonstrating potential for success in the Ph.D. program. Submission of GRE scores is required except for applicants who hold an ABET accredited engineering degree from an institution in the USA or a graduate engineering degree from an institution of which the undergraduate degree is ABET accredited in the USA. TOEFL (or IELTS) are required for all applicants whose native language is not English unless their master (or BS) degrees are from USA institutions.

Curriculum Requirements

Degree Requirements

Ph.D. program requires minimum 24 credits of coursework and 24 credit hours of dissertation research work. Three fifths (3/5) of these courses (15 credit hours) shall be from 800-level courses as required by the University.

Department of Electrical and Computer Engineering

231 Kaufman Hall
757-683-3741

<http://www.odu.edu/ece/> (<http://odu.edu/ece/>)

Oscar González, Chair

Yuzhong Shen, Associate Chair

Chung-Hao Chen, Graduate Program Director, Electrical & Computer Engineering

Michel Audette, Graduate Program Director, Biomedical Engineering

Hong Yang, Graduate Program Director, Modeling and Simulation

Chung-Hao Chen, Graduate Program Director, Doctor of Engineering, Cybersecurity

Overview

The Department of Electrical and Computer Engineering strives to provide the highest quality engineering education at the undergraduate and graduate levels, to engage in scholarly research at the forefront of electrical, computer, and biomedical engineering, and to serve the professions of electrical, computer, modeling and simulation, and biomedical engineering. The department has strong graduate and research programs providing a high quality and broad-based education that prepares graduates for successful professional careers and a lifetime of learning. The Electrical & Computer Engineering Department also offers a Doctor of Engineering Degree in Cybersecurity. This program is available on-campus and online.

Electrical and Computer Engineering graduate studies encompass six broad areas:

1. systems
2. signal and image processing
3. physical electronics

4. computer engineering
5. cybersecurity engineering
6. modeling and simulation engineering

List of Degrees and Certificates

The department offers the following Electrical and Computer Engineering graduate degrees:

- Master of Science, Engineering - Electrical and Computer Engineering (Traditional and Online Formats)
- Doctor of Philosophy, Engineering - Electrical and Computer Engineering
- Doctor of Engineering, Electrical and Computer Engineering
- Doctor of Engineering, Cybersecurity

and

- Master of Science, Engineering - Modeling and Simulation
- Doctor of Philosophy, Engineering - Modeling and Simulation
- Doctor of Engineering - Modeling and Simulation
- Graduate Certificate in Modeling and Simulation Engineering

The department also administers the following Biomedical Engineering graduate degrees and a certificate.

- Master of Engineering - Biomedical Engineering
- Master of Science, Engineering - Biomedical Engineering
- Doctor of Philosophy, Engineering - Biomedical Engineering
- Advanced Engineering Certificate - Biomedical Engineering

Programs

Doctor of Engineering Programs

- Engineering with a Concentration in Cybersecurity (DEng) (p. 239)
- Engineering with a Concentration in Electrical and Computer Engineering (DEng) (p. 241)
- Engineering with a Concentration in Modeling and Simulation (DEng) (p. 244)

Doctor of Philosophy Programs

- Engineering with a Concentration in Biomedical Engineering (PhD) (p. 238)
- Engineering with a Concentration in Electrical and Computer Engineering (PhD) (p. 242)
- Engineering with a Concentration in Modeling and Simulation Engineering (PhD) (p. 245)

Master of Engineering Program

- Engineering with a Concentration in Biomedical Engineering (ME) (p. 235)

Master of Science Programs

- Engineering with a Concentration in Biomedical Engineering (MS) (p. 236)
- Engineering with a Concentration in Electrical and Computer Engineering (MS) (p. 240)
- Engineering with a Concentration in Modeling and Simulation (MS) (p. 243)

Certificate Program

- Modeling and Simulation - Engineering Certificate (p. 246)

Centers and Institutes

The research laboratories and institutes directly associated with the department include:

- Bioelectrics and Pulsed Power
- Biomedical Devices and Biomanufacturing Lab
- Collaborative Autonomous Systems Laboratory
- Cybersecurity, Communications & Networking Innovation (CCNI) Laboratory
- Machine Intelligence and HF Communications Lab
- Medical Simulations Laboratory
- Plasma Engineering Lab
- Systems Research Laboratory
- Virginia Institute for Photovoltaics (VIPV)
- Vision Lab
- Virginia Institute for Vision Analysis (VIVA)

In addition, the department has faculty with research labs at the Applied Research Center (ARC) at the Thomas Jefferson National Accelerator Facility. The ARC facilities include thin film fabrication equipment for applications in photovoltaics, thermoelectrics, superconductors, and semiconductors. ARC houses extensive materials analysis capabilities. These research facilities position the department for national leadership in several areas and as a leading research and higher education institution in the southeastern United States. In addition, the faculty have strong ties to the Thomas Jefferson National Accelerator Facility, Frank Reidy Center for Bioelectrics, the Center of Bioelectronics, and the Virginia Modeling, Analysis, and Simulation Center (VMASC).

Master of Engineering Engineering with a Concentration in Biomedical Engineering (ME) Biomedical Engineering Program

Michel Audette, Graduate Program Director

2123F Engineering Systems Building
757-683-6940
www.odu.edu/eng/programs/biomedical/

The Biomedical Engineering graduate degree programs are available to full-time and part-time students seeking to improve their research and professional skills in biomedical engineering. The programs strive to provide the highest quality engineering education at the graduate level, to engage in scholarly research at the forefront of biomedical engineering, and to serve the biomedical engineering profession. While the biomedical engineering program is administered by the Department of Electrical & Computer Engineering, the program is highly interdisciplinary, and students are admitted from broad areas of engineering, science, and healthcare. Cutting-edge research opportunities and instruction are offered in:

- Bioelectrics and Pulsed Power
- Cellular & Molecular Bioengineering
- Cardiovascular Engineering
- Musculoskeletal Biomechanics
- Plasma Medicine
- Systems Biology & Computational Bioengineering

Facilities: The Biomachina Laboratory; the Biomechanics Laboratory; Biomedical Devices and Biomanufacturing Lab; the Cellular Mechanobiology Laboratory; the Machine Intelligence & HR Communications Lab; the Gene Therapy and Regenerative Medicine Laboratory; the Medical Simulations Laboratory; the Medical Simulations Lab; and the Virginia Institute for Imaging and Vision Analysis (VIIVA).

The program also has strong ties to several other on- and off-campus laboratories, including the Applied Research Center at the Jefferson National Laboratory, the Center for Brain Research and Rehabilitation, the Frank Reidy Research Center for Bioelectrics, the Center for Bioelectronics, and the Virginia Modeling, Analysis and Simulation Center (VMASC). Regional, national, and international clinical collaborators support the program. These unique resources position the biomedical engineering

program as a leader in education and research in the Southeast and nationally.

Master of Engineering Admission Requirements

Admission to the Master of Engineering program in biomedical engineering is in accordance with Old Dominion University and Frank Batten College of Engineering and Technology requirements for master's programs as specified in this catalog. Specific additional requirements include the following:

1. Completion of a bachelor's degree in Engineering, Science or Mathematics from an accredited institution, although students from other educational backgrounds may apply with appropriate leveling courses. Accepted students from disciplines other than Biomedical Engineering will be required to complete a number of leveling courses to meet the prerequisites of the program; the Graduate Program Director will work with the admitted students to create the list of leveling courses, including calculus and differential equations.
2. A minimum GPA of 3.00 (out of 4.0) is required of most students. A student with a lower GPA meeting ODU's graduate admission requirements and with evidence of a high level of professional capability may be eligible for admission to the program upon submission of a petition to the graduate program director.
3. Recent scores, typically, not more than five years old, on the Graduate Record Examination's (GRE) verbal, quantitative, and analytical writing sections must be submitted by all applicants.
4. Two letters of recommendation (typically from faculty in the highest degree program completed when the application is within five years of graduation from that degree program) are encouraged but not required.
5. The applicant must submit a resume and a statement of purpose and goals.
6. Foundation knowledge in physics, basic chemistry, physiology, computer programming, and mathematics (including differential equations and statistics) is expected. Some leveling courses may be required to complement the student's expertise, namely in physiology, statistics, and differential equations.
7. The linked Bachelor's/Master's degree program in the Frank Batten College of Engineering and Technology at Old Dominion University is designed to provide an opportunity for exceptionally qualified engineering undergraduate students to obtain both a bachelors and a master's degree in Biomedical Engineering. Typically, undergraduate students apply at the end of their junior year for admission to the linked programs.

Curriculum Requirements

The Master of Engineering program requires completion of 30 course credits, including 15 core: 9 CH Common Core course credits, a 3 credit Core Project BME 698, and one 3 credit Methods Core course (BME 720 for Computer-Assisted Medicine specialization path) OR BME 792 (for Biomechanics path) OR BME 726 (for Diagnostics and Therapies path). In addition, there is a requirement of 15 credits of technical elective course credits, which entail 9 credits of BME technical electives and 6 credits of approved technical electives. The ME program culminates in a comprehensive exam, with written and oral components, the contents of which are based on the student's Core Project.

BME Core		15
<i>Complete the following Common Core courses (9 credits):</i>		
BME 711	Biological Mechanisms for Biomedical Engineers	
BME 712	Engineering Fundamentals in Biomedicine	
BME 740	Regenerative Medicine	
<i>Complete a 3 credit Core ME Project</i>		
BME 698	Master's Project	
<i>Complete one Methods Core Course (3 credits) from the following:</i>		
BME 720	Modern Biomedical Instrumentation	

BME 726	Biomaterials	
BME 792	Biomechanics	
BME Technical Electives ¹		9
Complete 9 credits of coursework from the following BME options:		
BME 530	Therapy and Function Models for Medical Simulation	
BME 554	Introduction to Bioelectronics	
BME 562	Introduction to Medical Image Analysis	
BME 564	Biomedical Applications of Low Temperature Plasmas	
BME 612	Digital Signal Processing I	
BME 695	Topics in Biomedical Engineering	
BME 698	Master's Project	
BME 700	Cardiovascular Physiology	
BME 702	Biomedical Sciences Journal Club	
BME 710	Advanced Cell Biology	
BME 714	Biomedical Sciences Laboratory	
BME 721	Mathematical Modeling in Physiology	
BME 730	Predoctoral Fellowship Grant Writing	
BME 731	Finite Element Analysis	
BME 741	Principles of Visualization	
BME 747	Responsible Conduct of Research	
BME 751	Computational and Statistical Methods in Biomedical Engineering	
BME 754	Advanced Bioelectronics	
BME 755	Biomembranes and Ion Channels	
BME 760	Autonomous and Robotic Systems Analysis and Control	
BME 762	Applied Medical Image Analysis	
BME 770	Advanced Study in Biology	
BME 775	Grant Writing in Biology	
BME 783	Digital Image Processing	
BME 785	Advanced Manufacturing Technology	
BME 794	Cellular Biomechanics	
BME 795	Special Topics in Biomedical Engineering	
BME 797	Independent Study	
Approved Technical Electives ¹		6
Complete 6 credits of coursework from electives not necessarily listed above.		
Total Credit Hours		30

¹ A total of 15 credits of technical elective courses can be selected from the biomedical engineering technical electives (9 credits) or a wide variety of appropriate graduate courses (6 credits) in engineering, biology, chemistry, psychology, computer science, modeling and simulation, mathematics, statistics, or other programs. Technical electives without the BME prefix must be approved by the graduate program director.

Master of Science Engineering with a Concentration in Biomedical Engineering (MS) Biomedical Engineering Program

Michel Audette, Graduate Program Director

2123F Engineering Systems Building
757-683-6940

The Biomedical Engineering graduate degree programs are available to full-time and part-time students seeking to improve their research and professional skills in biomedical engineering. The programs strive to provide the highest quality engineering education at the graduate level, to engage in scholarly research at the forefront of biomedical engineering, and to serve the biomedical engineering profession. While the biomedical engineering program is administered by the Department of Electrical & Computer Engineering, the program is highly interdisciplinary, and students are admitted from broad areas of engineering, science, and healthcare. Cutting-edge research opportunities and instruction are offered in:

- Bioelectrics and Pulsed Power
- Cellular & Molecular Bioengineering
- Cardiovascular Engineering
- Musculoskeletal Biomechanics
- Plasma Medicine
- Systems Biology & Computational Bioengineering

Facilities: The Biomachina Laboratory; the Biomechanics Laboratory; Biomedical Devices and Biomanufacturing Lab; the Cellular Mechanobiology Laboratory; the Machine Intelligence & HR Communications Lab; the Gene Therapy and Regenerative Medicine Laboratory; the Medical Simulations Laboratory; the Medical Simulations Lab; and the Virginia Institute for Imaging and Vision Analysis (VIIVA).

The program also has strong ties to several other on- and off-campus laboratories, including the Applied Research Center at the Jefferson National Laboratory, the Center for Brain Research and Rehabilitation, the Frank Reidy Research Center for Bioelectrics, the Center for Bioelectronics, and the Virginia Modeling, Analysis and Simulation Center (VMASC). Regional, national, and international clinical collaborators support the program. These unique resources position the biomedical engineering program as a leader in education and research in the Southeast and nationally.

Master of Science Admission Requirements

Admission to the Master of Science, Engineering - Biomedical Engineering program is in accordance with Old Dominion University and Frank Batten College of Engineering and Technology requirements for master's programs as specified in this catalog. Specific additional requirements include the following:

1. Completion of a bachelor's degree in Engineering, Science or Mathematics from an accredited institution, although students from other educational backgrounds may apply with appropriate leveling courses. Accepted students from disciplines other than Biomedical Engineering will be required to complete a number of leveling courses to meet the prerequisites of the program; the Graduate Program Director will work with the admitted students to create the list of leveling courses, including calculus and differential equations.
2. A minimum GPA of 3.00 (out of 4.0) is required of most students. A student with a lower GPA meeting ODU's graduate admission requirements and with evidence of a high level of professional capability may be eligible for admission to the program upon submission of a petition to the graduate program director.
3. Recent scores, typically, not more than five years old, on the Graduate Record Examination's (GRE) verbal, quantitative, and analytical writing sections must be submitted by all applicants.
4. Two letters of recommendation (typically from faculty in the highest degree program completed when the application is within five years of graduation from that degree program) are encouraged but not required.
5. The applicant must submit a resume and a statement of purpose and goals.
6. Foundation knowledge in physics, basic chemistry, physiology, computer programming, and mathematics (including differential equations and statistics) is expected. Some leveling courses may be required to complement the student's expertise, namely in physiology, statistics, and differential equations.

7. The linked Bachelor's/Master's degree program in the Frank Batten College of Engineering and Technology at Old Dominion University is designed to provide an opportunity for exceptionally qualified engineering undergraduate students to obtain both a bachelors and a master's degree in Biomedical Engineering. Typically, undergraduate students apply at the end of their junior year for admission to the linked programs.

Curriculum Requirements

The Master of Science program requires completion of 24 course credits, including 12 CH Core Course credits and 12 elective course credits, including 6 credits of BME technical electives and 6 credits of approved technical electives, in addition to 6 thesis research credits. The 12 credits of technical electives should be chosen to meet the student's research and career objectives.

BME Common Core 12

Complete the following Core Courses (12 credits):

BME 711	Biological Mechanisms for Biomedical Engineers ¹
BME 712	Engineering Fundamentals in Biomedicine ¹
BME 740	Regenerative Medicine
BME 747	Responsible Conduct of Research

BME Technical Electives ¹ 6

Complete 6 credits of coursework from the following:

BME 530	Therapy and Function Models for Medical Simulation
BME 554	Introduction to Bioelectrics
BME 562	Introduction to Medical Image Analysis
BME 564	Biomedical Applications of Low Temperature Plasmas
BME 612	Digital Signal Processing I
BME 695	Topics in Biomedical Engineering
BME 698	Master's Project
BME 700	Cardiovascular Physiology
BME 702	Biomedical Sciences Journal Club
BME 710	Advanced Cell Biology
BME 714	Biomedical Sciences Laboratory
BME 720	Modern Biomedical Instrumentation
BME 721	Mathematical Modeling in Physiology
BME 726	Biomaterials
BME 730	Predoctoral Fellowship Grant Writing
BME 731	Finite Element Analysis
BME 741	Principles of Visualization
BME 751	Computational and Statistical Methods in Biomedical Engineering
BME 754	Advanced Bioelectrics
BME 755	Biomembranes and Ion Channels
BME 760	Autonomous and Robotic Systems Analysis and Control
BME 762	Applied Medical Image Analysis
BME 770	Advanced Study in Biology
BME 775	Grant Writing in Biology
BME 783	Digital Image Processing
BME 785	Advanced Manufacturing Technology
BME 792	Biomechanics
BME 794	Cellular Biomechanics
BME 795	Special Topics in Biomedical Engineering
BME 797	Independent Study

Approved Technical Electives ¹ 6

Complete 6 credits of coursework from electives not necessarily listed above.

BME 699	Master's Thesis
Total Credit Hours	30

- ¹ The 12 credits of technical elective courses can be selected from the biomedical engineering technical electives (6 credits) or a wide variety of appropriate graduate courses (6 credits) in engineering, biology, chemistry, psychology, computer science, modeling and simulation, mathematics, statistics, or other programs. Technical electives without the BME prefix must be approved by the graduate program director. To earn a master's degree, a student needs to take at least five courses at the 600 or higher level, and no more than three courses at the 500 level.

Doctor of Philosophy Engineering with a Concentration in Biomedical Engineering (PhD)

Web Site: <https://www.odu.edu/biomedical-engineering> (<https://www.odu.edu/biomedical-engineering/>)

Biomedical Engineering Program

Michel Audette, Graduate Program Director

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www.odu.edu/eng/programs/biomedical/

The Biomedical Engineering graduate degree programs are available to full-time and part-time students seeking to improve their research and professional skills in biomedical engineering. The programs strive to provide the highest quality engineering education at the graduate level, to engage in scholarly research at the forefront of biomedical engineering, and to serve the profession of biomedical engineering. While the biomedical engineering program is administered by the Department of Electrical & Computer Engineering, the program is highly interdisciplinary and students are admitted from broad areas of engineering, science, and healthcare. Cutting-edge research opportunities and instruction are offered in:

- Bioelectrics and Pulsed Power
- Cellular & Molecular Bioengineering
- Cardiovascular Engineering
- Musculoskeletal Biomechanics
- Plasma Medicine
- Systems Biology & Computational Bioengineering

Facilities: The Biomachina Laboratory; the Biomechanics Laboratory; Biomedical Devices and Biomanufacturing Lab; the Cellular Mechanobiology Laboratory; the Machine Intelligence & HR Communications Lab; the Gene Therapy and Regenerative Medicine Laboratory; the Medical Simulations Laboratory; the Medical Simulations Lab; and the Virginia Institute for Imaging and Vision Analysis (VIIVA).

The program also has strong ties to several other on- and off-campus laboratories, including the Applied Research Center at the Jefferson National Laboratory, the Center for Brain Research and Rehabilitation, the Frank Reidy Research Center for Bioelectrics, Center for Bioelectronics, and the Virginia Modeling, Analysis and Simulation Center (VMASC). Regional, national, and international clinical collaborators support the program. These unique resources position the biomedical engineering program as a leader in education and research in the Southeast and nationally.

Doctor of Philosophy Admission Requirements

Admission to the Ph.D. program in biomedical engineering is in accordance with Old Dominion University and Frank Batten College of Engineering and

Technology requirements for doctoral programs as specified in this catalog. Specific additional requirements include the following:

1. Completion of a master's degree in a closely related field is expected. Accepted students from disciplines other than Biomedical Engineering will be required to complete a number of leveling courses to meet the prerequisites of the program; the Graduate Program Director will work with the admitted students to create the list of leveling courses, including calculus and differential equations.
2. A minimum GPA of 3.50 (out of 4.0) is required of most students. A student with a lower GPA meeting ODU's graduate admission requirements and with evidence of a high level of professional capability may be eligible for admission to the program upon submission of a petition to the graduate program director.
3. Recent scores, typically, not more than five years old, on the Graduate Record Examination's (GRE) verbal, quantitative, and analytical writing sections must be submitted by all applicants.
4. Three letters of recommendation (typically at least two of which are from faculty in the highest degree program completed when the application is within five years of graduation from that degree program) are encouraged but not required.
5. The applicant must submit a resume and a statement of purpose and goals.
6. Foundation knowledge in physics, basic chemistry, physiology, computer programming, and mathematics (including differential equations and statistics) is expected. Some leveling courses may be required to complement the student's expertise, namely in physiology, statistics, and differential equations.
7. The Frank Batten College of Engineering and Technology at Old Dominion University has the Direct Bachelor-to-Ph.D. and linked Bachelor/Ph.D. programs that allow exceptionally well-qualified undergraduate students to apply for admission directly to a Ph.D. program. Typically, undergraduate students apply at the end of their junior year for admission to the linked programs.

Curriculum Requirements

The Ph.D. degree requires:

- 24 credit hours of graduate-level courses beyond the master's degree,
- 24 research credit hours (BME 899) beyond the master's degree,
- successful completion of a written diagnostic examination,
- successful completion of written and oral candidacy examinations,
- successful completion of a dissertation research proposal, and
- successful completion and public defense of a dissertation.
- Or, in the absence of a master's degree, 78 credit hours beyond the bachelor's degree are required.

The program of study will be developed with the approval of the graduate program director and the student's advisor. The 24-credit course program shall include a common core of 12 credits (four 3-credit courses) including : BME 811 Biological Mechanisms for Biomedical Engineers, BME 812 Engineering Fundamentals in Biomedicine, BME 840 Regenerative Medicine, and BME 847 Responsible Conduct of Research (now worth 3CH). 12 credits of elective coursework are also required and are described below.

For students without a master's degree, a total of 78 credit hours of graduate level coursework is required, consisting of 48 credit hours of graduate courses (the 24 course credits listed above for master's holders, plus 24 elective credits), as well as 30 research credit hours (BME 899). Three fifths of the required 48 course credit hours must be at the 800 level and need to comply with regular PhD program degree requirements.

Exceptions to the credit-hour distribution requirements at any level must be approved in writing by the graduate program director, the dean or his or her designee, and the provost or his or her designee. Additional course work or appropriate research background may be required to meet prerequisites for courses or in preparation for the diagnostic examination.

BME Common Core	12
<i>Complete the following Core courses (12 credits):</i>	
BME 811	Biological Mechanisms for Biomedical Engineers
BME 812	Engineering Fundamentals in Biomedicine
BME 840	Regenerative Medicine
BME 847	Responsible Conduct of Research
BME Technical Electives¹	6
<i>Complete 6 credits of coursework from the following:</i>	
BME 530	Therapy and Function Models for Medical Simulation
BME 554	Introduction to Bioelectrics
BME 562	Introduction to Medical Image Analysis
BME 564	Biomedical Applications of Low Temperature Plasmas
BME 612	Digital Signal Processing I
BME 800	Cardiovascular Physiology
BME 802	Biomedical Sciences Journal Club
BME 810	Advanced Cell Biology
BME 814	Biomedical Sciences Laboratory
BME 820	Modern Biomedical Instrumentation
BME 821	Mathematical Modeling in Physiology
BME 826	Biomaterials
BME 830	Predoctoral Fellowship Grant Writing
BME 831	Finite Element Analysis
BME 841	Principles of Visualization
BME 851	Computational and Statistical Methods in Biomedical Engineering
BME 854	Advanced Bioelectrics
BME 855	Biomembranes and Ion Channels
BME 860	Autonomous and Robotic Systems Analysis and Control
BME 862	Applied Medical Image Analysis
BME 870	Advanced Study in Biology
BME 875	Grant Writing in Biology
BME 883	Digital Image Processing
BME 885	Advanced Manufacturing Technology
BME 892	Biomechanics
BME 894	Cellular Biomechanics
BME 895	Special Topics in Biomedical Engineering
BME 897	Independent Study
BME 999	Doctoral Graduate Credit
Approved Technical Electives¹	6
Complete 6 credits of coursework from electives not necessarily listed above.	
Dissertation Research	24
BME 899	PHD Dissertation Research
Total Credit Hours	48

¹ The technical elective courses provide a basis for dissertation research and future career objectives. These courses can be selected from the biomedical engineering technical electives (6 credits) or a wide variety of appropriate graduate courses (6 credits) in engineering, biology, chemistry, psychology, computer science, modeling and simulation, mathematics, statistics, or other programs. At least 15 credits of non-dissertation course work must be at the 800-level. A minimum of 3 credits must be selected from the biomedical engineering technical electives list; the remaining credits can be selected from

this list or other graduate courses with approval of the student's advisor and the graduate program director.

Doctor of Philosophy Degree Requirements

The Ph.D. in biomedical engineering is offered in accordance with the general requirements for doctoral degrees as specified in the Requirements for Graduate Degree Section of this catalog. Specific program of study requirements include the following:

1. Completion of a minimum of 48 hours of graduate credits to include: a minimum of 24 credits of course work beyond the master's degree and a minimum of 24 credits of dissertation research. At least 15 credits of non-dissertation course work must be at the 800-level. The Graduate Program Director in concurrence with the Chair can approve exceptions to these requirements under special circumstances.
2. For students without a master's degree, a total of 78 credit hours of graduate level coursework is required, consisting of 48 credit hours of graduate courses (the 24 course credits listed above for master's holders, plus 24 elective credits), as well as 30 research credit hours (BME 899). Three fifths of the required 48 course credit hours must be at the 800 level and need to comply with regular PhD program degree requirements.
3. Successful completion of a written diagnostic examination before the end of the first academic year.
4. Successful completion of a written and oral qualifying examination near the completion of the coursework.
5. Successful presentation of a dissertation research proposal at the beginning of the dissertation research.
6. The successful completion and public defense of a dissertation representing independent, original research worthy of publication in a peer-reviewed scholarly journal. At least one published and one submitted manuscript as first author in peer-reviewed, indexed journals are expected.

Doctor of Engineering Engineering with a Concentration in Cybersecurity (DEng)

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www.odu.edu/eng/

Doctor of Engineering, Cybersecurity

The Department offers a Doctor of Engineering (D.Eng.) degree with concentration in Cybersecurity in accordance with the admission criteria and degree requirements specified in the Frank Batten College of Engineering and Technology section in this catalog.

Doctor of Engineering Program

The College offers an interdisciplinary Doctor of Engineering (D.Eng.) program to provide the Commonwealth and the nation with exceptionally educated engineering practitioners. These individuals will have developed the highest possible capability to provide innovative solutions in specialized engineering endeavors. The graduates of the program will meet the highest standards for advanced level engineering and leadership positions in industry and government.

Admission Criteria

Consideration for admission to the Doctor of Engineering program with a concentration in Cybersecurity requires the following:

1. A master of science degree from an accredited university in the United States or an equivalent foreign institution;
2. Official copies of all transcripts

3. Coursework or a minimum of two years' work experience in cybersecurity and/or related areas;
4. Two letters of recommendation from individuals familiar with the applicant's professional and/or academic background;
5. A current resume;
6. A statement of professional goals;
7. GRE Scores, with a 50% or better attainment on quantitative reasoning;
8. English proficiency requirement if the applicant's native language is not English.

Curriculum Requirements

A minimum of 48 hours of graduate work beyond the master's degree is required including:

- 18 credit hours of core courses
- At least 18 credit hours of graduate coursework in the student's area of specialization as determined by the department
- At least 12 credit hours of applied doctoral project

At least three fifths of the course work must be at 800-level. Exceptions to the credit-hour distribution requirements at any level must be approved in writing by the graduate program director, the dean or his or her designee, and the provost or his or her designee.

Cybersecurity Concentration

The curriculum of this concentration consists of 18 credit hours of CYSE, ECE, MSIM, or ENMA 600 and 800 level courses as core courses, 18 credit hours of graduate coursework in the area of specialization and 12 credit hours of applied doctoral project. The courses need approval of the advisor and the graduate program director. Of the total 36 credit hours of coursework, 15 credit hours need to be completed at the 800 level, and no more than 15 credit hours can be taken from disciplines other than CYSE, ECE, MSIM, or ENMA.

Additional Requirements

Continuation and Graduation Requirements

The continuation requirements are the same as the continuation requirements for the Doctor of Philosophy programs. The graduation requirements for the Doctor of Engineering degree are as follows:

1. Satisfactory completion of a minimum of 48 credit hours of approved graduate work beyond the master's degree, including the doctoral project.
2. Satisfactory performance on a diagnostic examination at the completion of nine credit hours of coursework. The purpose of this examination is to determine if the student has adequate background to pursue a doctoral degree. The diagnostic examination may only be repeated once.
3. Satisfactory completion of a written and oral candidacy examination before the advisory committee. The student will take the candidacy examination when he/she is within six credit hours of completing all the required coursework. The candidacy examination may only be repeated once.
4. Prepare and successfully defend a project concept proposal in written and oral formats. The student will be required to prepare and present a concept proposal related to the work that will be undertaken for the doctoral project. The concept proposal will be defended before the doctoral project committee.
5. Submission of progress reports as deemed necessary by the doctoral project committee.
6. Written report of the project results. The doctoral project shall be documented in a manner consistent with advanced, professional work. The project report will follow the standard format for Old Dominion University dissertations and theses.
7. Comprehensive oral defense of the doctoral project before the student's doctoral project committee and a general audience.

Once a student has completed the coursework, passed the candidacy examinations, and gained approval for the project proposal, the student

advances to candidacy. The applied doctoral project must successfully demonstrate the student's mastery of the subject area and ability to apply advanced technical knowledge to identify, formulate, and solve novel and complex engineering problems. The project must address a complex but practical problem currently faced by the public, industry, or government, and it must provide a solution that satisfies all the technical, social, political, economic, safety, sustainability, and environmental requirements and/or constraints. The advisory and doctoral project committees need at least three members certified for graduate instruction; two faculty members must be from the ECE department. The committee chair must be an ECE faculty member or a faculty member with an ECE degree from the BCET college. A faculty member who is not in the BCET college but has expertise in Cybersecurity-related areas needs the graduate program director's approval to serve as a project advisor or the committee chair. The committee must also have at least one non-ECE faculty member who is knowledgeable about the project subject area.

Master of Science Engineering with a Concentration in Electrical and Computer Engineering (MS)

The Department offers a Master of Science (M.S.) in Engineering degree with a concentration in Electrical & Computer Engineering. It requires a minimum of 30 credit hours of graduate study. Full-time and part-time students may complete coursework through a combination of on-campus and online courses. Online courses are available synchronously at higher education centers and can be broadcast to any computer with a high-speed Internet connection. Full details on all requirements for graduating with a Master's degree are outlined in a separate section that follows the admission information.

Admission Information

Applicants are expected to hold a B.S. degree in electrical engineering (EE) or computer engineering (CpE) from an accredited institution. Applicants are also expected to have a minimum grade point average of 3.0 (on a 4.0 scale) in both the baccalaureate major area (EE or CpE) and overall. Applicants with a GPA below a 3.0 may be considered for provisional admission, which may require additional prerequisite courses in addition to the graduate degree requirements. The applications are submitted through the Office of Admissions of Old Dominion University. Together with the completed application form, two letters of recommendation from former instructors or employment supervisors, transcripts from all colleges and universities attended, GRE scores, a resume, and a personal statement of objectives are required. TOEFL scores are also required for international applicants. Applicants with academic degrees in areas other than electrical and computer engineering will be considered. Those with degrees in math, physics, computer science, or other engineering fields are encouraged to apply. The linked Bachelor's/Master's degree program in the Frank Batten College of Engineering and Technology at Old Dominion University is designed to provide an opportunity for exceptionally qualified engineering undergraduate students to obtain both a bachelor's and a master's degree in Electrical and Computer Engineering. Typically undergraduate students apply at the end of their junior year for admission to the linked programs.

Accepted students from disciplines other than EE or CpE are required to complete a number of leveling courses to meet prerequisites for graduate studies. All students are required to have one year of college chemistry and one year of calculus-based college physics in addition to Calculus III and Differential Equations courses. Students at Old Dominion University may complete the leveling requirement by earning a minor in electrical or computer engineering with a GPA of 3.0 or greater. Students that have not earned a minor need to meet with the graduate program director to prepare a course plan and determine which pre-requisite courses are needed. In general, three to four leveling courses are needed and they are chosen from the following lists.

List of Possible Courses to Meet the Leveling Requirement

ECE 202	Circuit Analysis II	3
ECE 241	Fundamentals of Computer Engineering	4
ECE 302	Linear System Analysis	3
ECE 303	Introduction to Electrical Power	3
ECE 304	Probability, Statistics, and Reliability	3
ECE 313	Electronic Circuits	4
ECE 323	Electromagnetics	3
ECE 332	Microelectronic Materials and Processes	3
ECE 341	Digital System Design	3
ECE 346	Microcontrollers	3
ECE 381	Introduction to Discrete-time Signal Processing	3

Students interested in taking computer engineering graduate courses may need to take additional leveling computer science courses as indicated below.

List of Possible Computer Science Courses to Meet the Leveling Requirements

CS 350	Introduction to Software Engineering	3
CS 361	Data Structures and Algorithms	3
CS 381	Introduction to Discrete Structures	3

Curriculum Requirements

The M.S. degree requires a minimum of 30 credit hours of graduate study.

The M.S. degree thesis option requires a minimum of 24 credit hours of courses (not including the Graduate Seminar) and 6 credit hours of thesis along with the oral thesis defense examination. Continuation in the M.S. program thesis option is contingent upon identifying a MS thesis advisor after completing 18 credit hours of coursework (which coincides approximately with the end of the second semester of study for full-time students). For the thesis committee, the chair has to be a full time ECE faculty member or a faculty member with an ECE degree in the Batten College of Engineering and Technology (BCET). A faculty member that is not in BCET can still be approved to serve as the advisor but cannot be the committee chair unless they have a joint appointment with ECE. Also, a minimum of 2 full time ECE faculty members and 1 outside ECE member are required on the committee.

The M.S. degree project option requires a minimum of 27 credit hours of courses (not including the Graduate Seminar) and 3 credit hours of Master's project course (ECE 698) that includes an oral defense examination.

The M.S. degree course option requires a minimum of 30 credit hours of courses (not including the Graduate Seminar) and a written comprehensive examination at the end of the course work. The examination is offered every fall and spring semester, and the student needs to pass the examination in no more than two attempts. The second attempt, if necessary, should be taken at the next offered examination.

The M.S. program is available to full-time and part-time students seeking to improve their professional skills in electrical and computer engineering. Students are required to complete at least one course that meets the department's mathematics requirement. The current list of courses that meet this requirement is given next.

ECE 601	Linear Systems	3
ECE 611	Numerical Methods in Engineering Analysis	3
ECE 623	Electromagnetism	3
ECE 651	Statistical Analysis and Simulation	3

The remaining courses are chosen to meet the student's career objectives. To earn a master's degree, a student needs to take at least five courses at the 600 or higher level, no more than 6 credit hours of Independent Study courses (ECE 797), and no more than three courses at the 500 level. Also, no more

than three graduate courses can be taken in other departments. The Graduate Program Director, in concurrence with the Chair, can approve exceptions to these requirements under special circumstances. All course selections must be reviewed by the graduate program director, and for the M.S. thesis option, students' course selections should be made in coordination with their research/thesis advisor. The graduate course descriptions are included in the graduate catalog and are also listed on the department's website. Additional graduate courses are offered through Cardinal Education (Home - Cardinal Education (<https://www.cardinaleducation.org/>)). All funded Master's students are required to attend Graduate Seminar.

Doctor of Engineering Engineering with a Concentration in Electrical and Computer Engineering (DEng)

The Department offers a Doctor of Engineering (D.Eng.) degree with concentration in Electrical and Computer Engineering in accordance with the admission criteria and degree requirements specified in the Frank Batten College of Engineering and Technology section in this catalog. The curriculum of this concentration consists of 18 credit hours of ECE 600 and 800 level courses as core courses, 18 credit hours of graduate coursework in the area of specialization and 12 credit hours of applied doctoral project. The courses need approval of the advisor and the graduate program director. Among the total 36 credit hours of coursework, no more than five graduate courses can be taken in other departments.

Doctor of Engineering Program

The College offers an interdisciplinary Doctor of Engineering (D.Eng.) program to provide the Commonwealth and the nation with exceptionally educated engineering practitioners. These individuals will have developed the highest possible capability to provide innovative solutions in specialized engineering endeavors. The graduates of the program will meet the highest standards for advanced level engineering and leadership positions in industry and government.

Admission Criteria

Consideration for admission to the Doctor of Engineering program requires the following:

1. A formal application;
2. Undergraduate and graduate transcripts;
3. Two letters of recommendation (One of the letters of recommendation should be from an agency point of contact if a sponsoring agency is involved. Sponsorship does not necessarily imply financial support, but it rather focuses on the provision of a project and access to data, information, and means to apply and test a solution.);
4. An essay describing the applicant's preparation for graduate work, personal and academic goals, and professional objectives.
5. A personal or telephone interview of the applicant with the graduate program director will be required;
6. Engineering experience of at least two years within the last five years;
7. Master's degree with a grade point average of 3.5 out of 4.0 in an appropriate STEM field from an accredited institution of higher education.

Curriculum Requirements

A minimum of 48 hours of graduate work beyond the master's degree is required including:

- 18 credit hours of ECE 600 and 800 level courses as core courses,
- At least 18 credit hours of graduate coursework in the student's area of specialization as determined by the department
- At least 12 credit hours of an applied doctoral project
- Not more than 9 credit hours of non-ECE courses.

At least three-fifths of the course work (15 credit hours) must be at 800-level. Exceptions to the credit-hour distribution requirements at any level must be approved in writing by the graduate program director, the dean or his or her designee, and the provost or his or her designee. No more than 9 credit hours of graduate courses can be taken outside ECE.

Additional Requirements

Continuation and Graduation Requirements

The continuation requirements are the same as the continuation requirements for the Doctor of Philosophy programs. The graduation requirements for the Doctor of Engineering degree are as follows:

1. Satisfactory completion of a minimum of 48 credit hours of approved graduate work beyond the master's degree, including the doctoral project.
2. Satisfactory performance on a diagnostic examination at the completion of nine credit hours of coursework. The purpose of this examination is to determine if the student has adequate background to pursue a doctoral degree. The diagnostic examination may only be repeated once.
3. Satisfactory completion of a written and oral candidacy examination before the advisory committee. The student will take the candidacy examination when he/she is within six credit hours of completing all the required coursework. The candidacy examination may only be repeated once.
4. Preparation and successful defense of a project concept proposal in both written and oral formats. The student will be required to prepare and present a concept proposal related to the work that will be undertaken for the doctoral project. The concept proposal will be defended before the doctoral project committee.
5. Submission of progress reports as deemed necessary by the doctoral project committee.
6. Written report of the project results. The doctoral project shall be documented in a manner consistent with advanced, professional work. The project report will follow the standard format for Old Dominion University dissertations and theses.
7. Comprehensive oral defense of the doctoral project before the student's doctoral committee and a general audience.

The applied doctoral project must successfully demonstrate the student's mastery of the subject area and his/her ability to apply advanced technical knowledge to identify, formulate, and solve novel and complex engineering problems. Once a student has completed the course work, passed the candidacy examinations, and has gained approval for the project proposal, the student advances to candidacy. It is a University requirement that students who have advanced to candidacy be enrolled for at least one credit hour every fall, spring, and summer until graduation. The project must address a complex but practical problem currently faced by the public, industry, or government, and it must provide a solution that satisfies all the technical, social, political, economic, safety, sustainability, and environmental requirements and/or constraints. Both advisory and doctoral project committees will have at least three members certified for graduate instruction; two faculty members must be from ECE department. The committee chair must be a full time ECE faculty or a faculty member with an ECE degree in the BCET college. A faculty that is not in the BCET college can still be approved to serve as an advisor but cannot be the committee chair unless they have a joint appointment with ECE. The committee must also have at least one non-ECE person with special knowledge of the project subject area.

Doctor of Philosophy Engineering with a Concentration in Electrical and Computer Engineering (PhD)

The Department offers a strong doctoral program leading to the Doctor of Philosophy (Ph.D.) in Engineering degree with a concentration in Electrical and Computer Engineering. The Ph.D. degree is awarded to candidates

who have displayed an in-depth understanding of the subject matter and demonstrated the ability to make an original contribution to knowledge in their chosen field of specialty. A very important component of the Ph.D. degree is the original research pursued by the student which culminates in a written dissertation, as well as an oral defense of this work. Ph.D. students usually publish the result of their research in highly reputable nationally and internationally refereed journals. In addition, the students are expected to present their work at national and international conferences.

Admission Requirements

Applicants to a doctoral degree in electrical and computer engineering are expected to have completed a master's degree in electrical engineering and/or computer engineering or a closely related technical field with a minimum grade point average of 3.5 (on a 4.0 scale) in graduate course work. The applications are submitted through the Office of Admissions of Old Dominion University. Together with the completed application form, three letters of recommendation, transcripts from all colleges and universities attended, GRE scores, a resume, and a personal statement of objectives are required. TOEFL scores are required for international applicants. At least two of the recommendation letters should be submitted by faculty or work supervisor familiar with the applicant's graduate work. The Frank Batten College of Engineering and Technology at Old Dominion University has the Direct Bachelor-to-Ph.D. and Integrated Bachelor/Ph.D. programs that allow exceptionally well-qualified undergraduate students to apply for admission directly to a Ph.D. program. The programs are described in the college section of the catalog.

Curriculum Requirements

The Ph.D. degree requires:

- 24 credit hours of graduate-level courses beyond the master's degree (not including Graduate Seminar),
- 24 research credit hours,
- successful completion of a written diagnostic examination,
- successful completion of written and oral candidacy examinations,
- successful completion of a dissertation research proposal, and
- successful completion and public defense of a dissertation.
- Or, in the absence of a master's degree, 78 credit hours (not including Graduate Seminar) beyond the bachelor's degree are required.

For students with a master's degree, the 24 credit hours of graduate-level coursework consist of 8 graduate level courses that are chosen by the student together with the research advisor and are approved by the Graduate Program Director. Of the 8 courses, 5 must be completed at the 800 level, no more than 6 credit hours Independent Study courses (ECE 897), and no more than 3 graduate courses can be taken in other departments. For students without a master's degree, the 78 credit hours of graduate level coursework consist of 48 credit hours of graduate courses and 30 research credit hours (ECE 899). Three fifths of the required 78 credit hours must be at the 800 level and need to comply with regular PhD program degree requirements. Exceptions to the credit-hour distribution requirements at any level must be approved in writing by the graduate program director, the dean or his or her designee, and the provost or his or her designee. Additional course work or appropriate research background may be required to meet prerequisites for courses or in preparation for the diagnostic examination. Furthermore, at least 1 credit hour of Graduate Seminar (ECE 831) is required, and all funded students are required to attend Graduate Seminar. The graduate course descriptions are included in the catalog and are also listed on the department's website. Additional graduate courses are offered through Cardinal Education (Home - Cardinal Education (<https://www.cardinaleducation.org/>)).

All Ph.D. students are required to take the department's Ph.D. Diagnostic Examination. For BS/PHD students, they are required to take the Diagnostic Exam for the first time before the end of their fourth semester or completing the 36 credit hours of graduate courses. For PHD students with MS, they are required to take the Diagnostic Exam for the first time before the end of their second semester or completing the 18 credit hours of graduate courses. The

examination is offered every fall and spring semester, and the student needs to pass the examination in no more than two attempts. The second attempt, if necessary, should be taken at the next offered examination. The topics for the examination and samples of previous examinations are posted in the department's website. The examination rules are given on the first page of each examination.

It is required that the written and oral candidacy examinations be taken in the semester before a student is completing the graduate course work or during the following semester. Once a student has completed the course work, passed the candidacy examinations, and has gained approval for the research proposal, the student advances to candidacy. It is an University requirement that students who have advanced to candidacy be enrolled for at least one credit hour every fall, spring, and summer until graduation. For both advisory and dissertation committees, the chair has to be a full time ECE faculty member or a faculty member with an ECE degree in the BCET college. A faculty member that is not in the BCET college can still be approved to serve as the advisor but cannot be the committee chair unless they have a joint appointment with ECE. Also, a minimum of 2 full time ECE faculty members and 1 outside ECE member are required in the committee.

Master of Science Engineering with a Concentration in Modeling and Simulation (MS)

The master's degree in modeling and simulation (M&S) emphasizes a strong, common subject core while providing the student with the flexibility to design a plan of study to meet each individual's study objectives and needs. The purpose of the program's subject core is to provide a common academic foundation for all simulation students. Thus, all students in this program will have grounding in the same methods, principles, and philosophy of simulation. This provides the mechanisms for the simulationist to work across disciplines and domains while maintaining a common frame of reference for communication, technical specialization, and advanced study and research. The Master of Science (MS) in Modeling and Simulation offers two options: Thesis Option and Course Option. The Thesis Option requires six hours of thesis credit and 24 hours of course credit and it is directed primarily at full-time students who are preparing for a career in advanced M&S research and/or academic positions. The Course Option requires 30 hours of course credit and it is focused on developing the practical skills and knowledge needed to solve problems requiring applications of modeling and simulation. The Course Option is further divided into two tracks: Development Track and Application Track. The Development Track is programming intensive and prepares students for advanced simulation development, while the Application Track focuses on the usage of existing advanced simulation tools.

The program's subject core consists of:

1. an overview of modeling and simulation;
2. an in-depth exploration of specific simulation methodological approaches;
3. simulation system modeling principles and techniques;
4. an introduction to computer visualization and visual simulation; and,
5. principles of stochastic analysis.

Most courses are offered in an online format. They are delivered to Old Dominion University's higher education centers and are available synchronously using video conferencing software.

Master of Science Admission Requirements

The Master's Degree in Modeling and Simulation is designed for students having bachelor's degrees in Engineering, Science or Mathematics, although students from other educational backgrounds may apply with appropriate leveling courses. Prerequisites for admission include: mathematics – two courses in differential and integral calculus and one course in calculus-based probability and statistics; and computer science – algorithmic problem

solving using a high-level object-oriented programming language such as C++.

A minimum GPA of 2.80 overall and a minimum GPA of 3.0 in the undergraduate major are required. Students with notable deficiencies may be considered for provisional admission and will be required to complete prerequisite course requirements in addition to the graduate degree requirements. Job experience and training may be considered in evaluating prerequisite requirements.

Applicants should plan to submit a completed application form, transcripts from all colleges and universities attended, GRE scores (verbal, quantitative, and analytical writing - required of MS applicants for the thesis option only), a resume and personal statement of objectives, two letters of recommendation from former university instructors or current employer (recommendation letters are required of MS applicants for the thesis option only), and TOEFL scores if an international applicant.

Potential prerequisite courses for the master's degrees in modeling and simulation include the following:

1. Introductory differential and integral calculus equivalent to MATH 211 (<https://catalog.odu.edu/search/?P=MATH%20211>) (Calculus I) and MATH 212 (<https://catalog.odu.edu/search/?P=MATH%20212>) (Calculus II).
2. Calculus-based probability and statistics; this material is available for graduate credit in PSYC 727 (<https://catalog.odu.edu/search/?P=PSYC%20727>). Undergraduate courses STAT 330 (<https://catalog.odu.edu/search/?P=STAT%20330>) or ENMA 420 (<https://catalog.odu.edu/search/?P=ENMA%20420>) will also meet the prerequisite requirement.
3. Computer science fundamentals including an object-oriented programming language such as C++, algorithmic problem solving, and data structures.

Curriculum Requirements

Master of Science Degree Requirements

The Master of Science program requires 12 hours of course credit in modeling and simulation foundation courses. These foundation courses include:

MSIM 741	Principles of Visualization	3
MSIM 551	Analysis for Modeling and Simulation	3
or MSIM 751	Advanced Analysis for Modeling and Simulation	
Advanced Modeling Course (See List Below)		3
Advanced Simulation Course (See List Below)		3

Advanced Modeling Course Examples (3 credits)

MSIM 607	Machine Learning I
MSIM 660	System Architecture and Modeling
MSIM 702	Systemic Decision Making
MSIM 730	Simulation Formalisms
MSIM 772	Modeling Global Events
MSIM 774	Transportation Network Flow Models

Other courses with Graduate Program Director's approval.

Advanced Simulation Course Examples (3 credits)

MSIM 711	Finite Element Analysis
MSIM 715	High Performance Computing Simulation and Data Analytics
MSIM 722	Cluster Parallel Computing
MSIM 725	Principles of Combat Modeling and Simulation
MSIM 742	Synthetic Environments
MSIM 776	Simulation Modeling in Transportation Networks

Other courses with Graduate Program Director's approval.

The remaining course credits (12 credits for the thesis option and 18 credits for the course option) are elective course credits. These courses are selected to achieve one or more program objectives or themes and must be approved by the student's advisor and/or graduate program director. Elective courses outside the ECE Department must be approved by the graduate program director. The thesis option concludes with 6 credit hours of thesis credit (MSIM 699 (<https://catalog.odu.edu/search/?P=MSIM%20699>)) and a thesis defense and the course option concludes with a comprehensive exam. Students must also complete the Responsible Conduct of Research for Engineers training online.

Certain students will need to take pre-requisite leveling courses that will count towards the 12 credit hour elective course requirement. These courses are: MSIM 510 (<https://catalog.odu.edu/search/?P=MSIM%20510>) Model Engineering; MSIM 541 (<https://catalog.odu.edu/search/?P=MSIM%20541>) Computer Graphics and Visualization; MSIM 602 (<https://catalog.odu.edu/search/?P=MSIM%20602>) Simulation Fundamentals; and, MSIM 603 (<https://catalog.odu.edu/search/?P=MSIM%20603>) Simulation Design. The Course Option Application Track only requires MSIM 510 (<https://catalog.odu.edu/search/?P=MSIM%20510>) Model Engineering and MSIM 602 (<https://catalog.odu.edu/search/?P=MSIM%20602>) Simulation Fundamentals as leveling courses.

The MS Course Option is also offered online via Canvas which provides online lectures, homework submissions, examinations, discussion boards, wikis, video/audio collaboration sessions, and grading. Students with reliable high-speed internet service can connect and participate in engaging discussions and distributed asynchronous learning with the instructor and other students. All course materials are distributed and collected electronically. Students located in the Hampton Roads region may utilize live courses to fulfill the elective course requirement with approval from the ECE graduate program director.

Doctor of Engineering Engineering with a Concentration in Modeling and Simulation (DEng)

The D. Eng. in Modeling and Simulation program focuses on developing the advanced skills and knowledge to enable the graduate to conduct and lead advanced technical M&S projects in an engineering environment. It affords engineering practitioners the opportunity to achieve advanced graduate education beyond the master's degree.

Admission Criteria

Consideration for admission to the Doctor of Engineering program requires the following:

1. A formal application;
2. Undergraduate and graduate transcripts;
3. Two letters of recommendation (One of the letters of recommendation should be from an agency point of contact if a sponsoring agency is involved. Sponsorship does not necessarily imply financial support, but it rather focuses on the provision of a project and access to data, information, and means to apply and test a solution.);
4. An essay describing the applicant's preparation for graduate work, personal and academic goals, and professional objectives.
5. A personal or telephone interview of the applicant with the graduate program director will be required;
6. Engineering experience of at least two years within the last five years;
7. Master's degree with a grade point average of 3.5 out of 4.0 in an appropriate STEM field from an accredited institution of higher education.

Curriculum Requirements

Doctor of Engineering Curriculum

A minimum of 48 credits of graduate work beyond the master's degree is required including:

- 18 credit hours of core courses
- At least 18 credit hours of graduate coursework in the student's area of specialization as determined by the department
- At least 12 credit hours of applied doctoral project
- At least three fifths of the course work must be at 800-level.

Modeling and Simulation Concentration

The program of study for the D.Eng. in M&S program is developed with the approval of the graduate program director and the student's advisor. The program shall include a minimum of 18 credits of professional course work (<http://catalog.odu.edu/graduate/frankbattencollegeofengineeringandtechnology/#doctorofengineeringprogram>). Some professional courses can be substituted by other courses approved by the Graduate Program Director if these professional courses are not available.

The D.Eng. also requires 18 credits of technical core course work beyond the master's degree distributed as follows:

Technical Core Courses

Select three Advanced Simulation Course from the list below	3
MSIM 830 Simulation Formalisms	3
MSIM 842 Synthetic Environments	3
MSIM 851 Advanced Analysis for Modeling and Simulation	3
Two approved technical elective courses	6
Total Credit Hours	18

Advanced Simulation Course Examples (3 credits)

MSIM 811 Finite Element Analysis	3
MSIM 815 High Performance Computing Simulation and Data Analytics	3
MSIM 822 Cluster Parallel Computing	3
MSIM 825 Principles of Combat Modeling and Simulation	3
MSIM 876 Simulation Modeling in Transportation Networks	3

Other courses with Graduate Program Director's approval.

No more than three credits from course work satisfying foundation knowledge requirements may be included in the program of study for technical elective credit. At least three-fifths of the non-project coursework must be at the 800-level.

Certain students entering the program will be required to complete additional pre-requisite leveling courses. These courses are: MSIM 510; MSIM 541; MSIM 602; and MSIM 603.

For graduation, students must complete the requirements for their final project and the Responsible Conduct of Research for Engineers training online.

Additional Requirements

Continuation and Graduation Requirements

The continuation requirements are the same as the continuation requirements for the Doctor of Philosophy programs. The graduation requirements for the Doctor of Engineering degree are as follows:

1. Satisfactory completion of a minimum of 48 credit hours of approved graduate work beyond the master's degree, including the doctoral project.
2. Satisfactory performance on a diagnostic examination at the completion of nine credit hours of coursework. The purpose of this examination is to determine if the student has adequate background to pursue a doctoral degree. The diagnostic examination may only be repeated once.
3. Satisfactory completion of a written and oral candidacy examination. The student will take the candidacy examination when he/she is

within six credit hours of completing all the required coursework. The candidacy examination may only be repeated once.

4. Preparation and successful defense of a project concept proposal. The student will be required to prepare and present a concept proposal related to the work that will be undertaken for the doctoral project. The concept proposal will be defended before the doctoral committee.
5. Submission of progress reports as deemed necessary by the doctoral committee.
6. Written report of the project results. The doctoral project shall be documented in a manner consistent with advanced, professional work. The project report will follow the standard format for Old Dominion University dissertations and theses.
7. Comprehensive oral defense of the doctoral project before the student's doctoral committee and a general audience.

The applied doctoral project must successfully demonstrate the student's mastery of the subject area and his/her ability to apply advanced technical knowledge to identify, formulate, and solve novel and complex engineering problems. The project must address a complex but practical problem currently faced by the public, industry, or government, and it must provide a solution that satisfies all the technical, social, political, economic, safety, sustainability, and environmental requirements and/or constraints. The doctoral project committee will have at least three Old Dominion University faculty members certified for graduate instruction; two faculty members must be from the major department. The committee must also have at least one non-University person with special knowledge of the project subject area.

Doctor of Philosophy Engineering with a Concentration in Modeling and Simulation Engineering (PhD)

The Ph.D. in Modeling and Simulation program focuses on developing the necessary skills and knowledge to enable the graduate to conduct and evaluate independent, original research in an area of modeling and simulation. The goal of the program is to prepare students for careers in teaching and research at academic institutions, as well as the conduct or leadership of research and development in public and private organizations.

Doctor of Philosophy Admission Requirements

Admission to the Ph.D. in M&S program is made in accordance with Old Dominion University and Batten College of Engineering and Technology requirements for doctoral programs as specified in this Catalog. Specific requirements for the modeling and simulation degree include the following:

1. Completion of a master's degree in an appropriate and closely related field is expected. However, students who have completed 24 credits of graduate courses in an appropriate field from an accredited institution may apply.
2. A minimum GPA in graduate course work of 3.50 (out of 4.0) is required of most students. A student with a GPA greater than 3.25 and with evidence of a high level of professional capability in the field of modeling and simulation may be eligible for admission to the program upon submission of a petition to the graduate program director.
3. Recent scores (typically, not more than five years old) on the Graduate Record Examination's (GRE) verbal, quantitative, and analytical writing sections must be submitted by all applicants.
4. Three letters of recommendation (typically at least two of which are from faculty in the highest degree program completed when the application is within five years of graduation from that degree program) are required.
5. The applicant must submit a statement of purpose, goals, and objectives related to the program and a resume.

Applicants are expected to have the following foundation knowledge:

1. Mathematics fundamentals including differential and integral calculus, ordinary differential equations, calculus-based probability and statistics, and linear algebra.
2. Computer science fundamentals including an object-oriented programming language such as C++, algorithmic problem solving, and data structures.
3. Knowledge of the content of the foundation courses required in the Modeling and Simulation Master's Program.

Curriculum Requirements

Doctor of Philosophy Degree Requirements

The Ph.D. in modeling and simulation is offered in accordance with the general requirements for doctoral degrees as specified in the Requirements for Graduate Degrees Section of this Catalog. Specific program of study requirements for the concentration in modeling and simulation include the following:

1. Completion of a minimum of 24 credits of course work beyond the master's degree; and a minimum of 24 credits of dissertation research.
2. Successful completion of a written diagnostic examination before completion of nine credits of advanced course work.
3. Successful completion of a written and oral qualifying (candidacy) examination near the completion of the course work.
4. Successful presentation of a dissertation research proposal at the beginning of the dissertation research.
5. The successful completion and public defense of a dissertation representing independent, original research worthy of publication in a peer-reviewed scholarly journal.

The program of study for the Ph.D. in M&S program is developed with the approval of the graduate program director and the student's advisor. The program shall include a minimum of 24 credit hours of course work beyond the master's degree distributed as follows.

Common Core

Advanced Simulation Course (see the list below)		3
MSIM 830	Simulation Formalisms	3
MSIM 842	Synthetic Environments	3
MSIM 851	Advanced Analysis for Modeling and Simulation	3

Total Credit Hours **12**

Advanced Simulation Course Examples (3 credits)

MSIM 811	Finite Element Analysis	3
MSIM 815	High Performance Computing Simulation and Data Analytics	3
MSIM 822	Cluster Parallel Computing	3
MSIM 825	Principles of Combat Modeling and Simulation	3
MSIM 876	Simulation Modeling in Transportation Networks	3

Other courses with graduate program director's approval.

Electives - Minimum of 12 credits of elective courses that provide a basis for dissertation research. No more than six credits from course work satisfying foundation knowledge requirements may be included in the program of study for elective credit. At least three-fifths (15 credits) of course work for fulfilling the degree requirement must be at the 800-level. Elective courses outside the ECE Department must be approved by the Graduate Program Director.

Certain students entering the program will be required to complete additional pre-requisite leveling courses. These courses are: MSIM 510 Model Engineering; MSIM 541 Computer

Graphics and Visualization; MSIM 602 Simulation Fundamentals; and MSIM 603 Simulation Design.

For graduation, students must successfully defend their dissertation and complete the Responsible Conduct of Research for Engineers training online.

Certificate Modeling and Simulation - Engineering Certificate

The Graduate Certificate in Modeling and Simulation Engineering is designed for those who meet the admission requirements of the modeling and simulation master's program and wish to broaden their knowledge of modeling and simulation related principles and practices without pursuing a graduate degree. This is a 12 credit hour non-degree program offered by the Department of Electrical & Computer Engineering. The certificate program is open to both degree-seeking and non-degree-seeking graduate students. Certain courses taken for the certificate program may later be applied to the master's degree in modeling and simulation.

Graduate Certificate Admission Requirements

Students should have either an undergraduate degree from a regionally accredited institution and should have a mathematical background through calculus, along with a calculus based probability and statistics course. Students should submit a graduate non-degree application through the Office of Admissions, and then submit a departmental application with copies of unofficial transcripts from all previous coursework to the ECE Department. More details on the program and application are available online: <https://www.odu.edu/academics/programs/certificate/modeling-simulation-engineering> (<https://www.odu.edu/academics/programs/certificate/modeling-simulation-engineering/>). For further questions, please contact:

Dr. Hong Yang
Old Dominion University
Graduate Program Director, Modeling & Simulation Engineering Program
ECE Department
Old Dominion University
1117 ECSB
Norfolk, VA 23529

Curriculum Requirements

Graduate Certificate Course Requirements

The Graduate Certificate in Modeling and Simulation Engineering requires the completion of 12 credit hours at the graduate level. The course requirements are:

Select three courses from the following:		9
MSIM 601	Introduction to Modeling and Simulation	
MSIM 602	Simulation Fundamentals	
MSIM 510	Model Engineering	
MSIM 603	Simulation Design	
MSIM 541	Computer Graphics and Visualization	
MSIM 551	Analysis for Modeling and Simulation	
MSIM Elective *		3
Total Credit Hours		12

* A graduate level elective approved by the Graduate Program Director. This elective may be an MSIM course or from another discipline outside of modeling and simulation. It is possible that this course may be outside of the discipline of modeling and simulation, but

approved because it complements the field of modeling and simulation and the student's interests.

An overall GPA of 3.0 or better is required to earn the graduate certificate in modeling and simulation engineering.

Department of Engineering Management and Systems Engineering

Web Site: <http://www.odu.edu/emse> (<http://www.odu.edu/emse/>)

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(757) 683-4558

Ertunga Cem Ozelkan, Chair
Resit Unal, Graduate Program Director, Master's Programs
Andrew Collins, Graduate Program Director, Doctoral Programs

Overview

The Engineering Management and Systems Engineering (EMSE) Department at Old Dominion University is dedicated to excellence in teaching and research in critical areas related to the management of complex, technology-intensive organizations and systems. Our award-winning programs are directed at working professionals and traditional full-time students with technical undergraduate degrees. The degrees are available on campus in a traditional classroom setting as well as online through synchronous web delivery. Courses are scheduled in the evenings and can be attended live on the Norfolk main campus, from the ODU's higher education centers, satellite campuses, and ODUGlobal.

The EMSE Department is the recipient of the American Society of Engineering Management's 1995, 2000, 2002, 2004, 2005, 2007, 2010, and 2014 awards for Excellence in Leadership in Graduate Programs. The Master of Engineering Management (MEM) program at Old Dominion University is also one of the first three programs certified by the American Society for Engineering Management. The program was initially certified in 2003 and has been re-certified in 2007, 2012, and 2018.

List of Degrees and Certificates

- Master of Engineering Management
- Master of Science in Engineering Management
- Master of Engineering, Engineering – Systems Engineering
- Doctor of Philosophy, Engineering – Engineering Management and Systems Engineering
- Doctor of Engineering – Engineering Management and Systems Engineering
- Graduate Certificates in
 - Advanced Engineering Cyber Systems Security
 - Engineering Management
 - Project Management
 - Homeland Security
 - Entrepreneurship and Innovation for Engineers
 - Mission Analysis and Engineering

Graduate Certificates

The Department of Engineering Management and Systems Engineering administers or participates in a variety of graduate certificates. These include graduate certificates or advanced engineering certificates with concentrations as follows:

- Advanced Engineering Cyber Systems Security
- Engineering Management
- Project Management
- Homeland Security

- Entrepreneurship and Innovation in Engineering
- Mission Analysis and Engineering

Please refer to Frank Batten College of Engineering and Technology (<http://catalog.odu.edu/graduate/frankbattencollegeofengineeringandtechnology/>) for more information.

Programs

Doctor of Engineering Program

- Engineering with a Concentration in Engineering Management and Systems Engineering (DEng) (p. 249)

Doctor of Philosophy Program

- Engineering with a Concentration in Engineering Management and Systems Engineering (PhD) (p. 250)

Master of Engineering Program

- Engineering with a Concentration in Systems Engineering (ME) (p. 249)

Master of Engineering Management Program

- Engineering Management (MEM) (p. 247)

Master of Science Program

- Engineering Management (MS) (p. 248)

Master of Engineering Management Engineering Management (MEM) Degree Description

The Master of Engineering Management (MEM) provides a foundation and the necessary skills, knowledge, and abilities required to design and manage the technology-based, project-driven enterprise. Fundamentally, the engineering management program focuses on problems, design, and management of projects and complex operations. The program is grounded in solid principles of systems science while exploiting the tools of management science and project management. The Master of Engineering Management emphasizes the concept of technological leadership. Technological leadership's vision looks to the creation of new products, processes, and services which, in turn, will create new markets or enable domination of existing ones. Core coursework in the Master of Engineering Management program concentrates on developing the knowledge and skills required by graduates to provide the project and program leadership and management necessary to develop and manage technology intensive organizational settings.

The degree is directed at working professionals and traditional full-time students with technical undergraduate degrees. The degree is available on campus in a live setting as well as online through synchronous web delivery. Courses are scheduled in the evenings and can be attended from off-campus sites, including the Peninsula Higher Education Center in Hampton and the Virginia Beach Higher Education Center. The complete M.E.M. program is available through ODUGlobal and through the Commonwealth Graduate Engineering Program. Both programs transmit courses to educational, industrial, and government locations throughout Virginia and via a web-based platform.

Admission Requirements

Admission to the master of Engineering Management program is in accordance with Old Dominion University and Frank Batten College of Engineering and Technology requirements for master's programs as specified in this catalog.

Admission requirements specific to this program include the following:

1. Official transcripts from all post-secondary institutions attended.
2. Undergraduate degree from a U.S. ABET-accredited program in engineering or engineering technology with a GPA of 3.00 (out of 4.00) or better. Students who hold bachelor's degrees in other disciplines or who do not meet the GPA requirement may be considered for admission based on transcript evidence of applicable physics and calculus courses, a résumé indicating relevant work experience in an engineering discipline, and/or satisfactory GRE quantitative scores.
3. Résumé detailing relevant work experience.
4. Personal Statement that outlines the rationale for applying to the program and how it aligns with the student's professional goals.
5. Students not meeting the above requirements may be admitted provisionally. The Graduate Program Director may request additional information, including GRE scores.
6. International students must meet University admission requirements; please refer to the website: <https://www.odu.edu/admissions/proficiency> (<https://www.odu.edu/admissions/proficiency/>).

Curriculum Requirements

General Requirements

The Master of Engineering Management is in accordance with the general requirements for master's degrees as specified in this Catalog. All students must have mathematics coursework through the level of integral calculus, matrix algebra or differential equations, and ENMA 420 or equivalent calculus-based probability and statistics. Students who have not had a calculus-based probability and statistics course will be required to include ENMA 420, or equivalent, as part of their plan of study *in addition to the required 31 credit hours*. All students are expected to communicate effectively both orally and in written documents, that are correct in grammar, style, and mechanics. Those deemed insufficient may be required to take remedial speech or writing courses. The engineering management curriculum has been designed around six core areas that develop the skill sets identified earlier and prepare graduates to assume positions within technology-based enterprises.

Curricular Requirements

The Master of Engineering Management (M.E.M.) program requires 31 credits of coursework (10 three-credit courses plus a one-credit capstone course). At least three-fifths (3/5) of coursework must be at the 600- or 700-level for the M.E.M. degree. Students must maintain a 3.00 GPA or better. Students must meet all University continuance requirements.

M.E.M. Courses

Prerequisite *

Complete prerequisite requirements

Core

ENMA 600	Cost Estimating and Financial Analysis	3
ENMA 601	Analysis of Organizational Systems	3
ENMA 603	Operations Research	3
ENMA 604	Project Management	3
ENMA 646	Information Science for Systems and Engineering Management	3

Select one of the following: 3

ENMA 614	Quality Systems Design	
ENMA 715	Systems Analysis	
ENMA 724	Risk Analysis	

Electives * 12

Capstone

ENMA 605	Program Capstone (required final semester)	1

Total Credit Hours 31

* Students must select twelve credit hours of elective coursework for the M.E.M. These electives may be selected from the available graduate-level ENMA courses.

Additional Requirements

Requirements for Graduation

In addition to completing all the required courses, all graduate students must complete the Collaborative Institutional Training Initiative (CITI) basic course, Responsible Conduct of Research for Engineers. The basic course includes the following modules: Misconduct (falsification, fabrication, and plagiarism); Data acquisition, management, sharing and ownership; Mentor/trainee relationships; Publication practice and responsible authorship; Peer review; Conflicts of interest; and Collaborative research. The RCR modules must be completed prior to completion of 12 semester hours. Students who fail to complete this requirement will have a registration hold placed on their records.

Master of Science

Engineering Management (MS)

Degree Description

The Master of Science in Engineering Management (MS) provides the foundation and the necessary skills, knowledge, and abilities required to design and manage the technology-based, project-driven enterprise. The Master of Science (M.S.) program requires thesis research, and the student is expected to identify an advisor and work with him/her starting from the first semester. Fundamentally, the engineering management program focuses on problems, design, and management of projects and complex operations. The program is grounded in solid principles of systems science while exploiting the tools of management science and project management. The coursework is designed to produce graduates capable of addressing issues related to the design, operation, analysis, and transformation of complex problems. Core coursework in the Master of Science in Engineering Management program concentrates on developing the knowledge and skills required by graduates to provide the project and program leadership and management necessary for an organization to develop and manage technologies.

The degree is directed at working professionals and traditional full-time students. The degree is available on campus in a live setting as well as online through synchronous web delivery. Courses are scheduled in the evenings and can be attended from off-campus sites, including the Peninsula Higher Education Center in Hampton and the Virginia Beach Higher Education Center. The complete MS in Engineering Management program is available through ODUGlobal and through the Commonwealth Graduate Engineering Program. Both programs transmit courses to educational, industrial, and government locations throughout Virginia and via a web-based platform.

Admission Requirements

Admission to the Master of Science in Engineering Management program is in accordance with Old Dominion University and Frank Batten College of Engineering and Technology requirements for master's programs as specified in this catalog.

Admission requirements specific to this program include the following:

1. Official transcripts from all post-secondary institutions attended.
2. Undergraduate degree from a U.S. ABET-accredited program in engineering or engineering technology with a GPA of 3.00 (out of 4.00) or better. Students who hold bachelor's degrees in other disciplines or who do not meet the GPA requirement may be considered for admission based on transcript evidence of applicable physics and calculus courses, a résumé indicating relevant work experience in an engineering discipline, and/or satisfactory GRE quantitative scores.
3. Résumé detailing relevant work experience.

4. Personal Statement that outlines the rationale for applying to the program and how it aligns with the student's professional goals.
5. Students not meeting the above requirements may be admitted provisionally. The Graduate Program Director may request additional information, including GRE scores.
6. International students must meet University admission requirements; please refer to the website: <https://www.odu.edu/admissions/proficiency> (<https://www.odu.edu/admissions/proficiency/>).

Curriculum Requirements

General Requirements

The Master of Science in Engineering Management (MSEM) is in accordance with the general requirements for master's degrees as specified in this Catalog. Students are required to identify an advisor as part of the program requirements. All students are expected to communicate effectively both orally and in written documents, that are correct in grammar, style, and mechanics. Those deemed insufficient may be required to take remedial speech or writing courses. All students must have mathematics coursework through the level of integral calculus, matrix algebra or differential equations, and ENMA 420 or equivalent calculus-based probability and statistics. Students who have not had a calculus-based probability and statistics course will be required to include ENMA 420, or equivalent, as part of their plan of study in addition to the required 30 credits.

Curricular Requirements

The Master of Science in Engineering Management requires 30-credit hours of coursework (8 three-credit courses plus 2 three-credit thesis research courses). At least three-fifths (3/5) of coursework must be at the 600- or 700-level. Students must identify an advisor within completion of 9 credit hours. Students must maintain a GPA of 3.00 or better. Students must meet all University continuance requirements.

The following table delineates the specific course requirements for this program.

M.S. Courses

Required *

ENMA 711	Engineering Research Methodology	3
ENMA 720	Multivariate Statistics for Engineering	3

Core

Select four of the following: 12

ENMA 600	Cost Estimating and Financial Analysis
ENMA 601	Analysis of Organizational Systems
ENMA 603	Operations Research
ENMA 604	Project Management
ENMA 614	Quality Systems Design
ENMA 715	Systems Analysis

Electives *

Select electives 6

Thesis Research **

Complete thesis research 6

Total Credit Hours 30

- * Students must select six credit hours of elective coursework for the M.S.E.M. These electives may be selected from the available graduate level ENMA courses.
- ** M.S. students take six credits of thesis research, ENMA 699, or project hours ENMA 698, which must be spread over a minimum of two semesters.

Additional Requirements

Requirements for Graduation

In addition to completing all the required courses, all graduate students must complete the Collaborative Institutional Training Initiative (CITI) basic

course, Responsible Conduct of Research for Engineers. The basic course includes the following modules: Misconduct (falsification, fabrication, and plagiarism); Data acquisition, management, sharing and ownership; Mentor/trainee relationships; Publication practice and responsible authorship; Peer review; Conflicts of interest; and Collaborative research. The RCR modules must be completed prior to completion of 12 semester hours. Students who fail to complete this requirement will have a registration hold placed on their records. Master of Science students must also pass a final examination in front of a thesis committee approved by the graduate program director.

Master of Engineering Engineering with a Concentration in Systems Engineering (ME)

Degree Description

The Master of Engineering, Engineering – Systems Engineering provides an interdisciplinary approach to support the realization, deployment, and maintenance of successful system solutions to complex problems. This program builds upon your technical background as an engineer. It is designed to provide in-depth, real-world practitioner expertise in engineering complex system solutions. In addition, this rigorous educational experience will help develop your skills in effectively addressing complex problems for both government and commercial organizations. Students in the program are introduced to core competencies for systems engineering, complex systems, modeling, systems analysis, complex problem solving needed for successful delivery of system solutions.

Admission Requirements

Admission to the MESE program is in accordance with Old Dominion University and Frank Batten College of Engineering and Technology requirements for masters programs as specified in this catalog.

Admission requirements specific to this program include the following:

1. Official transcripts from all post-secondary institutions attended.
2. Undergraduate degree from a U.S. ABET-accredited program in engineering or engineering technology with a GPA of 3.00 (out of 4.00) or better. Students who do not meet the requirements may be considered for admission based on transcript evidence of applicable physics and calculus courses, a résumé indicating relevant work experience in an engineering discipline, and/or satisfactory GRE quantitative scores.
3. Résumé detailing relevant work experience.
4. Personal Statement that outlines the rationale for applying to the program and how it aligns with the student's professional goals.
5. Students not meeting the above requirements may be admitted provisionally. The Graduate Program Director may request additional information, including GRE scores.
6. International students must meet University admission requirements; please refer to the website: <https://www.odu.edu/admissions/proficiency> (<https://www.odu.edu/admissions/proficiency/>).

Curriculum Requirements

General Requirements

The Master of Engineering - Engineering - Systems Engineering is in accordance with the general requirements for master's degrees as specified in this Catalog. In addition, all students must have mathematics coursework through the level of integral calculus, matrix algebra or differential equations, and ENMA 420 or equivalent calculus-based probability and statistics. Students who have not had a calculus-based probability and statistics course will be required to include ENMA 420, or equivalent, as part of their plan of study as an additional requirement to the 31 credit hours. All students are expected to communicate effectively both orally and in written documents, that are correct in grammar, style, and mechanics. Those deemed insufficient may be required to take remedial speech or writing courses.

Curricular Requirements

The Master of Engineering - Engineering - Systems Engineering requires 31 graduate credit hours of coursework (10 courses plus a one-credit capstone course) for the degree. At least three-fifths (3/5) of coursework work must be at the 600 or 700 level for the M.E. degrees. The capstone course should be taken within the last two semesters of study. The following table delineates the specific course requirements for this program.

Core

ENMA 515	Introduction to Systems Engineering	3
ENMA 656	Mathematical and Computational Modeling in Systems Engineering	3
ENMA 660	Systems Architectures	3
ENMA 661	Systems Engineering Design	3
ENMA 715	Systems Analysis	3
Select one of the following		3
ENMA 725	System Risk and Failure Analysis	
ENMA 743	Reliability and Maintainability	
ENMA 763	Robust Engineering Design	
ENMA 771	Risk and Vulnerability Management of Complex Interdependent Systems	

Electives **

Select electives	12

Capstone *

ENMA 690	Systems Engineering Capstone	1

Total Credit Hours	31

- * Required for the Master of Engineering in systems engineering, is to be taken near the final semester of study.
- ** Students must select twelve credit hours of elective coursework. These electives may be selected from the available graduate-level ENMA courses.

Additional Requirements

Requirements for Graduation

In addition to completing all the required courses, all graduate students must complete the Collaborative Institutional Training Initiative (CITI) basic course, Responsible Conduct for Engineers. The basic course includes the following modules: Misconduct (falsification, fabrication, and plagiarism); Data acquisition, management, sharing and ownership; Mentor/trainee relationships; Publication practice and responsible authorship; Peer review; Conflicts of interest; and Collaborative research. The RCR modules must be completed prior to completion of 12 semester hours. Students who fail to complete this requirement will have a registration hold placed on their records.

Doctor of Engineering Engineering with a Concentration in Engineering Management and Systems Engineering (DEng)

Degree Description

The Department offers a Doctor of Engineering (D.Eng.) program with a concentration in Engineering Management and Systems Engineering in accordance with the D.Eng. program requirements specified for the Batten College of Engineering and Technology in this catalog. Additional information on the admission procedure and criteria can be found at <https://www.odu.edu/academics/programs/doctoral/engineering-management> (<https://www.odu.edu/academics/programs/doctoral/engineering-management/>).

Doctor of Engineering Program

The College offers an interdisciplinary Doctor of Engineering (D.Eng.) program to provide the Commonwealth and the nation with exceptionally educated engineering practitioners. These individuals will have developed the highest possible capability to provide innovative solutions in specialized engineering endeavors. The graduates of the program will meet the highest standards for advanced level engineering and leadership positions in industry and government.

Admission Criteria

Consideration for admission to the Doctor of Engineering program with a concentration in Engineering Management and Systems Engineering requires the following:

1. A formal application;
2. Undergraduate and graduate transcripts;
3. Two letters of recommendation (One of the letters of recommendation should be from an agency point of contact if a sponsoring agency is involved. Sponsorship does not necessarily imply financial support, but it rather focuses on the provision of a project and access to data, information, and means to apply and test a solution.);
4. An essay describing the applicant's preparation for graduate work, personal and academic goals, and professional objectives.
5. A personal or telephone interview of the applicant with the graduate program director will be required;
6. Engineering experience of at least two years within the last five years;
7. Master's degree with a grade point average of 3.5 out of 4.0 in an appropriate field from an accredited institution of higher education.

Curriculum Requirements

A minimum of 48 hours of graduate work beyond the master's degree is required including:

- 18 credit hours of core courses
- At least 18 credit hours of graduate coursework in the student's area of specialization as determined by the department
- At least 12 credit hours of applied doctoral project

At least three fifths of the course work must be at 800-level.

Additional Requirements

Continuation and Graduation Requirements

The continuation requirements are the same as the continuation requirements for the Doctor of Philosophy programs. The graduation requirements for the Doctor of Engineering degree are as follows:

1. Satisfactory completion of a minimum of 48 credit hours of approved graduate work beyond the master's degree, including the doctoral project.
2. Satisfactory performance on a diagnostic examination at the completion of nine credit hours of coursework. The purpose of this examination is to determine if the student has adequate background to pursue a doctoral degree. The diagnostic examination may only be repeated once.
3. Satisfactory completion of a written and oral candidacy examination. The student will take the candidacy examination when he/she is within six credit hours of completing all the required coursework. The candidacy examination may only be repeated once.
4. Preparation and successful defense of a project concept proposal. The student will be required to prepare and present a concept proposal related to the work that will be undertaken for the doctoral project. The concept proposal will be defended before the doctoral committee.
5. Submission of progress reports as deemed necessary by the doctoral committee.
6. Written report of the project results. The doctoral project shall be documented in a manner consistent with advanced, professional work.

The project report will follow the standard format for Old Dominion University dissertations and theses.

7. Comprehensive oral defense of the doctoral project before the student's doctoral committee and a general audience.

The applied doctoral project must successfully demonstrate the student's mastery of the subject area and his/her ability to apply advanced technical knowledge to identify, formulate, and solve novel and complex engineering problems. The project must address a complex but practical problem currently faced by the public, industry, or government, and it must provide a solution that satisfies all the technical, social, political, economic, safety, sustainability, and environmental requirements and/or constraints. The doctoral project committee will have at least three Old Dominion University faculty members certified for graduate instruction; two faculty members must be from the major department. The committee must also have at least one non-University person with special knowledge of the project subject area.

Doctor of Philosophy Engineering with a Concentration in Engineering Management and Systems Engineering (PhD)

Degree Description

The Doctor of Philosophy (Ph.D.) focuses on developing the necessary skills to perform and evaluate rigorous research. Graduates are prepared for careers in teaching and research at academic institutions as well as in other public and private organizations characterized by innovation and technological leadership. The program blends highly theoretical with more applied or pragmatic research. The fields of research supported by the program are defined by the diverse specializations of the department faculty. Students in the Ph.D. program work closely with faculty to develop world-class expertise in their chosen fields of research. Advising faculty expect doctoral students to become collaborators, supporting the faculty's research agenda, and contributing towards their research goals. *This program is available on-campus and online.*

Admission Requirements

Admission to the Ph.D. program is competitive. The admission process is designed to select applicants that have a strong alignment between their own research interests and an area of specialization of one of the faculty. The best qualified applicant or applicants for an area of specialization are then selected. The number of students admitted into any faculty's area of specialization is dependent on the faculty's projected ability to advise additional doctoral students. The selected is based on the applicants' academic history, maturity in the development of research capabilities, and proficiency in specialized skills demanded by the research area.

In addition to general University admission requirements, which include English language proficiency for international students, applicants must have: (1) A master's degree or equivalent with a grade point average of 3.50 in an appropriate field from an accredited institution of higher education. (2) Undergraduate degree from an ABET-accredited program in engineering or engineering technology with a GPA of 3.00 (out of 4.00) or better. Students who hold bachelor's degrees in other disciplines or who do not meet the GPA requirement may be considered for admission based on transcript evidence of applicable physics and calculus courses, a resume indicating relevant work experience in an engineering discipline, and/or satisfactory GRE quantitative scores.

Each applicant is required to submit the following documentation when initially applying: (1) Transcripts from all institutions that the applicant has attended; (2) Graduate Record Examination general aptitude scores; (3) A curriculum vitae that highlights professional and research related activities; and (4) an essay of 500 words or less describing personal and academic goals, professional objectives, preparation for graduate study, and how the chosen program will help the applicant achieve these goals

and objectives. The essay should clearly state the specific area in which the applicant intends to specialize.

Applicants whose interests can be supported by a faculty's specialization and demonstrate adequate preparation to meet the demands of doctoral studies will be contacted by the Graduate Program Director. The GPD may request additional information that will assist in the selection process. Additional information may include but is not restricted to: publications, samples of research reports, and documents or materials that support proficiency claims of specialized skills. If warranted, the GPD will organize an interview of the applicant by faculty that have specializations in areas that may overlap with the applicant's intended area of research.

Admission is contingent on having the support of a faculty that is willing to commit to acting as an advisor should the applicant be admitted.

Students lacking adequate academic preparation may be required to complete coursework in addition to the graduate admission requirements. Students may be admitted to the Ph.D. program deficient in these leveling courses, but as part of their plan of study, the student must take and successfully complete these courses at the earliest possible opportunity. All students must have mathematics coursework through the level of integral calculus; matrix algebra or differential equations; and a course in calculus-based statistics (ENMA 420 (<http://catalog.odu.edu/search/?P=ENMA%20420>) or equivalent). As part of masters-level coursework, all students must have completed the following engineering management leveling courses or their equivalent: ENMA 600 (<http://catalog.odu.edu/search/?P=ENMA%20600>), ENMA 603 (<http://catalog.odu.edu/search/?P=ENMA%20603>), and ENMA 604 (<http://catalog.odu.edu/search/?P=ENMA%20604>).

Curriculum Requirements

General Requirements

The Ph.D. program is intended to develop scholarship and research capabilities in the student. Graduates will be experts in their chosen field, highly skilled researchers, critical thinkers, and competent communicators and debaters. Graduates will demonstrate this in a variety of ways that will include, but is not limited to, their performance in: coursework, written and oral examinations, closed and public debates and defenses, and contribution to their field's body of knowledge. The development and assessment of such expertise and scholarship take place under the guidance, advising, and mentorship of a faculty that is an expert in the field, and appropriate guidance, dissertation, and examination committees.

Curricular Requirements

Curriculum requirements in engineering management are in accordance with the general requirements for Ph.D. degrees as specified in the Requirements for Graduate Degrees section of this catalog. The Ph.D. program is governed by a Plan of Study that is established by the student in conjunction with his/her advisor and guidance committee within the first nine credit hours of coursework and will follow the established course requirements (below) unless a substitution to one or more courses is agreed upon between the advisor and student and approved by the Graduate Program Director. The plan of study is designed to prepare the student to undertake scholarly research in the particular field and specialization of their dissertation. The coursework selected will provide the student with (1) the requisite foundational knowledge of the selected field, and (2) the necessary research skills. A high degree of flexibility is provided to customize the plan of study, taking into account the diversity in the fields of study, the multidisciplinary nature and variety of research that is undertaken, as well as the different levels of preparation that individual students have.

At least three-fifths (3/5) of formal coursework must be at the 800 level for all doctoral programs.

Subject Area Specialization (Advisor-driven)

Complete the specialization	9

Subject Area Electives (Suggested courses)

Select a minimum of two of the following:	6
ENMA 661 Systems Engineering Design	

ENMA 815	Systems Analysis	
ENMA 824	Risk Analysis	
ENMA 843	Reliability and Maintainability	
ENMA 854	Big Data Fundamentals	
ENMA 863	Robust Engineering Design	
Research Skills (required)		
ENMA 811	Engineering Research Methodology	3
ENMA 820	Multivariate Statistics for Engineering	3
ENMA 821	Foundations of Research	3
Dissertation Research *		
Complete dissertation		24
Total Credit Hours		48

* Up to 6 dissertation research hours may be replaced by coursework with the approval of the advisor and GPD.

Additional Requirements

Requirements for Graduation

In addition to any University and College requirements presented in this catalog, the Ph.D. program in engineering management requires:

1. Satisfactory completion of a minimum of 48 credit hours of postmaster's degree credit or equivalent level of performance coursework. This shall include a minimum of 24 credit hours of coursework that complies with the student's plan of study, and a minimum of 18 credit hours of dissertation research hours.
2. Passing a written and oral candidacy examination at the completion of formal coursework.
3. The completion of research representing independent original research and its formal documentation as a dissertation.
4. The successful defense of a dissertation proposal.
5. The successful final public defense of the dissertation before an audience, which includes an appropriately selected committee of faculty knowledgeable in the field of the research.

Continuance Requirements

Students may be separated for failure to comply with any policies, procedures or requirements that pertain to this Ph.D. program or student behavior. In addition to the requirements for graduation, separation from the program may be warranted for the following reasons, among others:

Coursework:

1. All students admitted to Engineering Management and Systems Engineering programs must earn a grade of "C" or better in all courses required for the degree and in all Engineering Management prerequisite courses. A student may be separated from the program if he/she receives a grade lower than a "C". Additionally, a student may be separated from the program if he/she receives 2 (two) grades lower than a "B".

Adherence to programmatic expectations:

1. Students are expected to complete their coursework according to an agreed upon plan of study. See plan of study requirements above. Failure to adhere to the plan of study may result in separation from the program.
2. Students are expected to make timely progress on their coursework and research. Persistent failure to meet deadlines and milestones or other indicators that demonstrate progress, as assessed and documented by the guidance or advisory committee may lead to separation from the program.
3. Students are expected to remain within the specialization area of their advisor and committee members. Students that deviate outside of the agreed upon research area will be notified of this deviation. The student may lose the support of their advisor and committee if the deviation persists. A student will be given a limited period of time (generally one semester) to acquire an advisor that is capable of supporting their

new research direction. Separation from the program will result if the student cannot obtain a new advisor, whether this is due to the lack of a specialization in the new field, or if a faculty with a suitable specialization cannot take on additional advising responsibilities.

- Similarly, if a student is left without an advisor for any other reason (e.g. departure of a faculty advisor from the program), it is contingent on the student to obtain a new advisor in a timely manner. This may require flexibility and willingness by the student to adjust their area of specialization. The department will assist the student and take their particular situation into consideration when the loss of an advisor is due to factors outside of the student's control. Separation from the program will, however, result if no advisor is obtained after a limited period of time (generally one semester).

Quality of Research

- A student that persistently submits work of low quality whether it be in documented or in oral form, may be required to submit for special reviews by the committee. Records taken by the advisor, and the guidance or advisory committees, which document the quality problems and present remedial actions where appropriate will be used to help ascertain whether the problems can reasonably be expected to be resolved, or if separation from the program is warranted.

Ethical Behavior

- Any student partaking or demonstrating behaviors that might be considered to go against the policies and conditions expected for responsible conduct in research, Old Dominion University expected codes of conduct, or ethical considerations that might be specific to an area of research, may result in separation from the program.

Department of Mechanical and Aerospace Engineering

Web Site: <http://www.odu.edu/mae> (<http://www.odu.edu/mae/>)

241 Kaufman Hall
757-683-6363

Marwan Al-Haik, Chair
Colin Britcher, Associate Chair

Drew Landman, Graduate Program Director

Overview

The Department of Mechanical and Aerospace Engineering strives to provide the highest quality engineering education at the undergraduate and graduate levels, to engage in scholarly research at the forefront of mechanical and aerospace engineering, and to serve the professions of mechanical and aerospace engineering. Graduate degrees in mechanical engineering and aerospace engineering include the Master of Engineering, Master of Science, and Doctor of Philosophy degrees and are designed to prepare graduates for professional practice in teaching, research and development, design, and consulting. Graduates are prepared for challenging and rewarding employment in high-technology industries, research organizations, consulting firms and government agencies. These programs are also designed to serve both full-time and part-time graduate students. The department is closely associated with area industries, consulting firms, government agencies and research laboratories, which add relevance to the graduate engineering curricula, creating a stimulating environment for the pursuit of graduate studies. The students also benefit from the University's affiliation with NASA Langley Research Center, the Jefferson National Laboratory, the National Institute of Aerospace, and the Virginia Modeling Analysis and Simulation Center. All degree programs offered by the department can be utilized as components within the linked Baccalaureate-Master's and Baccalaureate-Doctoral degree programs offered through the Batten College of Engineering and Technology. For additional information about the educational and research opportunities available please visit our website at <http://www.odu.edu/mae>. *This program is available on-campus and online.*

List of Degrees and Certificates

- Master of Engineering - Mechanical Engineering
- Master of Science, Engineering - Mechanical Engineering
- Master of Engineering - Aerospace Engineering
- Master of Science, Engineering - Aerospace Engineering
- Doctor of Philosophy, Engineering - Mechanical Engineering
- Doctor of Philosophy, Engineering - Aerospace Engineering
- Graduate Certificate - Naval Architecture and Marine Engineering

Graduate Course Portfolio

Core Graduate Courses

MAE 601	Engineering Mathematics	3
MAE 602	Fluid Dynamics and Aerodynamics	3
MAE 603	Advanced Mechanics of Solids	3
MAE 604	Analytical Dynamics	3
MAE 605	Advanced Classical Thermodynamics	3
MAE 607	Continuum Mechanics	3
MAE 620	Heat Transfer I	3
MAE 640	Modern Control Theory	3
MAE 672	Design of Experiments	3
MAE 682	Concurrent Engineering	3

Aerodynamics and Fluids Graduate Courses

MAE 503	Flight Mechanics	3
MAE 506	Flight Vehicle Aerodynamics	3
MAE 517	Propulsion Systems	3
MAE 560	Introduction to Space Systems Engineering	3
MAE 710/810	Supersonic Flow	3
MAE 711/811	Hypersonic Aerodynamics	3
MAE 712/812	Experimental Aerodynamics	3
MAE 713/813	Turbulent Flow	3
MAE 715/815	Boundary Layer Theory	3
MAE 716/816	Computational Fluid Dynamics I	3
MAE 718/818	Aerospace Test Facilities	3
MAE 772/872	Response Surface Methodology	3

Thermodynamics and Energy Graduate Courses

MAE 511	Mechanical Engineering Power Systems Theory and Design	3
MAE 512	Environmental Control	3
MAE 513	Energy Conversion	3
MAE 514	Introduction to Gas Dynamics	3
MAE 720/820	Heat Transfer II	3
MAE 723/823	Nuclear Engineering	3

Materials and Structures Graduate Courses

MAE 522	Modern Engineering Materials	3
MAE 730/830	Finite Element Analysis	3
MAE 731/831	Mechanics of Composite Structures	3
MAE 734/834	Theory of Vibrations	3
MAE 750/850	Nanoscale Mechanical and Structural Properties of Materials	3
MAE 751/851	Fatigue and Fracture	3
MAE 752/852	Mechanical Behavior of Materials	3
MAE 753/853	Composite Materials	3

Dynamics and Controls Graduate Courses

MAE 504	Vibrations	3
MAE 531	Mechanisms Analysis and Design	3

MAE 538	Applied Analog and Digital Control	3
MAE 740/840	Autonomous and Robotic Systems Analysis and Control	3
MAE 741/841	Optimal Control Theory	3
MAE 742/842	Multibody Dynamics: Theories and Applications	3
MAE 743/843	Kinematic Synthesis of Mechanisms	3
MAE 744/844	Atmospheric Flight Dynamics and Control	3
MAE 745/845	Space Flight Dynamics and Control	3
MAE 746/846	Advanced Control Methodologies	3
MAE 747/847	Aerospace Vehicle Performance	3

Design/Manufacturing Graduate Courses

MAE 780/880	Engineering Optimization	3
MAE 781/881	Advanced Design	3
MAE 783/883	Robots and Manufacturing Automation	3
MAE 785/885	Advanced Manufacturing Technology	3
MAE 788/888	Computational Intelligence for Engineering Design Optimization Problems	3
MAE 789/889	Engineering Design with Uncertainties	3

Programs

Doctor of Philosophy Programs

- Engineering with a Concentration in Aerospace Engineering (PhD) (p. 254)
- Engineering with a Concentration in Mechanical Engineering (PhD) (p. 257)

Master of Engineering Programs

- Engineering with a Concentration in Aerospace Engineering (ME) (p. 253)
- Engineering with a Concentration in Mechanical Engineering (ME) (p. 255)

Master of Science Programs

- Engineering with a Concentration in Aerospace Engineering (MS) (p. 254)
- Engineering with a Concentration in Mechanical Engineering (MS) (p. 256)

Certificate Program

- Naval Architecture and Marine Engineering Certificate (p. 258)

Master of Engineering Engineering with a Concentration in Aerospace Engineering (ME)

Master's Admission Information

To qualify as a candidate for a Master of Science or a Master of Engineering program, applicants must meet the general University admission requirements and have completed undergraduate-level coursework that includes subject matter equivalent to a bachelor's degree in mechanical engineering, aerospace engineering, engineering mechanics, or a closely related discipline such as physics or mathematics. An applicant with an overall grade point average (GPA) of 3.0 and a GPA in the major of 3.0 (4.0 scale) is eligible for regular admission. Applicants with a GPA below 3.0 may be eligible for provisional admission. Students are typically required to submit their Graduate Record Examination (GRE) scores, although the Graduate Program Director (GPD) may waive the GRE requirement for applicants with excellent academic credentials. For those applicants with non-engineering degrees, or with engineering degrees other than mechanical engineering, aerospace engineering, or engineering mechanics, successful

completion of remedial graduate coursework may be required as a condition of admission. The Master of Science programs requires a minimum of 24 semester credit hours of coursework beyond the bachelor's degree with at least a B (3.0) average and a minimum of 6 semester credit hours of thesis research. The Master of Engineering program requires a minimum of 30 semester credit hours of course work with at least a B (3.0) average.

Leveling Requirements

Students from disciplines other than Mechanical and Aerospace Engineering are required to complete a number of leveling courses depending on their undergraduate degrees:

Holders of a B.S. degree in Mechanical Engineering Technology (MET) from an ABET accredited institution must complete three of the following leveling courses per recommendation of the Graduate Program Director:

MATH 307	Ordinary Differential Equations
MAE 303	Mechanics of Fluids
MAE 312	Thermodynamics II
MAE 340	Computational Methods in Mechanical Engineering
MAE 436	Dynamic Systems and Control

If applicants already have a minor in Mechanical Engineering or Aerospace Engineering, then no leveling courses are necessary. The selected courses are subject to satisfying the prerequisites listed in the catalog.

Holders of a B.S. degree in Physics or Mathematics from an ABET accredited institution must complete three of the following leveling courses per recommendation of the Graduate Program Director:

MAE 303	Mechanics of Fluids
MAE 311	Thermodynamics I
MAE 315	Heat and Mass Transfer
MAE 332	Mechanical Engineering Design I
MAE 340	Computational Methods in Mechanical Engineering
MAE 433	Mechanical Engineering Design II

If applicants already have a minor in Mechanical Engineering or Aerospace Engineering, then no leveling courses are necessary. The selected courses are subject to satisfying the prerequisites listed in the catalog.

Curriculum Requirements

Core Courses

MAE 601	Engineering Mathematics	3
or MAE 608	Applied Mathematics for Engineers	
or MATH 691	Engineering Analysis I	
Select three from the following:		9
MAE 602	Fluid Dynamics and Aerodynamics	
MAE 603	Advanced Mechanics of Solids	
MAE 604	Analytical Dynamics	
MAE 605	Advanced Classical Thermodynamics	
MAE 607	Continuum Mechanics	
MAE 620	Heat Transfer I	
MAE 640	Modern Control Theory	
MAE 672	Design of Experiments	
MAE 682	Concurrent Engineering	

Total Credit Hours **12**

In all programs, a maximum of 6 semester credit hours may be derived from 500-level courses.

Master of Engineering (Non-Thesis) Programs

The Master of Engineering is a non-research degree. The 30 semester credit hours is thus met entirely by course work. During their final semester,

students are required to either pass a comprehensive examination covering their course work or successfully complete a 3 hour project course, which includes written and oral presentations. The master's comprehensive examination is administered by the Graduate Program Director, and the rules for the comprehensive exam are identical to the Preliminary Diagnostic Examination for the Ph.D. program.

Process for MAE 698 (project):

1. Pick a professor to work with (project advisor).
2. Identify a project with the professor.
3. The professor approves the project.
4. Perform the work.
5. Write a paper (typically a conference length paper).
6. Present your results to your advisor and one other faculty member.

Master of Science Engineering with a Concentration in Aerospace Engineering (MS) Master's Admission Information

To qualify as a candidate for a Master of Science or a Master of Engineering program, applicants must meet the general University admission requirements and have completed undergraduate-level coursework that includes subject matter equivalent to a bachelor's degree in mechanical engineering, aerospace engineering, engineering mechanics, or a closely related discipline such as physics or mathematics. An applicant with an overall grade point average (GPA) of 3.0 and a GPA in the major of 3.0 (4.0 scale) is eligible for regular admission. Applicants with a GPA below 3.0 may be eligible for provisional admission. Students are typically required to submit their Graduate Record Examination (GRE) scores, although the Graduate Program Director (GPD) may waive the GRE requirement for applicants with excellent academic credentials. For those applicants with non-engineering degrees, or with engineering degrees other than mechanical engineering, aerospace engineering, or engineering mechanics, successful completion of remedial graduate coursework may be required as a condition of admission. The Master of Science programs requires a minimum of 24 semester credit hours of coursework beyond the bachelor's degree with at least a B (3.0) average and a minimum of 6 semester credit hours of thesis research. The Master of Engineering program requires a minimum of 30 semester credit hours of course work with at least a B (3.0) average.

Leveling Requirements

Students from disciplines other than Mechanical and Aerospace Engineering are required to complete a number of leveling courses depending on their undergraduate degrees:

Holders of a B.S. degree in Mechanical Engineering Technology (MET) from an ABET accredited institution must complete three of the following leveling courses per recommendation of the Graduate Program Director:

MATH 307	Ordinary Differential Equations
MAE 303	Mechanics of Fluids
MAE 312	Thermodynamics II
MAE 340	Computational Methods in Mechanical Engineering
MAE 436	Dynamic Systems and Control

If applicants already have a minor in Mechanical Engineering or Aerospace Engineering, then no leveling courses are necessary. The selected courses are subject to satisfying the prerequisites listed in the catalog.

Holders of a B.S. degree in Physics or Mathematics from an ABET accredited institution must complete three of the following leveling courses per recommendation of the Graduate Program Director:

MAE 303	Mechanics of Fluids
MAE 311	Thermodynamics I

MAE 315	Heat and Mass Transfer
MAE 332	Mechanical Engineering Design I
MAE 340	Computational Methods in Mechanical Engineering
MAE 433	Mechanical Engineering Design II

If applicants already have a minor in Mechanical Engineering or Aerospace Engineering, then no leveling courses are necessary. The selected courses are subject to satisfying the prerequisites listed in the catalog.

Curriculum Requirements

Core Courses

MAE 601	Engineering Mathematics	3
or MAE 608	Applied Mathematics for Engineers	
or MATH 691	Engineering Analysis I	
Select three from the following:		9
MAE 602	Fluid Dynamics and Aerodynamics	
MAE 603	Advanced Mechanics of Solids	
MAE 604	Analytical Dynamics	
MAE 605	Advanced Classical Thermodynamics	
MAE 607	Continuum Mechanics	
MAE 620	Heat Transfer I	
MAE 640	Modern Control Theory	
MAE 672	Design of Experiments	
MAE 682	Concurrent Engineering	
Total Credit Hours		12

In all programs, a maximum of 6 semester credit hours may be derived from 500-level courses.

Master of Science (Thesis) Programs

The Master of Science degree is a research degree requiring a written thesis. The thesis constitutes 6 semester credit hours within the 30 semester credit hour requirement. Students are given a verbal examination, administered as the student's thesis defense, under the direction of the faculty advisor with support from the Thesis Advisory Committee. The examination consists of two parts, a student presentation of their thesis research followed by a closed session where the Thesis Advisory Committee further questions the student. The committee concentrates on research presented in both oral and written formats, but may expand questioning to include related course work. The thesis should be formatted with guidelines established by the College.

Doctor of Philosophy Engineering with a Concentration in Aerospace Engineering (PhD)

The Doctor of Philosophy programs in Mechanical or Aerospace Engineering are advanced research degrees requiring a written dissertation offering new and unique contributions of a fundamental nature. Graduates are prepared for leadership roles in the many facets of engineering including teaching, research and development, design, and consulting. Doctoral students may select specializations in such technical areas as:

- aerodynamics and fluids
- thermodynamics and energy
- dynamics and controls
- materials and structures
- design and manufacturing

Students are also encouraged to select complementary courses in other engineering or science disciplines. The University's close associations with area industries, consulting firms, government agencies, and research laboratories create a stimulating environment for the pursuit of graduate studies.

Doctor of Philosophy Admission Requirements

To qualify for admission to a Doctor of Philosophy degree in Mechanical or Aerospace Engineering, a student must have earned a master’s degree from an accredited institution of higher learning in engineering, physics, or mathematics, including graduate-level course work equivalent to the corresponding master’s programs in Mechanical and Aerospace Engineering. Applicants with an overall grade point average (GPA) of 3.5 on a 4.0 scale at the master’s level are eligible for regular admission. Applicants with a GPA below 3.5 who present evidence and potential for improvement may be eligible for provisional admission. Students are typically required to submit their Graduate Record Examination (GRE) scores, although the Graduate Program Director (GPD) may waive the GRE requirement for applicants with excellent academic credentials.

Curriculum Requirements

Doctor of Philosophy Degree Requirements

A minimum of 24 credit hours of course work beyond the master’s degree and a minimum of 24 semester credit hours of dissertation research must be included in the doctoral degree program. At least 60% of the course work for the doctoral degree should be at the 800-level and the student should maintain at least a B (3.0) average. All doctoral students should satisfy either a foreign language or research skill requirement.

Additional Requirements

Preliminary Diagnostic Examination

Ph.D. students must take the diagnostic exam no later than the end of their first academic year. Diagnostic exams are scheduled annually in October and February and the exam dates are announced by the Graduate Program Director (GPD). Students who received their Master of Science degrees from ODU with a GPA of 3.5 or above are exempt from the diagnostic exam.

Students must fill the Ph.D. Diagnostic Exam form to notify the GPD of their desire to take the diagnostic exam. The form must be approved by the student's advisor. The diagnostic exam is a three hour long written exam containing four equally weighted questions from the core courses. It is conducted without any reference books or notes. Use of electronic devices with internet connection is not permitted. Only non-programmable scientific calculators are allowed. The questions might contain useful formulae to guide the students. Diagnostic exam questions will be prepared and graded by the faculty who taught these courses in the past five years. Students must pass each core topic area with a minimum passing grade of B. Students who pass at least two of the four subject areas in their first attempt can take the exam for a second time, where they will be tested on the failed areas. Students who fail their diagnostic exam can consider pursuing other MAE degrees. Students who fail their first attempt do not receive priority for departmental support as graduate teaching assistants or graders until they pass their diagnostic exam. However support as a graduate research assistant is within the discretion of the student's advisor. Part time or special status students attending ODU for joint foreign-institution/ODU degrees must also take their diagnostic exam within the first year of their Ph.D. studies at ODU.

Candidacy Examination

The candidacy exam is taken once the students finish their course work. The exam consists of written and oral parts. Written part of the exam can consist of a critical review report on a subject area determined by the student's advising committee. Written candidacy exam will be reviewed by the student's committee members for its technical content as well as for evaluation of the student's writing proficiency and research skills. Oral part of the candidacy exam is based on the defense of the written part, and will include extensive examination of the student's fundamental knowledge in his/her research area.

Dissertation Proposal

After the student passes the written and oral candidacy examinations, for advancement to candidacy, he/she must pass the dissertation proposal stage,

which is an oral presentation of the student's work containing literature survey and preliminary results sections to demonstrate feasibility of the proposed work.

Dissertation

Ph.D. candidates are expected to work with their dissertation advisors to form their Dissertation Committees. A Dissertation Committee should be composed of individuals with significant knowledge related to the candidate's dissertation research. The majority of whom must be full-time faculty members of the department.

Ph.D. candidates must submit their written dissertation to the committee members at least two weeks prior to the dissertation defense. The dissertation should be formatted in accordance with guidelines established by the college.

The dissertation defense consists of two parts; an open presentation to the general public and a closed examination conducted by the dissertation committee. The dissertation must be approved by the majority of the dissertation committee and must constitute a significant original contribution to the field. Students are permitted only two attempts to successfully complete the dissertation defense.

Master of Engineering Engineering with a Concentration in Mechanical Engineering (ME)

Master’s Admission Information

To qualify as a candidate for a Master of Science or a Master of Engineering program, applicants must meet the general University admission requirements and have completed undergraduate-level coursework that includes subject matter equivalent to a bachelor’s degree in mechanical engineering, aerospace engineering, engineering mechanics, or a closely related discipline such as physics or mathematics. An applicant with an overall grade point average (GPA) of 3.0 and a GPA in the major of 3.0 (4.0 scale) is eligible for regular admission. Applicants with a GPA below 3.0 may be eligible for provisional admission. Students are typically required to submit their Graduate Record Examination (GRE) scores, although the Graduate Program Director (GPD) may waive the GRE requirement for applicants with excellent academic credentials. For those applicants with non-engineering degrees, or with engineering degrees other than mechanical engineering, aerospace engineering, or engineering mechanics, successful completion of remedial graduate coursework may be required as a condition of admission. The Master of Science programs requires a minimum of 24 semester credit hours of coursework beyond the bachelor’s degree with at least a B (3.0) average and a minimum of 6 semester credit hours of thesis research. The Master of Engineering program requires a minimum of 30 semester credit hours of course work with at least a B (3.0) average.

Leveling Requirements

Students from disciplines other than Mechanical and Aerospace Engineering are required to complete a number of leveling courses depending on their undergraduate degrees:

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MAE 340	Computational Methods in Mechanical Engineering
MAE 436	Dynamic Systems and Control

If applicants already have a minor in Mechanical Engineering or Aerospace Engineering, then no leveling courses are necessary. The selected courses are subject to satisfying the prerequisites listed in the catalog.

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If applicants already have a minor in Mechanical Engineering or Aerospace Engineering, then no leveling courses are necessary. The selected courses are subject to satisfying the prerequisites listed in the catalog.

Curriculum Requirements

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Total Credit Hours 12

In all programs, a maximum of 6 semester credit hours may be derived from 500-level courses.

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3. The professor approves the project.
4. Perform the work.
5. Write a paper (typically a conference length paper).
6. Present your results to your advisor and one other faculty member.

Master of Science Engineering with a Concentration in Mechanical Engineering (MS)

Master's Admission Information

To qualify as a candidate for a Master of Science or a Master of Engineering program, applicants must meet the general University admission requirements and have completed undergraduate-level coursework that includes subject matter equivalent to a bachelor's degree in mechanical

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Doctor of Philosophy Engineering with a Concentration in Mechanical Engineering (PhD)

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- dynamics and controls
- materials and structures
- design and manufacturing

Students are also encouraged to select complementary courses in other engineering or science disciplines. The University's close associations with area industries, consulting firms, government agencies, and research laboratories create a stimulating environment for the pursuit of graduate studies.

Doctor of Philosophy Admission Requirements

To qualify for admission to a Doctor of Philosophy degree in Mechanical or Aerospace Engineering, a student must have earned a master's degree from an accredited institution of higher learning in engineering, physics, or mathematics, including graduate-level course work equivalent to the corresponding master's programs in Mechanical and Aerospace Engineering. Applicants with an overall grade point average (GPA) of 3.5 on a 4.0 scale at the master's level are eligible for regular admission. Applicants with a GPA below 3.5 who present evidence and potential for improvement may be eligible for provisional admission. Students are typically required to submit their Graduate Record Examination (GRE) scores, although the Graduate Program Director (GPD) may waive the GRE requirement for applicants with excellent academic credentials.

Curriculum Requirements

Doctor of Philosophy Degree Requirements

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Additional Requirements

Preliminary Diagnostic Examination

Ph.D. students must take the diagnostic exam no later than the end of their first academic year. Diagnostic exams are scheduled annually in October and February and the exam dates are announced by the Graduate Program Director (GPD). Students who received their Master of Science degrees from ODU with a GPA of 3.5 or above are exempt from the diagnostic exam.

Students must fill the Ph.D. Diagnostic Exam form to notify the GPD of their desire to take the diagnostic exam. The form must be approved by the student's advisor. The diagnostic exam is a three hour long written exam containing four equally weighted questions from the core courses. It is conducted without any reference books or notes. Use of electronic devices with internet connection is not permitted. Only non-programmable scientific calculators are allowed. The questions might contain useful formulae to guide the students. Diagnostic exam questions will be prepared and graded by the faculty who taught these courses in the past five years. Students must pass each core topic area with a minimum passing grade of B. Students who pass at least two of the four subject areas in their first attempt can take the exam for a second time, where they will be tested on the failed areas. Students who fail their diagnostic exam can consider pursuing other MAE degrees. Students who fail their first attempt do not receive priority for departmental support as graduate teaching assistants or graders until they pass their diagnostic exam. However support as a graduate research assistant is within the discretion of the student's advisor. Part time or special status students attending ODU for joint foreign-institution/ODU degrees must also take their diagnostic exam within the first year of their Ph.D. studies at ODU.

Candidacy Examination

The candidacy exam is taken once the students finish their course work. The exam consists of written and oral parts. Written part of the exam can consist of a critical review report on a subject area determined by the student's advising committee. Written candidacy exam will be reviewed by the student's committee members for its technical content as well as for evaluation of the student's writing proficiency and research skills. Oral part of the candidacy exam is based on the defense of the written part, and will include extensive examination of the student's fundamental knowledge in his/her research area.

Dissertation Proposal

After the student passes the written and oral candidacy examinations, for advancement to candidacy, he/she must pass the dissertation proposal stage, which is an oral presentation of the student's work containing literature survey and preliminary results sections to demonstrate feasibility of the proposed work.

Dissertation

Ph.D. candidates are expected to work with their dissertation advisors to form their Dissertation Committees. A Dissertation Committee should be composed of individuals with significant knowledge related to the candidate's dissertation research. The majority of whom must be full-time faculty members of the department.

Ph.D. candidates must submit their written dissertation to the committee members at least two weeks prior to the dissertation defense. The dissertation should be formatted in accordance with guidelines established by the college.

The dissertation defense consists of two parts; an open presentation to the general public and a closed examination conducted by the dissertation committee. The dissertation must be approved by the majority of the dissertation committee and must constitute a significant original contribution to the field. Students are permitted only two attempts to successfully complete the dissertation defense.

Certificate

Naval Architecture and Marine Engineering Certificate

In order to provide the opportunity for practicing engineers to further their knowledge and to become more competent in the fields of Naval Architecture and Marine Engineering, the Department of Mechanical and Aerospace Engineering offers a non-degree graduate level certificate program in Naval Architecture and Marine Engineering. Admission to the program requires a Bachelor of Science degree (or equivalent) in Mechanical Engineering, Aerospace Engineering, Naval Architecture and Marine Engineering, or a related field. The students must complete four 3-credit graduate-level courses to earn a certificate. The certificate program credits will be transferable to the Master's degree programs in Mechanical and Aerospace Engineering. The certificate program offers two tracks:

1. Naval Architecture
2. Marine Engineering

Curriculum Requirements

To meet the requirements of either track, students must complete a common required course, Engineering Mathematics or MAE 608 (<http://catalog.odu.edu/search/?P=MAE%20608>), Applied Mathematics for Engineers and three 3-credit courses described below.

Naval Architecture Track

Required

MAE 550	Principles of Naval Architecture	3
Select two of the following:		6
MAE 788	Computational Intelligence for Engineering Design Optimization Problems	
MAE 695	Topics in Mechanical and Aerospace Engineering (Numerical Marine Hydrodynamics)	
MAE 695	Topics in Mechanical and Aerospace Engineering (Ship Resistance and Propulsion)	
MAE 695	Topics in Mechanical and Aerospace Engineering (Dynamics of Marine Crafts)	
MAE 695	Topics in Mechanical and Aerospace Engineering (Marine Structures)	
Total Credit Hours		9

Marine Engineering Track

Required

MAE 511	Mechanical Engineering Power Systems Theory and Design	3
Select two of the following:		6
MAE 512	Environmental Control	
MAE 517	Propulsion Systems	
MAE 602	Fluid Dynamics and Aerodynamics	
Total Credit Hours		9

School of Health Professions

The School of Health Professions provides progressive, nationally recognized graduate training at facilities throughout Hampton Roads.

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Master of Medical and Health Professions Education Program

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Biomedical Sciences Programs

The Biomedical Sciences program offers a comprehensive and rigorous education through three distinct tracks: a Research Master's, a Medical Master's, and a Ph.D. program. Each track is designed to prepare students for advanced roles in their respective fields. All courses emphasize hands-on, experiential learning through laboratory work, clinical case studies, and faculty-guided research projects. Graduates emerge with the practical expertise and academic preparation necessary to contribute meaningfully to biomedical innovation and healthcare advancement.

Programs

Master of Science Programs

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Master of Science Biomedical Sciences - Medical Masters (MS)

The Macon & Joan Brock Virginia Health Sciences at Old Dominion University Biomedical Sciences - Medical One Year Program

The VHS Biomedical Sciences - Medical Program is a one-year pre-professional (postbaccalaureate) master's degree program designed for students who wish to matriculate into medical school.

The curriculum, which mainly consists of medical school courses taken with first year medical students, also has a medical preparation course aimed at improving students' interview skills and knowledge about other players in the healthcare field with whom they would interact as a physician.

The program provides an opportunity for highly motivated students to improve their academic credentials by demonstrating their academic abilities in a rigorous medical school environment. For this reason, it is particularly suitable to help students make themselves more competitive applicants to allopathic and osteopathic medical programs.

Goals and Objectives

It is the goal of the Biomedical Sciences - Medical One Year Program that every student successfully completes the program to become more academically competitive and an overall better candidate for admission to the professional school of his/her choice.

To accomplish this goal, the program has established the following objectives:

- Offer four first-year medical school courses within the Biomedical Sciences - Medical Program curriculum to create a challenging academic environment.
- Enhance student interviewing skills through the use of mock interviews with accompanying feedback.
- Initiate patient exposure through Standardized Patient experiences.

- Advise students individually and in small groups based on student ability and intention.

Transferability of Credit

No courses may be transferred for credit leading to the Biomedical Sciences - Medical Degree.

Admission

- A bachelor's degree from a regionally accredited institution in the U.S. or Canada prior to matriculating at VHS. Official transcripts from the awarding institution must indicate the date the degree was conferred.
- Successfully completed each of the following medical school prerequisite courses:
 - Two semesters or three quarters of physics with labs
 - Two semesters or three quarters of organic chemistry/biochemistry with labs
 - Two semesters or three quarters of chemistry with labs
 - Two semesters or three quarters of biology with labs

*Study abroad coursework is **not** accepted to fulfill prerequisite requirements.*

- A cumulative grade point average of 2.75 (B-) or better.
- Medical College Admission Test (MCAT) for students pursuing medical school
 - One-year program: MCAT with a **minimum score of 503**.
 - Two-year program: MCAT with a **minimum score of 496**.

We **do not** accept GRE scores in place of MCAT scores.

- Clinical experiences with patient contact (including scribing, shadowing, hospice, EMT)
 - At least 100 hours
- Volunteerism (clinical or not)
 - At least 100 hours

Applicants must be U.S. citizens or U.S. permanent residents.

Applicants from rural or other underserved regions and those who have been disadvantaged or underrepresented for economic, racial or social reasons, and who possess the motivation and aptitude required for the study of medicine, are strongly encouraged to apply.

All courses to fulfill the degree requirements for the Biomedical Sciences - Medical Program must be taken at Macon & Joan Brock Virginia Health Sciences at Old Dominion University. No credit will be given for courses taken at another institution.

Since we have a **rolling admissions process**, applicants are encouraged to **apply early** and submit all of their application materials as they become available, even when planning to take the MCAT at a later date.

Technical Standards

The abilities and skills candidates and students must possess in order to complete the education and training of the Biomedical Sciences Medical Master's Program are referred to as "Technical Standards." These abilities and skills are essential for entry into most professional practice settings associated with this degree program.

1.0 Observation Skills Technical Standard

1.01 Demonstrate sufficient attention and accuracy in observation skills (visual, auditory, and tactile) in the lecture hall, laboratory and/or online settings.

1.02 Indicators include, but are not limited to, this example:

- a. Accurate visualization and discrimination of text, numbers, patterns, graphic illustrations, and other imaging texts.

2.0 Communication Skills Technical Standard

2.01 Demonstrate effective communication skills with healthcare professionals, and with people of varying cultures, ethnicities and personalities.

2.02 Indicators include, but are not limited to, these examples:

- a. Clear, efficient and intelligible articulation of spoken English language.
- b. Legible, efficient and intelligible written English language.
- c. Accurate and efficient English language reading skills.
- d. Accurate and efficient expressive and receptive communication skills.
- e. Ability to accurately follow oral and written directions.

3.0 Critical Reasoning Skills Technical Standard

3.01 Demonstrate critical reasoning skills, including, but not limited to, intellectual, conceptual, integrative and quantitative abilities.

3.02 Indicators include, but are not limited to, these examples:

- a. Demonstrate ability to measure, calculate, reason, analyze, integrate and synthesize information.
- b. Demonstrate ability to acquire, retain and apply new and learned information.

4.0 Motor and Sensory Function Technical Standard

4.01 Perform demonstrations and experiments in the basic sciences.

4.02 Observe a patient accurately, both at a distance and close at hand; this ability requires the functional use of vision and somatic sensation.

4.03 Speak, hear, and observe patients in order to elicit information, describe changes in mood, activity, and posture, and perceive nonverbal communications.

4.04 Communicate effectively and efficiently in oral and written form.

4.05 Execute movements reasonably required to provide patients with general care and emergency treatment.

4.06 Students should also have sufficient motor function to elicit information from patients by palpation, auscultation, percussion and other diagnostic techniques.

4.07 The ability to solve problems, a skill which is critical to the practice of medicine, requires the intellectual abilities of measurement, calculation, reasoning, analysis and synthesis. In addition, a student must possess the emotional health required for full utilization of his or her intellectual abilities, the exercise of good judgment, the prompt completion of all responsibilities required for the diagnosis and care of patients, and the development of mature, sensitive, and effective relationships with patients.

4.08 All students of medicine must possess the intellectual, ethical, physical, and emotional capabilities required to undertake the full curriculum and to achieve the levels of competence required by the faculty.

5.0 Behavioral and Social Attributes Technical Standard

5.01 Demonstrate the behavioral and social attributes vital to participation in a professional program and service as a practicing laboratory professional.

5.02 Indicators include, but are not limited to, these examples:

- a. Possess the emotional health required for full utilization of mental faculties (judgment, orientation, affect, and cognition).
- b. Ability to develop mature and effective professional relationships with faculty, patients, the public, and other members of the healthcare team.
- c. Possess personal qualities that facilitate effective therapeutic interactions (compassion, empathy, integrity, honesty, benevolence, confidentiality).
- d. Demonstrate impartial motives, attitudes, and values in roles, functions, and relationships.
- e. Ability to monitor and react appropriately to one's own emotional needs and responses.
- f. Display appropriate flexibility and adaptability in the face of stress or uncertainty associated with laboratory experiments.
- g. Compliance with standards, policies, and practices set forth in the institutional student handbook and the program handbook.

Curriculum Requirements

Unique to our Two-Year Program

The Biomedical Sciences - Medical Program is a two-year pre-professional (post-baccalaureate) master's degree program designed for students who wish to matriculate into medical school.

The curriculum, which mainly consists of medical school courses taken with first year medical students, also contains the following courses: Medical School Preparation 1.0, 1.5 and 2.0, Principles of Epidemiology, MCAT Preparation, Legal and Ethical Issues in Medicine and Social and Behavioral Sciences for Public Health.

The program provides an opportunity for highly motivated students to improve their academic credentials by demonstrating their academic abilities in a rigorous medical school environment. For this reason, it is particularly suitable to help students make themselves more competitive applicants to allopathic and osteopathic medical programs as well as dental and other health professions programs.

Goals and Objectives

- It is the goal of the Biomedical Sciences - Medical Two-Year Program that every student successfully completes the program to become more academically competitive and an overall better candidate for admission to the professional school of his/her choice.
- To accomplish this goal, the program has established the following objectives:
- Offer four first-year medical school courses within the Biomedical Sciences - Medical Program curriculum to create a challenging academic environment.
 - Enhance student interviewing skills through the use of mock interviews with accompanying feedback.
 - Initiate patient exposure through Standardized Patient experiences.
 - Advise students individually and in small groups based on student ability and intention.
 - Provide MCAT preparation to improve MCAT scores and improve students' competitiveness for medical school.

Transferability of Credit

No courses may be transferred for credit leading to the Biomedical Sciences - Medical Degree.

Note

Students must complete both years of the program to be eligible to matriculate into EVMS.

One-year program

Term 1	20

BM 519	Medical School Preparation 2.0
BM 501	Foundations of Disease
BM 536	Human Structure
Term 2	12
BM 502	Introduction to Organ Systems
BM 503	Hormones
Total Credit Hours	32
Two-year program	
Term 1	12
BM 524	Medical School Preparation 1.0
BM 530	Foundational Science II
MPH 611	Social and Behavioral Sciences for Public Health
Term 2	10
BM 525	Medical School Preparation 1.5
BM 534	MCAT Preparation
MPAS 604	Legal & Ethical Issues in Medicine
MPHO 614	Principles of Epidemiology
Term 3	20
BM 501	Foundations of Disease
BM 519	Medical School Preparation 2.0
BM 536	Human Structure
Term 4	12
BM 502	Introduction to Organ Systems
BM 503	Hormones
Total Credit Hours	54

Master of Science

Biomedical Sciences-Research (MS)

The Biomedical Sciences MS (Research) program provides students with a strong foundation in biomedical research while developing critical thinking and analytical skills valued in the scientific and medical communities worldwide. Through coursework and hands-on research experience, students build a solid understanding of the biological mechanisms underlying human health and disease. This degree serves as a versatile platform for diverse career paths in research, education, biotechnology, and healthcare etc., and also provides excellent preparation for advanced academic pursuits, including PhD, MD, or other professional programs.

This program is offered to students with two options: thesis or non-thesis. Students chose their path in the fall semester of their second year. Students in both options will complete independent laboratory research projects in a faculty member's lab. Additionally, students will complete core academic courses, two laboratory rotations and advanced electives.

- Thesis option:
 - Students choosing the thesis option complete a research project that is developed into a written thesis and is defended in an institute-wide oral presentation.
- Non-Thesis option:
 - Students in the non-thesis option prepare a written report of their research followed by an oral presentation to their guidance committee.

Admission

The Biomedical Sciences Research Master's program is now participating in the BioMedCAS (<https://biomedcas2024.cas.myliaison.com/applicant-ux/#/> login), specifically designed for biomedical programs.

Applicants to the program must have:

- A bachelor's degree prior to matriculating as a student
 - If the bachelor's degree was issued by a U.S. college or university, as a general rule it should be from a regionally accredited institution. However, the program may grant exceptions on a case-by-case basis.
 - Official transcripts from the awarding institution must specify the date upon which the degree was issued.
- A cumulative grade point (GPA) of 3.0 or better (preferred)
 - We conduct a holistic review of applications and consider an applicant's entire record. Applicants with a GPA between 2.8 and 3.0 may be accepted. We pay special attention to science and math course grades, and we prefer to accept applicants with mostly A's and B's in these courses.
- Successfully completed the following courses:
 - General Biology (one semester with lab)
 - Additional Biology (one semester with lab)
 - General Chemistry (two semesters with labs)
 - Organic Chemistry I (one semester with lab)
 - Organic Chemistry II or Biochemistry (one semester, lab not required)
 - General Math, Calculus or statistics (one semester)
 - College Math or Physics (one semester)
- Completed the Test of English as a Foreign Language (TOEFL)
 - This applies to international applicants only.
- Completed the online application (<https://biomedcas2024.cas.myliaison.com/applicant-ux/#/login>) including a personal statement, along with an application fee
- Official transcripts from all colleges and universities attended, sent by the registrar at those institutions
 - Official transcripts from the awarding institution must specify the date upon which the degree is issued.
 - Graduate Record Exam (GRE) is no longer required for admission to this program
 - Official TOEFL scores (if applicable)
 - Two letters of recommendation submitted using the form provided within the online application
- Transcripts must be sent to BioMedCAS (<https://biomedcas2024.cas.myliaison.com/applicant-ux/#/login>) only. BioMedCAS (<https://biomedcas2024.cas.myliaison.com/applicant-ux/#/login>) only accepts electronic transcripts from the following sites:
 - Credentials Solutions (<http://www.transcriptplus.net/order/>)
 - Parchment (<https://www.parchment.com/order/>)
 - National Student Clearinghouse (<https://www.studentclearinghouse.org/>)

If your school does not offer these services, download and send a transcript request form to your school's registrar, who should send the transcript to:

BioMedCAS Transcript Processing Center
P.O. Box 9207
Watertown, MA 02471

Additional Requirements for International Applicants

Sending International Transcripts to BioMedCAS

- BioMedCAS will ONLY accept the evaluation report from the credentialing agency. Do not send your foreign transcript to BioMedCAS.
- All other foreign transcript evaluations from the credentialing agency must be sent directly to BioMedCAS.

Transcript evaluation: International applicants who attended any institution outside of the United States must contact one of the following credentialing agencies to submit transcripts for official evaluation:

- World Education Services (<http://www.wes.org/>)
- Educational Credential Evaluators (<http://www.ece.org/>)

These are preferred credentialing services. If you wish to select a company other than these, please contact us (https://www.evms.edu/education/masters_programs/biomedical_sciences_research_masters_program/application_process/#Contact) first.

Note: It can take 4 to 6 weeks for transcript evaluations to arrive after the agency receives transcripts. Plan ahead and request these documents early. Incomplete applications will not be reviewed.

Translation: If the academic institution that you attended does not issue documents in English, the credentialing agency may require that you submit a word-for-word translation of your transcripts if they do not have this service available for purchase. You can contact University Language Services (<http://www.universitylanguage.com/>) to submit your transcript for translation and instruct them to send the translated transcript to the credentialing agency.

TOEFL: International applicants whose native language is not English must take the TOEFL exam and receive a score as follows:

- Paper-based test: 550
- Computer-based test: 213
- IBT exam: 80

the TOEFL School Code is B886.

Please take the TOEFL exam online through the Education Testing Service (<http://www.ets.org/>) (ETS), and request your TOEFL scores be sent directly to Admissions and Enrollment team for Health Professions. ETS reports scores for two years after the test date. If you have previously taken the TOEFL but the two-year period has expired, the program will accept a personal copy if available.

Transfer Credit Policy

Transfer of credit may be allowed for courses comparable to those offered in our programs. Courses must have been taken at an accredited biomedical or biological sciences graduate program in the U.S. Grades of B or higher or a passing grade in a pass/fail course are required. The Biomedical Sciences Research master's program may accept up to nine transfer credits. Transfer credit will be determined by the program director in consultation with program faculty after a student matriculates into the program.

Early Assurance Program

The Early Assurance Program (EAP) exists to offer outstanding and qualified undergraduate students with firm interests in a career in biomedical science and the opportunity to gain early assurance of acceptance into the Biomedical Sciences Research Master's program before beginning their final year of college.

By granting early assurance of acceptance into the program, students will be able to broaden their academic focus, engage in extracurricular leadership activities and pursue first-hand, lab experience.

Partner Institutions

- Norfolk State University
- Regent University
- Hampton University
- Longwood University
- Virginia Wesleyan University
- Hampden-Sydney College
- Christopher Newport University

Each January, early assurance program advisers at each partner institution will forward names of eligible students who are interested in applying to the Biomedical Sciences Research Master's program through the Early Assurance Program. Students interested in the program are required to maintain regular contact with the EAP adviser during their college career.

Eligible students will receive an email containing the necessary links and instructions to apply.

Below are the main steps necessary to apply through the Early Assurance Program:

- Meet with the EAP adviser at your institution as soon as possible.
- Establish a plan to complete prerequisites, certification and patient care experience prior to application deadline.
- Complete the BioMedCAS application by June 15 of your junior year.
- Complete the undergraduate degree requirements and maintain EAP eligibility.

Eligibility

To be eligible to apply for the Early Assurance Program, a student must:

- Have completed the fall semester of their junior year with only one more academic year to complete;
- Meet all institutional and degree requirements to continue as a student in good standing;
- Maintain an overall (cumulative) GPA of 3.25 or better;
- Have satisfactorily completed seven of eight prerequisite courses by the time of application without withdrawing from or repeating any courses used to satisfy the prerequisites;
- Obtain grades of B or above in all science courses taken in sophomore, junior, or senior year;
- Have no academic or conduct code violations.

Maintaining Eligibility

Continuation in the EAP will require evidence of general academic progress consistent with past performance, and of significant progress toward achievement of individually specified goals outlined in the application. Ongoing communication between the EAP applicant, the EAP advisor, and the Biomedical Sciences program will ensure that both the school's requirements and individual applicant's objectives are being met. In addition, the following criteria must be maintained by the student to continue eligibility:

- Meet with EAP adviser each semester;
- Maintain contact with the Biomedical Sciences Program during the senior year;
- Carry sufficient credit load during the remaining regular academic semesters to fulfill undergraduate degree requirements;
- Maintain an overall (cumulative) GPA of 3.25 or better with consistent academic performance; obtain grades of B or above in all science courses taken after the freshman year;
- Make significant progress toward achieving the individually-specified goals outlined on the PUR submitted with the student's application;
- Fulfill all institution and degree requirements to maintain status as a student in good standing (no academic or conduct code violations) and earn a bachelor's degree prior to matriculating in the Research MS program;
- Complete any additional specific matriculation conditions set by the Research MS program at the time of acceptance notification (e.g., official transcripts confirming date of degree conferral, a criminal background check, indication of ability to independently meet the Technical Standards, and submission of all health requirements)

Failure to meet or maintain these eligibility standards will constitute grounds for dismissal from the program. Admission to the Research MS Program can be denied if events occur that would cause the Admissions Committee to question a student's suitability to pursue a career in biomedical research. These include, but are not limited to, misdemeanor or felony convictions, academic dishonesty or other code of conduct violations, unprofessional conduct in a laboratory or education setting, or inability to meet the Technical Standards.

Transfer Credit Policy

Transfer of credit may be allowed for courses comparable to those offered in our programs. Courses must have been taken at an accredited biomedical or biological sciences graduate program in the U.S. Grades of B or higher or a passing grade in a pass/fail course are required. The Biomedical Sciences Research master's program may accept up to nine transfer credits. Transfer credit will be determined by the Program Director in consultation with program faculty after a student matriculates into the program.

Official transcripts must be sent to BioMedCAS. Test scores and supportive application documents should be electronically submitted or mailed to Admissions and Enrollment.

Technical Standards

The abilities and skills candidates and students must possess in order to complete the education and training of the Biomedical Sciences Research master's programs are referred to as technical standards. These abilities and skills are essential for entry into most professional practice settings associated with this degree program.

1.0 Observation Skills Technical Standard

1.01 Demonstrate sufficient attention and accuracy in observation skills (visual, auditory and tactile) in the lecture hall, laboratory and/or online settings.

1.02 Indicators include, but are not limited to, this example:

1. Accurate visualization and discrimination of text, numbers, patterns, graphic illustrations and other imaging texts.

2.0 Communication Skills Technical Standard

2.01 Demonstrate effective communication skills with other students, faculty members, laboratory staff members and scientific colleagues.

2.02 Indicators include, but are not limited to, these examples:

1. Clear, efficient and intelligible articulation of verbal language.
2. Legible, efficient and intelligible written English language.
3. Accurate and efficient English language reading skills.
4. Accurate and efficient expressive and receptive communication skills.
5. Ability to accurately follow oral and written directions.

3.0 Critical Reasoning Skills Technical Standard

3.01 Demonstrate critical reasoning skills, including, but not limited to, intellectual, conceptual, integrative and quantitative abilities.

3.02 Indicators include, but are not limited to, these examples:

1. Demonstrate ability to measure, calculate, reason, analyze, integrate and synthesize information.
2. Demonstrate ability to acquire, retain and apply new and learned information.
3. Demonstrate ability to pursue a course of independent research in a laboratory setting, including the ability to plan and execute experiments.

4.0 Motor And Sensory Function Technical Standard

4.01 Demonstrate sufficient motor and sensory function to perform typical research laboratory duties.

4.02 Indicators include, but are not limited to, these examples:

1. Functional and sufficient sensory capacity (visual, auditory and tactile) to use laboratory equipment and perform experiments.
2. Execute motor movements that demonstrate safety and efficiency in the various learning settings (i.e., classroom and laboratories).
3. Physical stamina sufficient to complete the didactic and laboratory requirements, including prolonged periods of sitting or standing.

5.0 Behavioral And Social Attributes Technical Standard

5.01 Demonstrate the behavioral and social attributes vital to participation in a professional program and service as a practicing laboratory professional.

5.02 Indicators include, but are not limited to, these examples:

- 1. Possess the emotional health required for full utilization of mental faculties (judgment, orientation, affect and cognition).
- 2. Ability to develop mature and effective professional relationships with faculty, students and other members of the research team.
- 3. Demonstrate impartial motives, attitudes and values in roles, functions and relationships.
- 4. Ability to monitor and react appropriately to one’s own emotional needs and responses.
- 5. Display appropriate flexibility and adaptability in the face of stress or uncertainty associated with technical difficulties in research or scientific review (e.g., criticism of ideas shared in written or oral presentations, manuscripts, etc.)

Compliance with standards, policies and practices set forth in the Student Handbook and the program handbook.

Curriculum Requirements

Thesis Option

(Path Decision - Fall Semester of 2nd Year)		
Course Sequence - 1st Year		
Term 1 - Fall		12
BP 700	Molecules to Cells	
BP 701	Molecular and Cellular Techniques	
BP 703	Cell Communication and Signaling	
BP 704	Molecular Genetics	
BP 710	Oral Communication Forum	
BP 719	Biomedical Sciences Lab Rotation I	
Term 2 - Spring		11
BP 706	Cell Energetics & Organ Function	
BP 710	Oral Communication Forum	
BP 720	Biomedical Sciences Lab Rotation II	
BP 781	Applied Biostatistics & Bioinformatics	
BP 798	Research	
Term 3 - Summer		3
BP 798	Research	
Course Sequence - 2nd Year		
Term 4 - Fall		9
BP 771	Methods & Logic in Translational Biology	
BP 773	Responsible Conduct in Science	
BP 710	Oral Communication Forum	
BP 798	Research	
*Elective (2-3 credits as available, taken in lieu of research)		
Term 5 - Spring		4
BP 710	Oral Communication Forum	
BP 798	Research	
*Elective (2-3 credits as available, taken in lieu of research)		
Term 6 - Summer		4
BP 798	Research	
BP 799 Thesis		
Total Credit Hours		43

Non-Thesis Option

(Path Decision - Fall Semester of 2nd Year)		

Course Sequence - 1st Year		
Term 1 - Fall		12
BP 700	Molecules to Cells	
BP 701	Molecular and Cellular Techniques	
BP 703	Cell Communication and Signaling	
BP 704	Molecular Genetics	
BP 719	Biomedical Sciences Lab Rotation I	
Term 2 - Spring		11
BP 706	Cell Energetics & Organ Function	
BP 710	Oral Communication Forum	
BP 720	Biomedical Sciences Lab Rotation II	
BP 781	Applied Biostatistics & Bioinformatics	
BP 798 Research		
Term 3 - Summer		3
BP 798	Research	
Course Sequence - 2nd Year		
Term 4 - Fall		9
BP 771	Methods & Logic in Translational Biology	
BP 773	Responsible Conduct in Science	
BP 710	Oral Communication Forum	
BP 798	Research	
*Elective (2-3 credits as available, taken in lieu of research)		
Term 5 - Spring		4
BP 710	Oral Communication Forum	
BP 798	Research	
*Elective (2-3 credits as available, taken in lieu of research)		
Term 6 - Summer		3
BP 798	Research	
Oral Presentation of Research		
Total Credit Hours		42

Doctor of Philosophy Biomedical Sciences (PhD)

The Biomedical Sciences PhD program offers multidisciplinary training designed to prepare students for successful careers. Core coursework and laboratory rotations provide a strong foundation across the biomedical sciences, while advanced training is tailored to each student’s specific interests. Areas of study explore the molecular, cellular, and organismal mechanisms underlying human diseases, with opportunities to specialize in fields such as cancer biology, cardiovascular physiology, endocrinology, infectious disease, neurobiology, and reproduction.

Admission

The Biomedical Sciences, PhD program is now participating in the BioMedCAS (<https://biomedcas2024.cas.myliaison.com/applicant-ux/#/> login), specifically designed for biomedical programs.

Applicants to the program must have:

- A bachelor’s degree prior to matriculating as a student
 - If the bachelor’s degree was issued by a U.S. college or university, as a general rule it should be from a regionally accredited institution. However, the program may grant exceptions on a case-by-case basis.
 - Official transcripts from the awarding institution must specify the date upon which the degree was issued.
- An overall grade point average (GPA) of 3.0 or higher (undergraduate and graduate GPA combined).
 - While a holistic review is adopted, admission is competitive; most accepted applicants have a cumulative GPA of 3.3 or higher.
- Completed the Test of English as a Foreign Language (TOEFL)
 - This applies to international applicants only.

- Successfully completed the following courses:
 - General Biology (1 semester with lab)
 - Additional Biology (1 semester with lab)
 - Calculus and/or statistics (1 year)
 - General Chemistry (1 year with lab)
 - Organic Chemistry I (1 semester with lab)
 - Organic Chemistry II or Biochemistry (1 semester, lab not required)
 - Physics (one semester; one year preferred)
 - An additional course in mathematics, computer science or chemistry may substitute for the second semester of physics.

Applicants must also have previous laboratory research experience, and we recommend that they take additional courses in biology, chemistry, and physics.

- Complete the online application (<https://biomedcas2024.cas.myliaison.com/applicant-ux/#/login>) including a personal statement, along with the \$86 application fee:
- Official transcripts from all colleges and universities attended, sent by the registrar at those institutions
 - Official transcripts from the awarding institution must specify the date upon which the degree is issued.
 - Transcripts must be sent to BioMedCAS (<https://biomedcas2024.cas.myliaison.com/applicant-ux/#/login>) only. BioMedCAS only accepted electronic transcripts from Credentials Solutions, Parchment, and National Student Clearinghouse. If your school does not offer either of these services, your transcripts must be sent via mail. Please use the information below to send your transcripts.
- Sending transcripts to BioMedCAS electronically:
 - Credentials Solutions - <http://www.transcriptsplus.net/order> (<http://www.transcriptsplus.net/order/>)
 - Parchment - <https://www.parchment.com/order/> (<https://www.parchment.com/order/%C2%A0/>)
 - National Student Clearinghouse - <http://www.studentclearinghouse.org> (<http://www.studentclearinghouse.org/>)
- Sending transcripts to BioMedCAS by mail:
 - Download a transcript request form after you enter each institution in BioMedCAS.
 - Send the transcript request form to the institution registrar to send the transcript by mail to the address below:

BioMedCAS Transcript Processing Center
P.O. Box 9207
Watertown, MA 02471

- Three letters of recommendation submitted using the form provided within the online application
 - At least two letters should be written by faculty at colleges attended by the applicant who are familiar with the student's academic and research capabilities
 - Only professional references are acceptable. Letters from personal friends and family members will not be considered.

Additional Requirements for International Applicants

Sending International Transcripts to BioMedCAS

- BioMedCAS will ONLY accept the evaluation report from the credentialing agency. Do not send your foreign transcript to BioMedCAS.
- All other foreign transcript evaluations from the credentialing agency must be sent directly to BioMedCAS.

Transcript evaluation: International applicants who attended any institution outside of the United States must contact one of the following credentialing agencies to submit transcripts for official evaluation:

- World Education Services (<http://www.wes.org/>)
- Educational Credential Evaluators (<http://www.ece.org/>)

These are preferred credentialing services. If you wish to select a company other than these, please contact us (https://www.evms.edu/education/masters_programs/biomedical_sciences_research_masters_program/application_process/#Contact) first.

Note: It can take 4 to 6 weeks for transcript evaluations to arrive after the agency receives transcripts. Plan ahead and request these documents early. Incomplete applications will not be reviewed.

Translation: If the academic institution that you attended does not issue documents in English, the credentialing agency may require that you submit a word-for-word translation of your transcripts if they do not have this service available for purchase. You can contact University Language Services (<http://www.universitylanguage.com/>) to submit your transcript for translation and instruct them to send the translated transcript to the credentialing agency.

TOEFL: International applicants whose native language is not English must take the TOEFL exam and receive a score as follows:

- Paper-based test: 550
- Computer-based test: 213
- IBT exam: 80

The TOEFL School Code is B886.

Please take the TOEFL exam online through the Education Testing Service (<http://www.ets.org/>) (ETS) and request your TOEFL scores be sent directly to the Admissions and Enrollment team for Health Professions. ETS reports scores for two years after the test date. If you have previously taken the TOEFL but the two-year period has expired, the program will accept a personal copy if available.

Transfer Credit Policy

Transfer of credit may be allowed for courses comparable to those offered in our program. Courses must have been taken at an accredited biomedical or biological sciences graduate program in the U.S. Grades of B or higher or a passing grade in a pass/fail course are required. The Biomedical Sciences PhD program may accept up to 12 transfer credits. Transfer credit will be determined by the program director in consultation with program faculty after matriculation of a student into the program.

Official transcripts must be sent to BioMedCAS. Test scores and supportive application documents should be electronically submitted or mailed to the Admissions and Enrollment team for Health Professions.

Technical Standards

The abilities and skills candidates and students must possess in order to complete the education and training of the Biomedical Sciences PhD program are referred to as technical standards. These abilities and skills are essential for entry into most professional practice settings associated with these degree programs.

1.0 Observation Skills Technical Standard

1.01 Demonstrate sufficient attention and accuracy in observation skills (visual, auditory, and tactile) in the lecture hall, laboratory, and/or online settings.

1.02 Indicators include, but are not limited to, this example:

1. Accurate visualization and discrimination of text, numbers, patterns, graphic illustrations, and other imaging texts.

2.0 Communication Skills Technical Standard

2.01 Demonstrate effective communication skills with other students, faculty members, laboratory staff members, and scientific colleagues.

2.02 Indicators include, but are not limited to, these examples:

1. Clear, efficient, and intelligible articulation of verbal language.
2. Legible, efficient, and intelligible written English language.
3. Accurate and efficient English language reading skills.
4. Accurate and efficient expressive and receptive communication skills.
5. Ability to accurately follow oral and written directions.

3.0 Critical Reasoning Skills Technical Standard

3.01 Demonstrate critical reasoning skills, including, but not limited to, intellectual, conceptual, integrative and quantitative abilities.

3.02 Indicators include, but are not limited to, these examples:

1. Demonstrate ability to measure, calculate, reason, analyze, integrate and synthesize information.
2. Demonstrate ability to acquire, retain and apply new and learned information.
3. Demonstrate ability to pursue a course of independent research in a laboratory setting, including the ability to plan and execute experiments.

4.0 Motor And Sensory Function Technical Standard

4.01 Demonstrate sufficient motor and sensory function to perform typical research laboratory duties.

4.02 Indicators include, but are not limited to, these examples:

1. Functional and sufficient sensory capacity (visual, auditory and tactile) to use laboratory equipment and perform experiments.
2. Execute motor movements that demonstrate safety and efficiency in the various learning settings (i.e., classroom and laboratories).
3. Physical stamina sufficient to complete the didactic and laboratory requirements, including prolonged periods of sitting or standing.

5.0 Behavioral And Social Attributes Technical Standard

5.01 Demonstrate the behavioral and social attributes vital to participation in a professional program and service as a practicing laboratory professional.

5.02 Indicators include, but are not limited to, these examples:

1. Possess the emotional health required for full utilization of mental faculties (judgment, orientation, affect and cognition).
2. Ability to develop mature and effective professional relationships with faculty, students and other members of the research team.
3. Demonstrate impartial motives, attitudes and values in roles, functions and relationships.
4. Ability to monitor and react appropriately to one's own emotional needs and responses.
5. Display appropriate flexibility and adaptability in the face of stress or uncertainty associated with technical difficulties in research or scientific review (e.g., criticism of ideas shared in written or oral presentations, manuscripts, etc.).
6. Compliance with standards, policies and practices set forth in the Student Handbook (https://www.evms.edu/education/resources/student_policies_handbooks/) and the program handbook.

Curriculum Requirements

Our program aims to develop graduates who will pursue careers as independent investigators with an appreciation for both basic and clinical aspects of biomedical research.

Students will complete 1.5 years of core academic courses, three laboratory rotations and advanced electives. Beginning in the summer following

the first year, students will start mentored research projects in a faculty member's laboratory.

Core Course Sequence

<i>Year 1 - Fall</i>	<i>12</i>
BP 700	Molecules to Cells
BP 703	Cell Communication and Signaling
BP 701	Molecular and Cellular Techniques
BP 704	Molecular Genetics
BP 708	Oral Communication Forum
BP 819	Lab Rotation I
<i>Year 1 - Spring</i>	<i>11</i>
BP 706	Cell Energetics & Organ Function
BP 708	Oral Communication Forum
BP 781	Applied Biostatistics & Bioinformatics
BP 820	Lab Rotation II
BP 821	Lab Rotation III
<i>Year 2 - Fall</i>	<i>6</i>
BP 709	Scientific Writing & Research Design
BP 771	Methods & Logic in Translational Biology
BP 773	Responsible Conduct in Science
BP 795 Elective Courses	6
Elective courses are taken as available and in lieu of research	
BP 898 Research	30
BP 708 Oral Communication Forum	5
BP 899 Dissertation	9
Total Credit Hours	79

Counseling & Art Therapy Programs

Our faculty members are talented educators and dedicated scholars with strong counselor identities who are members of the American Counseling Association (<https://www.counseling.org/>), serve on the American Counseling Association Foundation (<https://www.counseling.org/about/aca-foundation/>), and have been elected to state and national leadership positions in the Virginia Art Therapy Association (<https://www.vaarttherapy.org/>) and the American Art Therapy Association (<https://arttherapy.org/>).

Through our faculty members' teaching methods, students in our 61 credit hour, two-year program engage with the elements of counseling and art therapy practice and the research that leads to improved care. Our instruction focuses on collaborative and experiential learning, reflecting on learning and applying those lessons to internships and clinical work.

Programs

Master of Science Programs

- Counseling & Art Therapy (MS) (p. 266)

Certificate Programs

- Advanced Cultural Humility Certificate (p. 268)
- Trauma and Neuroscience Informed Art Psychotherapy Certificate (p. 268)

Master of Science Counseling & Art Therapy (MS)

This program maintains an admission process unique to the program. Prospective students are encouraged to review the admission requirements in order to best prepare themselves for a successful future at VHS.

Admission

Both personal characteristics and academic qualifications of applicants are evaluated to ensure that students are capable of developing professional competence as counselors and art therapists.

Our Admissions Guide (http://catalog.odu.edu/graduate/health-professions/counseling-and-art-therapy/counseling-and-art-therapy-ms/Admissions_Guide_2024-25.pdf) contains specific information about the admissions requirements, process, and timeline for the program. We offer both a full-time and part-time options (https://www.evms.edu/education/masters_programs/counseling_art_therapy/curriculum/part-time_curriculum/) for our curriculum. We also offer three stand-alone Graduate Certificates. (https://www.evms.edu/education/masters_programs/art_therapy_counseling_program/continuing_education/)

- A **qualifying grade point average** of 3.0 or better.
- A **Bachelor's degree** completed no later than July 1.
- All **prerequisite coursework** satisfactorily completed no later than July 1:
 - **Psychology Coursework**
 - 6 semester credit hours in Psychology (must include developmental, abnormal) and
 - 6 optional psychology semester credit hours in psychology and/or human services related field.
 - **Studio Art Coursework or equivalency**
 - 12 semester credit hours in Studio Art (must include painting, drawing, sculpture/3-D and clay/ceramics) [recommended] or
 - Portfolio equivalency in Painting, Drawing, Sculpture/3D, and/or Clay/ceramics [considered for review by the Admissions Committee]
 - Satisfaction of prerequisite competencies in studio art may be demonstrated by competencies through portfolio review
 - Applicants must submit a portfolio of at least 6 artworks in the category for prerequisite review (i.e., 6 artworks in Painting for painting coursework equivalency).
 - Artworks must display adequate to proficient skills in the use of the media and principles of design.
 - A combination of coursework and portfolio equivalency may be considered for review by the Admissions Committee.
- Complete the online application (<https://www.evms.edu/hpapplication/>) including the following:
 - Official transcript(s) from all academic institutions attended
 - Official TOEFL scores (if applicable)
 - Two letters of reference
 - Personal interview with portfolio presentation
- Reviewed the technical standards (https://www.evms.edu/education/masters_programs/art_therapy_counseling_program/technical_standards/).

Transcripts must be sent to GradCAS only. GradCAS only accepts electronic transcripts from the following sites:

- Credentials Solutions (<http://www.transcriptsplus.net/order/>)
- Parchment (<https://www.parchment.com/order/>)
- National Student Clearinghouse (<http://www.studentclearinghouse.org/>)

If your school does not offer these services, download and send a transcript request form to your school's registrar, who should send the transcript to: GradCAS Transcript Processing Center
P.O. Box 9217
Watertown, MA 02471

Additional Requirements for International Applicants

Applicants with foreign degrees may be considered on a case-by-case basis. A written request must be submitted to HP Admissions (vhs-admissions@odu.edu) with all of the following included for consideration:

An official academic credential evaluation of the foreign transcript. The evaluation must include the following components:

- Analysis of credentials to determine equivalence to an accredited U.S. bachelor's degree
- Course-by-course translation, including information on course name, grade and U.S. credit equivalency
- Overall performance in comparison to the standard U.S. grading system (i.e., GPA)

Official transcripts of all coursework done in the U.S. educational system to date;

TOEFL scores for any applicant with a foreign degree and English as a second language or who entered the U.S. after age 12 from a non-English-speaking country of origin (as determined by high school graduation or personal statement). Graduation with an undergraduate degree from a U.S. educational institution will not fulfill this requirement. To ensure an ability to function at the graduate level due to the importance of communication in the English language for both learning and providing healthcare, the following are expected minimal scores:

- Internet-based test (preferred): 85
- Computer-based test: 220
- Speaking component: 25

Although multiple companies provide translation services, an English translation without the appropriate information above will not be accepted in place of an academic credential evaluation. Our preference is that you submit an evaluation completed by World Education Services to provide us with the most complete picture of your previous educational background.

All 30 credits of prerequisite coursework must be completed at an accredited U.S. or Canadian institution with a B, 3.0 (on a 4.0 scale) grade or better in order to establish a record of academic performance in this educational system. No foreign courses, degrees, work experience or other summative exams (e.g., GRE or MAT) will substitute for prerequisite coursework.

At the time of program interviews, if language issues are identified, further demonstration of English proficiency - to include TOEFL testing - may be requested as a condition of acceptance.

Early Assurance Program

To be eligible for the Early Assurance Program (EAP) with Regent University, a student must:

- Be at least in their junior year at Regent University and with only one academic year left to complete their undergraduate education when applying. Interested students should meet with the Regent University EAP Advisor (advising@regent.edu | 757.352.4385) during their freshman year or within the first semester of coursework to express interest in the EAP;
- Meet citizenship requirements of the program;
- Meet all Regent University institutional and degree requirements to continue as a student in good standing;
- Have an overall (cumulative) GPA of 3.0 or better;
- Have no academic or other code of conduct violations;
- Follow the Admission (https://www.evms.edu/education/masters_programs/art_therapy_counseling_program/admissions_requirements/) guidelines;
- Have a pre-matriculation meeting with the Program Director during the spring semester before the fall matriculation date.

The guarantee of admission through the EAP is contingent upon the student's continued eligibility in the EAP.

Curriculum Requirements

Our faculty members are talented educators and dedicated scholars with strong counselor identities who are members of the American Counseling Association (<https://www.counseling.org/>), serve on the American Counseling Association Foundation (<https://www.counseling.org/about/aca->

foundation/), and have been elected to state and national leadership positions in the Virginia Art Therapy Association (<https://www.vaarttherapy.org/>) and the American Art Therapy Association (<https://arttherapy.org/>).

Through our faculty members' teaching methods, students in our 61 credit hour, two-year program engage with the elements of counseling and art therapy practice and the research that leads to improved care. Our instruction focuses on collaborative and experiential learning, reflecting on learning and applying those lessons to internships and clinical work.

Course Sequence - 1st Year

<i>Term 1 - Fall</i>		16
CAT 604	Individual Counseling	
CAT 605	Processes & Materials I	
CAT 608	Psychopathology	
CAT 610	Theories of Development	
CAT 611	Introduction to Art Therapy	
CAT 616	Cultural Humility	
<i>Term 2 - Spring</i>		15
CAT 600	Basic Counseling Skills	
CAT 603	Group Counseling	
CAT 606	Processes & Materials II	
CAT 609	Assessment	
CAT 615	Research Methods & Program Evaluation	
<i>Term 3 - Summer</i>		4-5
CAT 607	Case Presentation Skills	
CAT 669	Practicum	
CAT 690	Capstone Project ***	

Course Sequence - 2nd Year

<i>Term 4 - Fall</i>		12-13
CAT 618	Ethics & Professionalism	
CAT 620	Addictions	
CAT 622	Trauma & Neuroscience Informed Counseling	
CAT 668	Internship *	
CAT 690	Capstone Project ***	
<i>Term 5 - Spring</i>		13-14
CAT 614	Clinical Case Conference	
CAT 617	Family Counseling	
CAT 619	Creativity Symbolism Metaphor	
CAT 621	Career Counseling	
CAT 668	Internship *	
CAT 690	Capstone Project ***	
<i>Electives and Sub-Specialization Courses</i>		1-4
CAT 612	Medical Art Therapy	
CAT 625	Community Art	
CAT 627	Countertransference/Jung	
CAT 628	Exploration of the Psyche	
CAT 631	Applied Cultural Sensitivity **	
CAT 639	Art Therapy in the Schools	
CAT 698	Independent Study Research Methods	

Total Credit Hours 61-67

- * 6 credits required
- ** May be repeated for up to 8 credits
- *** Degree requirement (1) credit Capstone; may be completed in the Fall or Spring of 2nd year; Research based Capstones require 1 elective credit to develop proposal before beginning Capstone.

Certificate Advanced Cultural Humility Certificate

This program maintains an admission process unique to the program. Prospective students are encouraged to review the admission requirements in order to best prepare themselves for a successful future at VHS.

Admission

- A **qualifying grade point average** of 3.0 or better.
- A **Bachelor's degree**
- A Master's degree (*Master's degree in Counseling, any related field or other advanced degree for Trauma and Neuroscience Informed Therapy Certificate)
- Complete the online application (<https://www.evms.edu/hpapplication/>) including the following:
 - Official transcript(s) from all academic institutions attended. **Transcripts must be sent to GradCAS only.**
 - Current CV/resume documenting professional experience, educational achievement, and any volunteer experience
 - Two letters of reference
 - Personal statement

Curriculum Requirements

CAT 616	Cultural Humility	3
CAT 631	Applied Cultural Sensitivity	4
Total Credit Hours		7

Certificate Trauma and Neuroscience Informed Art Psychotherapy Certificate

This program maintains an admission process unique to the program. Prospective students are encouraged to review the admission requirements in order to best prepare themselves for a successful future at VHS.

Admission

- A **qualifying grade point average** of 3.0 or better.
- A **Bachelor's degree**
- A Master's degree in art therapy
- Complete the online application (<https://www.evms.edu/hpapplication/>) including the following:
 - Official transcript(s) from all academic institutions attended. **Transcripts must be sent to GradCAS only.**
 - Current CV/resume documenting professional experience, educational achievement, and any volunteer experience
 - Two letters of reference
 - Personal statement

Curriculum Requirements

CAT 622	Trauma & Neuroscience Informed Counseling	3
Total Credit Hours		3

Health Sciences Programs

The program consists of 14 courses for a total of 42 credit hours, delivered in eight consecutive semesters via online, asynchronous instruction. The online format allows students anywhere to earn the degree while balancing work and other responsibilities.

Programs

Doctor of Health Sciences Program

- Health Sciences (DHSc) (p. 269)

Doctor of Health Sciences Health Sciences (DHSc)

The program consists of 14 courses for a total of 42 credit hours, delivered in eight consecutive semesters via online, asynchronous instruction. The online format allows students anywhere to earn the degree while balancing work and other responsibilities.

Admission

- A master's or doctoral degree awarded by a regionally accredited institution in the field of healthcare, education, management, or related disciplines.
- Qualifying grade point average (GPA) of 3.0 or better (on a 4-point scale), taken from the highest of the following two possible calculations:
 - Completed Undergraduate GPA (foreign degrees considered on a case by case basis)
 - Completed U.S. graduate degree GPA
- Two letters of recommendation from individuals who can reasonably assess the applicant's ability to successfully complete our doctoral program. Make sure your recommenders submit this form through the GradCAS Evaluator portal.
- Personal essay of approximately 300-500 words describing how the Doctor of Health Sciences program will enhance the applicant's academic and/or professional career goals.
- Current resume/CV documenting professional experience and educational achievements.
- Applicants must report all institutions attended and send all official transcripts to GradCAS. If you do not list or send official transcripts for all institutions attended, processing of your application may be delayed.
- Following the online instructions, applicants must contact every college or university attended and request transcripts be sent directly to GradCAS.
 - GradCAS accepts electronic transcripts from:
 - Credential Solutions (<http://www.transcriptsplus.net/order/>)
 - Parchment (<https://www.parchment.com/order/my-credentials/>)
 - National Student Clearinghouse (<https://www.studentclearinghouse.org/>)
 - Sending transcripts to GradCAS by mail
 - Download a transcript request form after you enter each institution in GradCAS
 - Send the transcript request form to the institution registrar to send transcript by mail to the address below:

GradCAS Transcript Processing Center
P.O. Box 9217
Watertown, MA 02471

Additional Requirements for International Applicants

English Proficiency Exams – Competitive applicants should achieve or surpass the following scores for the Test of English as a Foreign Language (TOEFL):

- 80 for the iBT (preferred),
- 213 for CBT or
- 550 for the PBT.

Scores must have been obtained within two years of the application date. This requirement will be waived for applicants who have completed an undergraduate or graduate degree from a regionally accredited institution in the United States.

- TOEFL School Code: B886

Transcript Evaluation – In addition to providing official transcripts, applicants must provide both a transcript evaluation and translation, including a course-by-course evaluation and an overall GPA calculation, through one of the following credentialing agencies:

- World Education Services (<https://www.wes.org/>)
- Educational Credential Evaluators (<https://www.ece.org/>)

Sending International Transcripts to GradCAS – GradCAS will ONLY accept the evaluation report from the credentialing agency. DO NOT SEND your foreign transcript to GradCAS.

All foreign transcript evaluations from a credentialing agency must be sent directly to GradCAS to the following address:

GradCAS Transcript Processing Center
P.O. Box 9217
Watertown, MA 02471

Applicant Help Center

- Having trouble accessing the application? The preferred browsers are Google Chrome or Firefox
- Applicant Help Center (https://help.liaisonedu.com/GradCAS_Applicant_Help_Center/)
- If you have questions about your application status, please contact your GradCAS Customer Service Representative at 857.304.2086 or GradCASinfo@liaisonedu.com.

Technical Standards

The essential abilities and skills that candidates and students must possess in order to complete the education and training associated with the Doctor of Health Sciences program are referred to as technical standards.

1.0 Observation Skills Technical Standard

1.01 Demonstrate sufficient attention and accuracy in observation skills (visual, auditory and tactile) in the lecture hall, in clinical and educational settings and online.

2.02 Indicators include, but are not limited to, this example:

1. Accurate visualization and discrimination of text, numbers, patterns, graphic illustrations and other imaging texts.

2.0 Communication Skills Technical Standard

2.01 Demonstrate effective communication skills with professionals of varying cultures, ethnicities and personalities.

2.02 Indicators include, but are not limited to, these examples:

1. Clear, efficient and intelligible articulation of spoken English language.
2. Legible, efficient and intelligible written English language.
3. Accurate and efficient English language reading skills.
4. Accurate and efficient, expressive and receptive communication skills.
5. Ability to accurately follow directions (oral and written).

3.0 Critical Reasoning Skills Technical Standard

3.01 Demonstrate critical reasoning skills, including but not limited to intellectual, conceptual, integrative and quantitative abilities.

3.02 Indicators include but are not limited to these examples:

1. Demonstrate ability to measure, calculate, reason, analyze, integrate and synthesize information.
2. Demonstrate ability to acquire, retain and apply new and learned information.

4.0 Motor and Sensory Function Technical Standard

4.01 Demonstrate sufficient motor and sensory function.

4.02 Indicators include, but are not limited to, these examples:

1. Execute motor movements that demonstrate safety and efficiency in the various learning settings (i.e., classroom, online).
2. Physical stamina sufficient to complete online didactic study, which will include prolonged periods of sitting.

5.0 Behavioral and Social Attributes Technical Standard

5.01 Demonstrate the behavioral and social attributes vital to participation in a graduate-level academic program.

5.02 Indicators include, but are not limited to, these examples:

1. Possess the emotional health required for full utilization of mental faculties (judgment, orientation, affect and cognition).
2. Ability to develop mature and effective professional relationships with faculty and other members of the educational and healthcare team.
3. Possess personal qualities that facilitate effective therapeutic interactions (compassion, empathy, integrity, honesty, benevolence, confidentiality).
4. Demonstrate impartial motives, attitudes, and values in roles, functions and relationships.
5. Ability to monitor and react appropriately to one's own emotional needs and responses.
6. Display appropriate flexibility and adaptability in the face of stress or uncertainty in teaching and learning environments.
7. Compliance with standards, policies and practices set forth in the program handbook.

Curriculum Requirements

The program consists of 14 courses for a total of 42 credit hours, delivered in eight consecutive semesters via online, asynchronous instruction.

Course Sequence - 1st Year

<i>Term 1 - Fall</i>		6
DHSC 700	Strategic Communication	
DHSC 702	Healthcare Delivery Systems	
<i>Term 2 - Spring</i>		6
DHSC 701	Management of Organizational Change	
DHSC 703	Conflict Analysis & Negotiation	
<i>Term 3 - Summer</i>		3
DHSC 805	Population Health & Preventive Care	

Course Sequence - 2nd Year

<i>Term 4 - Fall</i>		6
DHSC 800	Essentials of Financial Management	
DHSC 704	Intro to Healthcare Analytics	
<i>Term 5 - Spring</i>		6
DHSC 706	Research Methods	
DHSC 803	Program Evaluation	
<i>Term 6 - Summer</i>		3
DHSC 804	Leadership and Professionalism	

Course Sequence - 3rd Year

<i>Term 7 - Fall</i>		6
DHSC 900	Policy & Politics of Health	
DHSC 901	Healthcare Strategy	
<i>Term 8 - Spring</i>		6
DHSC 705	Information Technology for Healthcare Organizations	

Laboratory Animal Science Programs

This program maintains an admission process unique to the program. Prospective students are encouraged to review the admission requirements in order to best prepare themselves for a successful future.

Programs

Master of Science Programs

- Laboratory Animal Science (MS) (p. 270)

Certificate Programs

- Laboratory Animal Anesthesia and Handling Techniques Certificate (p. 273)

Master of Science Laboratory Animal Science (MS)

The online Master of Laboratory Animal Science program is designed for individuals who may be currently working within the field of laboratory animal science, those seeking career advancement or those looking for opportunities in research laboratories but who do not want to relocate to attend a traditional master's program.

Admission

The program is designed to provide basic training in laboratory animal science, animal resource management and study design to highly motivated veterinary students, veterinary technicians and research associates in educational or pharmaceutical research facilities.

The following elements are requirements to be considered for admission into the program:

For all applicants

- Bachelor's or graduate degree with a qualifying GPA of 2.5 or higher from a regionally and nationally accredited U.S. college or university or an international equivalent.
 - The program may grant exceptions on a case-by-case basis.
- Please be advised that all students in the EVMS School of Health Professions are expected to attain a term Grade Point Average of at least 3.0 to be considered in good academic standing and a cumulative GPA of at least 3.0 to graduate.
- Successful completion of two semesters each of college-level Biology and Chemistry and one semester of Mathematics.
 - No more than one prerequisite course will be accepted without a traditional letter grade (e.g. Pass, Advanced Placement, International Baccalaureate, etc.).
 - The courses without a traditional letter grade can only be accepted for intro level prerequisite courses of Biology I, Chemistry I or Mathematics I.
 - Replacement courses may be accepted for missing prerequisite courses, only with Program Director's approval. Replacement course syllabus should be submitted by applicant for consideration.
- Minimum of three months or 500 hours of hands-on experience, as described below is required prior to the start of the first semester.
 - Applicants who desire a future as a Laboratory Animal technologist are strongly encouraged to continue a full-time experience/employment during the two years of the program to be eligible for LAT and LATG certification through American Association of Laboratory Animal Science (AALAS).
- Two letters of Recommendation (https://www.evms.edu/media/evms_public/departments/distance_education/EVMS-

GradCAS_Reference-Form2.pdf), one of which must verify the minimum hands-on animal experience requirement.

- Personal statement outlining the applicant's academic and professional goals.
- Computer and computer services with various specifications.

Additional Requirements for International Applicants

In addition to meeting the admissions requirements above, international applicants are required to meet the following:

Foreign Transcripts

- Request a course by course evaluation of all foreign transcripts showing GPA calculation on a four-point scale.
- EVMS does not endorse any particular evaluating and/or credentialing service. You can use the following agencies:
 - World Education Services (<https://www.wes.org/>)
 - Educational Credential Evaluators (<https://www.ece.org/>)

Translation

If the academic institution that you attended does not issue documents in English, the credentialing agency will require that you submit a word-for-word translation of your transcripts. You can contact University Language Services (<https://www.universitylanguage.com/>) to submit your transcript for translation and instruct them to send the translated transcript to the credentialing agency you choose.

Transcript Evaluation

International students whose native language is not English may contact one of the following credentialing agencies to submit transcripts for official evaluation: WES or ECE. Instruct the credentialing agency to send the official evaluation (and translation) directly to GradCAS. You must provide both a course-by-course evaluation report along with an overall GPA calculation. Evaluations are mandatory even for transcripts from institutions that report grades in English. This provides EVMS with a U.S. credit equivalency and allows the transcripts to be reviewed accurately. WES and ECE are preferred credentialing services. If you wish to select a company other than these, please contact the program first.

TOEFL

International applicants whose native language is not English must take the TOEFL exam and receive a score as follows: Paper-based test: 550; Computer-based test: 213; iBT exam: 80. Please go to the ETS website to take the TOEFL exam, and request your TOEFL scores be sent directly to GradCAS. ETS reports scores for two years after the test date. If you have previously taken the TOEFL but the two-year period has expired, the program will accept a personal copy if available.

Note

If the candidate has received a BS or graduate degree from a college or university in a country where English is the primary language (like the U.S., Canada and UK), applicants could request for the TOEFL requirement to be waived by the Program Director or the Admission Committee.

GradCAS

GradCAS (https://catalog.evms.edu/preview_program.php?catoid=9&pooid=2036#GradCAS) will **ONLY** accept the evaluation report from the credentialing agency. **Do not send** your foreign transcript to GradCAS.

All other foreign transcript evaluations from the credentialing agency must be sent directly to GradCAS to the following address:

GradCAS Transcript Processing Center
P.O. Box 9217
Watertown, MA 02471

GRE School Code: 5729 TOEFL School Code is B886

Application submission

Applications should be submitted by March 1 for early admission consideration. Applications submitted after March 1 will be considered until all positions are filled. Students who plan to seek Financial Aid (https://www.evms.edu/education/financial_aid/) are advised to submit their applications as early as possible. Upon acceptance into the program, a \$300 nonrefundable matriculation fee (which will be credited toward the first semester's tuition) is required to secure class placement.

Important Note:

International applicants who are applying for ICLAS Scholarships (<https://iclas.org/iclas-scholarship-program-for-veterinarians/>), should contact program director immediately for an early application review and provisional acceptance which is needed for ICLAS application process.

Prerequisite Experience

Applicants are encouraged to include all animal-related experience they have. Experience and skills related to the maintenance of the health and well-being of animals in research or laboratory animal facility settings will be considered as hour-for-hour against experience requirement. Such experience includes procurement, care, use, handling, treatment, surgical or necropsy activities, cage wash operations, clinical pathology, quality assurance and IACUC functions that relate to laboratory animal science or the direct supervision or training of personnel engaged in these activities, and experience gained as part of an externship, internship, preceptorship or fellowship in a laboratory animal facility.

Experience and skills in a laboratory animal facility that do not affect the health and well-being of laboratory animals - such as office/administration, selling laboratory animals equipment - or in a non-laboratory animal facility - such as veterinary clinics, zoos, pet stores or other similar businesses - will be considered based on a 3-to-1 ratio. Therefore, nine (9) months of such experience will be considered as equal to three (3) months of hands-on experience.

Transfer credits

Transfer of credit may be allowed for coursework taken at a regionally accredited institution of higher learning, such as an accredited member of the Southern Association of Colleges and Schools (<http://www.sacscoc.org/>), for courses in which a grade of B (3.0) or higher was received and for a maximum of 9 transfer credits. Course grades obtained from another institution will not be counted in the GPA. All applicants seeking to transfer credit(s) should contact the program (lasinfo@evms.edu) for special application or credential requirements. Decisions regarding applicability of transfer courses/credits will be made by the program director in consultation with faculty as deemed appropriate.

Technical Standards

The abilities and skills that candidates and students must possess in order to complete the education and training associated with the Master's of Laboratory Animal Science Program are referred to as "Technical Standards." These abilities and skills are essential for professionals in animal care facilities and preclinical biomedical research settings which utilize animal models.

The abilities and skills that candidates and students must possess in order to complete the education and training associated with the master's of Laboratory Animal Science Program are referred to as "Technical Standards." These abilities and skills are essential for professionals in animal care facilities and preclinical biomedical research settings which utilize animal models.

1.0 Observation Skills Technical Standard

1.01 Demonstrate sufficient attention and accuracy in observation skills (visual, auditory and tactile) in the lecture hall, laboratory and/or online settings. Indicators include but are not limited to accurate visualization and discrimination of text, numbers, patterns, graphic illustrations and other imaging texts.

2.0 Communication Skills Technical Standard

2.01 Demonstrate effective communication skills with biomedical research or animal care professionals and with people of varying cultures, ethnicities and personalities.

2.02 Indicators include, but are not limited to, these examples:

1. Clear, efficient and intelligible articulation of spoken English language.
2. Legible, efficient and intelligible written English language.
3. Accurate and efficient English language reading skills.
4. Accurate and efficient, expressive and receptive communication skills.
5. Ability to accurately follow directions (oral and written).

3.0 Critical Reasoning Skills Technical Standard

3.01 Demonstrate critical reasoning skills, including but not limited to intellectual, conceptual, integrative and quantitative abilities.

3.02 Indicators include but are not limited to these examples:

1. Demonstrate ability to measure, calculate, reason, analyze, integrate and synthesize information.
2. Demonstrate ability to acquire, retain and apply new and learned information.

4.0 Motor and Sensory Function Technical Standard

4.01 Demonstrate sufficient motor and sensory function to perform typical animal care or laboratory duties.

4.02 Indicators include but are not limited to these examples:

1. Functional and sufficient sensory capacity (visual, auditory and tactile) to use laboratory equipment and perform procedures.
2. Execute motor movements that demonstrate safety and efficiency in the various learning settings (i.e., classroom, online and laboratories).
3. Physical stamina sufficient to complete the online didactic and some laboratory study, which will include prolonged periods of sitting.

5.0 Behavioral and Social Attributes Technical Standard

5.01 Demonstrate the behavioral and social attributes vital to participation in a professional program and service as a practicing animal care and laboratory professional.

5.02 Indicators include but are not limited to these examples:

1. Possess the emotional health required for full utilization of mental faculties (judgment, orientation, affect and cognition).
2. Ability to develop mature and effective professional relationships with faculty, animal user researchers, the public and other members of the animal care or use team.
3. Possess personal qualities that facilitate effective therapeutic interactions (compassion, empathy, integrity, honesty, benevolence, confidentiality).
4. Demonstrate impartial motives, attitudes and values in roles, functions and relationships.
5. Ability to monitor and react appropriately to one's own emotional needs and responses.
6. Display appropriate flexibility and adaptability in the face of stress or uncertainty associated with clinical encounters and clinical environments.
7. Compliance with standards, policies and practices set forth in the program handbook.

Curriculum Requirements

The program has a total of 31 credits in five semesters over two years.

Course Sequence (Full Time)

1st Year

Term 1 - Fall

7

MLAS 613	Comparative Anatomy & Physiology	
MLAS 614	Applied Biostatistics and Research Design	
<i>Term 2 - Spring</i>		7
MLAS 602	Laboratory Animal Husbandry, Care, & Ethics	
MLAS 603	Journal Club	
MLAS 604	Diseases of Lab Animals I	
<i>Term 3 - Summer</i>		4
MLAS 606	Anesthesia & Surgery	
MLAS 608	Internship	
2nd Year		
<i>Term 4 - Fall</i>		6
MLAS 705	Diseases of Lab Animals II	
MLAS 711	Facility Management	
<i>Term 5 - Spring</i>		7
MLAS 709	Biotech & Diagnostic Tech	
MLAS 712	Graduate Seminar	
MLAS 715	Laboratory Animal Behavior and Behavioral Management	
MLAS 716	Cryopreservation	
<i>Term 6 - Summer (CRB Track Only)</i>		0-6
RCS 701	Introduction IVF, Laboratory Tech and Skills Development	
RCS 705	IVF Technology	

Total Credit Hours **31-37**

Course Sequence (Part Time)

1st Year

Term 1 - Fall 4

MLAS 613 Comparative Anatomy & Physiology

Term 2 - Spring 3

MLAS 604 Diseases of Lab Animals I

Term 3 - Summer 2

MLAS 606 Anesthesia & Surgery

2nd Year

Term 4 - Fall 3

MLAS 614 Applied Biostatistics and Research Design

Term 5 - Spring 4

MLAS 602 Laboratory Animal Husbandry, Care, & Ethics

MLAS 603 Journal Club

Term 6 - Summer 2

MLAS 608 Internship

3rd Year

Term 7 - Fall 3

MLAS 705 Diseases of Lab Animals II

Term 8 - Spring 4

MLAS 709 Biotech & Diagnostic Tech

MLAS 716 Cryopreservation

Term 9 - Summer 3

MLAS 711 Facility Management

4th Year

Term 10 - Fall 3

MLAS 712 Graduate Seminar

MLAS 715 Laboratory Animal Behavior and Behavioral Management

Term 11 - Spring (CRB Track Only) 0-6

RCS 701 Introduction IVF, Laboratory Tech and Skills Development

Certificate

Laboratory Animal Anesthesia and Handling Techniques Certificate

This program maintains an admission process unique to the program. Prospective students are encouraged to review the admission requirements in order to best prepare themselves for a successful future at VHS.

Admissions

The following elements are requirements to be considered for admission into the program:

- A bachelor degree with GPA of minimum 2.5 is required.
- Successful completion of two semesters each of college-level Biology and Chemistry, and one semester of Mathematics.
 - No more than one (1) prerequisite course will be accepted without a traditional letter grade (e.g. Pass, Advanced Placement, International Baccalaureate, etc.).
 - The courses without a traditional letter grade can only be accepted for intro level prerequisite courses of Biology I, Chemistry I, or Mathematics I.
 - Replacement courses may be accepted for missing prerequisite courses, only with Program Directors' approval. Replacement course syllabus should be submitted by applicant for consideration.
- Minimum of three months or 500 hours of hands-on experience, as described below is required prior to the start of the first semester.
 - Applicants who desire a future as a Laboratory Animal technologist are strongly encouraged to continue a full-time experience/employment during the two years of the program to be eligible for LAT and LATG certification through American Association of Laboratory Animal Science (AALAS).
- One Letter of Recommendation, which must verify the minimum hands-on animal experience requirement.
- Personal statement - Your personal statement must detail your experience and explain your goals for taking this certificate.
- In addition to meeting the admissions requirements above, international applicants are required to meet the following: Foreign Transcript(s) Request a course-by-course evaluation of all foreign transcripts showing GPA calculation on a four-point scale. Eastern Virginia Medical School does not endorse any particular evaluating and/or credentialing service.
 - You can use the following agencies:

World Education Services (<https://www.wes.org/>) or Educational Credential Evaluators Translation (<https://www.ece.org/>)

- Translation: If the academic institution that you attended does not issue documents in English, the credentialing agency will require that you submit a word-for-word translation of your transcripts. You can contact University Language Services (<https://www.universitylanguage.com/>) to submit your transcript for translation and instruct them to send the translated transcript to the credentialing agency you choose.
- Transcript Evaluation: International students whose native language is not English may contact one of the following credentialing agencies to submit transcripts for official evaluation: WES or ECE. Instruct the credentialing agency to send the official evaluation (and translation) directly to GradCAS. You must provide both a course-by-course evaluation report along with an overall GPA calculation. Evaluations are mandatory even for transcripts from institutions that report grades in English. This provides EVMS with a U.S. credit equivalency and allows the transcripts to be reviewed accurately. WES and ECE are preferred credentialing services. If you wish to select a company other than these, please contact the program first.
- Test of English Foreign Language: International applicants whose native language is not English must take the TOEFL exam and receive a score

as follows: Paper-based test: 550; Computer-based test: 213; iBT exam: 80.

- Please go to the ETS (<https://www.ets.org/>) website to take the TOEFL exam, and request your TOEFL scores be sent directly to GradCAS. ETS reports scores for two years after the test date. If you have previously taken the TOEFL but the two-year period has expired, the program will accept a personal copy if available. Note: If the candidate has received a BS or graduate degree from a college or university in a country where English is the primary language (like the U.S., Canada and UK), applicants could request for the TOEFL requirement to be waived by the Program Director or the Admission Committee.

Prerequisite experience

Applicants are encouraged to include all animal-related experience they have. Experience and skills related to the maintenance of the health and well-being of animals in research or laboratory animal facility settings will be considered as hour-for-hour against experience requirement. Such experience includes procurement, care, use, handling, treatment, surgical or necropsy activities, cage wash operations, clinical pathology, quality assurance and IACUC functions that relate to laboratory animal science, or the direct supervision or training of personnel engaged in these activities, and experience gained as part of an externship, internship, preceptorship or fellowship in a laboratory animal facility.

Experience and skills in a laboratory animal facility that do not affect the health and well-being of laboratory animals - such as office/administration, selling laboratory animals equipment - or in a non-laboratory animal facility - such as veterinary clinics, zoos, pet stores or other similar businesses - will be considered based on a 3-to-1 ratio. Therefore, nine (9) months of such experience will be considered as equal to three (3) months of hands-on experience.

Transfer credits

Transfer of credit may be allowed for coursework taken at a regionally accredited institution of higher learning, such as an accredited member of the Southern Association of Colleges and Schools (<http://www.sacscoc.org/>), for courses in which a grade of B (3.0) or higher was received and for a maximum of 9 transfer credits. Course grades obtained from another institution will not be counted in the GPA. All applicants seeking to transfer credit(s) should contact the program (lasinfo@evms.edu) for special application or credential requirements. Decisions regarding applicability of transfer courses/credits will be made by the program director in consultation with faculty as deemed appropriate.

Curriculum Requirements

Term 1 - Summer		4
MLAS 606	Anesthesia & Surgery	
MLAS 608	Internship	
Total Credit Hours		4

Medical and Health Professions Education Programs

MHPE Program Overview

The Medical and Health Professions Education (MHPE) Program offers the Master's of Medical and Health Professions Education (MMHPE), Doctor of Philosophy (PhD), and the Doctor of Education (EdD) degrees along with graduate certificates in Scholarship, Teaching, and Simulation Program Management.

Mission

The Medical & Health Professions Education program is dedicated to building an interprofessional learning community of scholars committed to advancing ethical, community-oriented education, research, and service in the health professions. Students who enroll in MHPE programs will engage in transformational learning that connects their experiences, coursework, and

knowledge to develop a more sophisticated understanding of the world that informs their teaching, research, and professional practice.

Program Director: Peggy Gesing gesingme@odu.edu

Programs

Master of Medical and Health Professions

Education Program

- Medical and Health Professions Education (MMHPE) (p. 274)

Doctor of Education Program

- Medical and Health Professions Education (EdD) (p. 276)

Doctor of Philosophy Program

- Medical and Health Professions Education (PhD) (p. 278)

Certificate Programs

- MHPE Scholarship Certificate (p. 279)
- MHPE Simulation Program Management Certificate (p. 280)
- MHPE Teaching Certificate (p. 281)

Master of Medical and Health Professions Education Medical and Health Professions Education (MMHPE)

MHPE Program Overview

The Medical and Health Professions Education (MHPE) Program offers the Master's of Medical and Health Professions Education (MMHPE), Doctor of Philosophy (PhD), and the Doctor of Education (EdD) degrees along with graduate certificates in Scholarship, Teaching, and Simulation Program Management.

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Program Director: Peggy Gesing gesingme@odu.edu

Admission

Candidates must have completed all undergraduate degree requirements and have been issued a bachelor's degree prior to matriculating as an EVMS student. If the bachelor's degree was issued by a U.S. college or university, as a general rule, it should be from a regionally accredited institution. However, the program may grant exceptions on a case-by-case basis. Official transcripts from the awarding institution must specify the date upon which the degree was issued.

Requirements for Admission

- A bachelor's degree in Health Professions/Medical discipline or related field or a bachelor's degree in an unrelated field with the addition of three or more years of work experience in a health field
- Complete and submit online application (<https://gradcas.liaisoncas.org/apply/>) (including \$60 application fee)
- Qualifying GPA of 3.0 or better (4-point scale)
 - Actual undergraduate GPA of 3.0 or better (**degrees earned outside the U.S. are considered on a case-by-case basis**) from the degree-granting institution, OR

- Completed U.S. graduate degree GPA of 3.0 or better from the degree-granting institution, OR
- A replacement GPA of 3.0 or better computed from the most recent 40 semester credit hours of U.S. graduate and undergraduate coursework in the case where a graduate degree was started and not completed
- Two letters of recommendation from those familiar with student's ability to be successful in an online graduate program
 - Recommenders must submit this form through the GradCAS Evaluator Portal.
- Letter of intent/personal essay outlining the applicant's academic and professional goals related to medical and health professions education
- Resume/Curriculum Vitae
- Official transcripts from each college/university attended, including an official transcript from any degree-granting institution that specifies the date upon which the degree was issued. Transcripts must be sent electronically or by mail directly to GradCAS. Any **official transcript** received by the program or the School of Health Professions Admissions and Enrollment department will not be accepted. If you do not list or send official transcripts for all institutions attended, processing of your application will be delayed.
- Sending Transcripts Electronically (Click here (https://help.liaisonedu.com/GradCAS_Applicant_Help_Center/) for additional information)
- GradCAS only accepts electronic transcripts from:
 - Credentials Solutions (<http://www.transcriptsplus.net/order/>)
 - Parchment (<http://www.parchment.com/order/>)
 - National Student Clearinghouse (<http://www.studentclearinghouse.org/>)
 - (<http://www.studentclearinghouse.org/>) To send transcripts to GradCAS by mail:
- Provide the registrar with the following items:
 - Your GradCAS ID#.
 - All information needed by the registrar to properly identify you in the school's database including any name changes.
 - Any transcript fees required by the registrar.
 - Any school-specific forms required by the registrar.
 - If you cannot use this form, make sure the registrar prints "GradCAS" and your full GradCAS ID# on the transcript before mailing it.
 - GradCAS Transcript Request Form. Ask the registrar to attach it to your official transcripts. This form is not required but strongly recommended as it helps ensure your official transcripts are properly matched to your application.
- Institutions must send transcripts directly to GradCAS to the following address:

**GradCAS Transcript Processing Center
P.O. Box 9217
Watertown, MA 02471**

Additional Requirements for International Applicants

Requirements for admission include:

- English proficiency exams (may be waived)
 - TOEFL Minimum Scores: Paper 550, Computer 213, iBT 80
 - IELTS Minimum Scores: Total 6.5, Subscores 6
- A transcript evaluation and translation
 - Please refer to Educational Credential Evaluators or World Education Services.
 - Applicants must supply a course-by-course evaluation and an overall GPA calculation
- GradCAS will **ONLY** accept the evaluation report from the credentialing agency. Do not send your foreign transcript to GradCAS.
 - All other foreign transcript evaluations from the credentialing agency must be sent directly to GradCAS to the following address:

GRE School Code is: 5729 TOEFL School Code is B886

Transfer Credits

Requests to transfer graduate credits from another accredited U.S. or Canadian institution are considered on an individual basis after students are admitted to the MMHPE program. International credits are reviewed on a case-by-case basis.

A student may transfer up to nine graduate credit hours, if all of the following conditions hold:

- Graduate course credits were completed at an accredited U.S. or Canadian institution and are reflected on an official transcript
- Transfers can feasibly occur within the three-year matriculation limit of this MMHPE program
- Grade earned is a B or better

All requests must be made by the end of the first term in the program. Students who wish to request that graduate credits be transferred into the MHPE program must submit a copy of the syllabus for the course to the program director who will consult with teaching faculty as appropriate and render a decision. Approved transfer grades are included on student's transcript; however, transfer grades are not included in semester or cumulative GPA calculations. Approved transfer grades are included on student's transcript; however, transfer grades are not included in semester or cumulative GPA calculations.

Applicant Help Center

- Having trouble accessing the GradCAS application? The preferred browsers are Google Chrome or Firefox
- The Applicant Help Center can be accessed here: Applicant Help Center (https://help.liaisonedu.com/GradCAS_Applicant_Help_Center/)
- If you have questions about your application status, please contact your GradCAS Customer Service Representative contact information at tel:8573042086 (https://catalog.evms.edu/preview_program.php?catoid=11&poid=2462#tel:8573042086) or GradCASinfo@liaisonedu.com (GradCASinfo@liaisonedu.com%)

Admission will occur on a rolling basis until the cohort is filled. Graduates of foreign programs will be considered on a case-by-case basis.

Technical Standards

The essential abilities and skills that candidates and students must possess in order to complete the education and training associated with this program are referred to as Technical Standards.

1.0 Observation Skills Technical Standard

1.01 Demonstrate sufficient attention and accuracy in observation skills (visual, auditory and tactile) in the lecture hall, in clinical and educational settings and online. Indicators include but are not limited to accurate visualization and discrimination of text, numbers, patterns, graphic illustrations and other imaging texts.

2.0 Communication Skills Technical Standard

2.01 Demonstrate effective communication skills with professionals of varying cultures, ethnicities and personalities.

2.02 Indicators include, but are not limited to, these examples:

1. Clear, efficient and intelligible articulation of spoken English language.
2. Legible, efficient and intelligible written English language.
3. Accurate and efficient English language reading skills.
4. Accurate and efficient, expressive and receptive communication skills.
5. Ability to accurately follow directions (oral and written).

3.0 Critical Reasoning Skills Technical Standard

3.01 Demonstrate critical reasoning skills, including but not limited to intellectual, conceptual, integrative and quantitative abilities.

3.02 Indicators include but are not limited to these examples:

1. Demonstrate ability to measure, calculate, reason, analyze, integrate and synthesize information.
2. Demonstrate ability to acquire, retain and apply new and learned information.

4.0 Motor and Sensory Function Technical Standard

4.01 Demonstrate sufficient motor and sensory function.

4.02 Indicators include but are not limited to these examples:

1. Execute motor movements that demonstrate safety and efficiency in the various learning settings (i.e., classroom, online).
2. Physical stamina sufficient to complete online didactic study, which will include prolonged periods of sitting.

5.0 Behavioral and Social Attributes Technical Standard

5.01 Demonstrate the behavioral and social attributes vital to participation in a graduate-level academic program.

5.02 Indicators include but are not limited to these examples:

1. Possess the emotional health required for full utilization of mental faculties (judgment, orientation, affect and cognition).
2. Ability to develop mature and effective professional relationships with faculty and other members of the educational and healthcare team.
3. Possess personal qualities that facilitate effective therapeutic interactions (compassion, empathy, integrity, honesty, benevolence, confidentiality).
4. Demonstrate impartial motives, attitudes and values in roles, functions and relationships.
5. Ability to monitor and react appropriately to one's own emotional needs and responses.
6. Display appropriate flexibility and adaptability in the face of stress or uncertainty in teaching and learning environments.
7. Compliance with standards, policies and practices set forth in the program handbook.

Curriculum Requirements

The curriculum for the MMHPE program has been constructed with the input from the course and program directors. The curriculum is designed to prepare educational leaders in various medical and health professions organizational settings. The program provides advanced education in the areas of teaching and learning, scholarship, and health professions education with an emphasis on real-world, practical applications.

The 31 credit hour distance learning program is designed to be completed in four 16 week terms and one 12 week term. Students will take two courses at a time over the 16 week term with the exception of the final spring term when the one credit Capstone is also taken.

Students complete coursework and interact with instructors and classmates through a distance education format utilizing the Canvas Learning Management System. Upon successful completion of the program, students are awarded the Master of Medical and Health Professions Education (MMHPE) degree and may use the initials MMHPE after their name.

Educational Format

Courses are delivered entirely online asynchronously with the occasional synchronous session. Students complete the practicum virtually, building upon didactic knowledge to design a completely online course.

MHPE 608	Contexts of Teaching and Learning	3
MHPE 609	Designing Educational Experiences	3

MHPE 613	Community Partnerships in Health Professions Education	3
MHPE 614	Organization and Management	3
MHPE 615	Current Issues in Higher Education	3
MHPE 690	Capstone	1
MHPE 669	Practicum	3
MHPE 702	Program Evaluation	3
MHPE 704	Simulation in Healthcare	3
MHPE 715	Educational Scholarship Method	3
MHPE 720	Exploring Paradigms in Higher Education	3
Total Credit Hours		31

Doctor of Education Medical and Health Professions Education (EdD)

MHPE Program Overview

The Medical and Health Professions Education (MHPE) Program offers the Master's of Medical and Health Professions Education (MMHPE), Doctor of Philosophy (PhD), and the Doctor of Education (EdD) degrees along with graduate certificates in Scholarship, Teaching, and Simulation Program Management.

Mission

The Medical & Health Professions Education program is dedicated to building an interprofessional learning community of scholars committed to advancing ethical, community-oriented education, research, and service in the health professions. Students who enroll in MHPE programs will engage in transformational learning that connects their experiences, coursework, and knowledge to develop a more sophisticated understanding of the world that informs their teaching, research, and professional practice.

Program Director: Peggy Gesing gesingme@odu.edu

Admission

The Medical and Health Professions Education (MHPE) Doctoral Program evaluates applicants using a variety of items submitted by the applicant. All components of an application are reviewed prior to making an admission decision.

- Application opens **October 1**. Application deadline is **March 15**. Applicants will be accepted after March 15 on a rolling basis.
- A master's degree from a regionally accredited institution with a cumulative grade point average of 3.00 or better prior to matriculation
 - For those applying to the **Contemporary Human Anatomy Education (CHAE) concentration**, the master's degree must be comprised of a minimum of 30 graduate-level credits and should include Clinical Gross Anatomy, Embryology and Histology at the master's level.
- One year of teaching experience in medical and health professions/higher education preferred.
- One-page personal essay outlining how the MHPE Doctoral degree will help the applicant reach their professional goals. The Personal Essay should include a brief discussion of the applicant's educational research interest related to health professions education.
- An original two-page single-spaced academic writing sample providing an introduction and brief review of the literature related to the applicant's research interest related to health professions education. The writing sample should follow the APA 7 style guide and include five - eight scholarly references.
- Curriculum vitae and/or resume
- Recommendations from two academic references (electronic form provided in GradCAS).

Official transcripts from each college/university attended, including an official transcript from any degree-granting institution that specifies the date

upon which the degree was issued. Transcripts must be sent electronically or by mail directly to GradCAS. Any **official transcript** received by the program or the School of Health Professions Admissions and Enrollment department will not be accepted. If you do not list or send official transcripts for all institutions attended, processing of your application will be delayed.

- Click here (https://help.liaisonedu.com/GradCAS_Applicant_Help_Center/) to send transcripts electronically
- GradCAS only accepts electronic transcripts from:
 - National Student Clearinghouse (<http://www.studentclearinghouse.org/>)
 - Parchment (<http://www.parchment.com/order/>)
 - Credentials Solutions (<http://www.transcriptsplus.net/order/>)
- To send transcripts to GradCAS by mail:
- Provide the registrar with the following items:
 - GradCAS Transcript Request Form. Ask the registrar to attach it to your official transcripts. This form is not required but strongly recommended as it helps ensure your official transcripts are properly matched to your application.
 - If you cannot use this form, make sure the registrar prints "GradCAS" and your full GradCAS ID# on the transcript before mailing it.
 - Any school-specific forms required by the registrar.
 - Any transcript fees required by the registrar.
 - All information needed by the registrar to properly identify you in the school's database including any name changes.
 - Your GradCAS ID#.
- Institutions must send transcripts directly to GradCAS to the following address:

GradCAS Transcript Processing Center
P.O. Box 9217
Watertown, MA 02471

Submit an application (<https://gradcas.liaisoncas.org/apply/>) to the Doctoral Program in Medical & Health Professions Education program.

Transfer Credits

Requests to transfer graduate credits from another accredited U.S. or Canadian institution are considered on an individual basis after students are admitted to the MHPE Doctoral program. International credits are reviewed on a case-by-case basis.

A student may transfer up to 12 graduate credit hours, if all of the following conditions hold:

- Graduate course credits were completed at an accredited U.S. or Canadian institution and are reflected on an official transcript
- Transfers can feasibly occur within the five-year matriculation limit of this MHPE program
- Grade earned is a B or better

All requests must be made no later than one full term prior to graduation from the program.

All requests must be made by the end of the first term in the program. Students who wish to request that graduate credits be transferred into the MHPE program must submit a copy of the syllabus for the course to the program director who will consult with teaching faculty as appropriate and render a decision. Approved transfer grades are included on student's transcript; however, transfer grades are not included in semester or cumulative GPA calculations.

Additional Requirements for International Applicants

Requirements for admission include:

- English proficiency exams (may be waived)
 - TOEFL Minimum Scores: Paper 550, Computer 213, iBT 80
 - IELTS Minimum Scores: Total 6.5, Subscores 6

- A transcript evaluation and translation
 - Please refer to Educational Credential Evaluators or World Education Services.
 - Applicants must supply a course-by-course evaluation and an overall GPA calculation
- GradCAS will ONLY accept the evaluation report from the credentialing agency. Do not send your foreign transcript to GradCAS.
 - All other foreign transcript evaluations from the credentialing agency must be sent directly to GradCAS to the following address:

GradCAS Transcript Processing Center
P.O. Box 9217
Watertown, MA 02471

TOEFL School Code is B886

Technical Standards

The essential abilities and skills that candidates and students must possess in order to complete the education and training associated with this program are referred to as Technical Standards.

1.0 Observation Skills Technical Standard

1.01 Demonstrate sufficient attention and accuracy in observation skills (visual, auditory and tactile) in the lecture hall, in clinical and educational settings and online. Indicators include but are not limited to accurate visualization and discrimination of text, numbers, patterns, graphic illustrations and other imaging texts.

2.0 Communication Skills Technical Standard

2.01 Demonstrate effective communication skills with professionals of varying cultures, ethnicities and personalities.

2.02 Indicators include, but are not limited to, these examples:

1. Clear, efficient and intelligible articulation of spoken English language.
2. Legible, efficient and intelligible written English language.
3. Accurate and efficient English language reading skills.
4. Accurate and efficient, expressive and receptive communication skills.
5. Ability to accurately follow directions (oral and written).

3.0 Critical Reasoning Skills Technical Standard

3.01 Demonstrate critical reasoning skills, including but not limited to intellectual, conceptual, integrative and quantitative abilities.

3.02 Indicators include but are not limited to these examples:

1. Demonstrate ability to measure, calculate, reason, analyze, integrate and synthesize information.
2. Demonstrate ability to acquire, retain and apply new and learned information.

4.0 Motor and Sensory Function Technical Standard

4.01 Demonstrate sufficient motor and sensory function.

4.02 Indicators include but are not limited to these examples:

1. Execute motor movements that demonstrate safety and efficiency in the various learning settings (i.e., classroom, online).
2. Physical stamina sufficient to complete online didactic study, which will include prolonged periods of sitting.

5.0 Behavioral and Social Attributes Technical Standard

5.01 Demonstrate the behavioral and social attributes vital to participation in a graduate-level academic program.

5.02 Indicators include but are not limited to these examples:

1. Possess the emotional health required for full utilization of mental faculties (judgment, orientation, affect and cognition).

2. Ability to develop mature and effective professional relationships with faculty and other members of the educational and healthcare team.
3. Possess personal qualities that facilitate effective therapeutic interactions (compassion, empathy, integrity, honesty, benevolence, confidentiality).
4. Demonstrate impartial motives, attitudes and values in roles, functions and relationships.
5. Ability to monitor and react appropriately to one's own emotional needs and responses.
6. Display appropriate flexibility and adaptability in the face of stress or uncertainty in teaching and learning environments.
7. Compliance with standards, policies and practices set forth in the program handbook.

Curriculum Requirements

The 48-credit hour distance learning program is designed to be completed in 3.5 - 4.5 years: Seven (12-16 week) terms of coursework with 6 - 7 credit hours per term and one year for research and dissertation completion.

The curriculum for the MHPE Doctoral Program has been constructed with the input from the course and program directors. The curriculum is designed to prepare educational leaders in various medical and health professions' organizational settings. The EdD is a professional doctoral degree designed for educators and leaders seeking to apply research to practice in educational, organizational, or community settings.

1. Teaching and Learning Core Courses

MHPE 720	Exploring Paradigms in Higher Education	3
MHPE 808	Contexts of Teaching and Learning	3
MHPE 809	Designing Educational Experiences	3
MHPE 869	Practicum	3

2. Research Core Courses

MHPE 702	Program Evaluation	3
MHPE 705	Applied Statistics	3
MHPE 715	Educational Scholarship Method	3
MHPE 806	Mixed Method Research Design	3
MHPE 807	Advanced Research Methods	3

3. Dissertation Courses

MHPE 804	Educational Scholarship Seminar *	3
MHPE 830	Candidacy Seminar	3
MHPE 900	Research **	6

4. Concentration Courses (Please select one concentration.)

Contemporary Human Anatomy Education Concentration Courses

CHAE 813	Stewards of Anatomy Education	
CHAE 814	Anatomy Education Foundations	
CHAE 815	Teaching & Tech for Anatomy	

Higher Education Concentration Courses

MHPE 813	Community Partnerships in Health Professions Education	
MHPE 814	Organization and Management	
MHPE 815	Current Issues in Higher Education	

Simulation Education Concentration Courses

MHPE 704	Simulation in Healthcare	
MHPE 725	Business of Simulation	
MHPE 814	Organization and Management	

Total Credit Hours **48**

* You must repeat MHPE 804 three times for a total of 3 credits.

** After completing the 6 credits of MHPE 900, you may register for MHPE 905 for additional dissertation credits if needed.

Doctor of Philosophy Medical and Health Professions Education (PhD)

MHPE Program Overview

The Medical and Health Professions Education (MHPE) Program offers the Master's of Medical and Health Professions Education (MMHPE), Doctor of Philosophy (PhD), and the Doctor of Education (EdD) degrees along with graduate certificates in Scholarship, Teaching, and Simulation Program Management.

Mission

The Medical & Health Professions Education program is dedicated to building an interprofessional learning community of scholars committed to advancing ethical, community-oriented education, research, and service in the health professions. Students who enroll in MHPE programs will engage in transformational learning that connects their experiences, coursework, and knowledge to develop a more sophisticated understanding of the world that informs their teaching, research, and professional practice.

Program Director: Peggy Gesing gesingme@odu.edu

Admission

The Medical and Health Professions Education (MHPE) Doctoral Program evaluates applicants using a variety of items submitted by the applicant. All components of an application are reviewed prior to making an admission decision.

- Application opens **October 1**. Application deadline is **March 15**. Applicants will be accepted after March 15 on a rolling basis.
- A master's degree from a regionally accredited institution with a cumulative grade point average of 3.00 or better prior to matriculation
 - For those applying to the **Contemporary Human Anatomy Education (CHAE) concentration**, the master's degree must be comprised of a minimum of 30 graduate-level credits and should include Clinical Gross Anatomy, Embryology and Histology at the master's level.
- One year of teaching experience in medical and health professions/higher education preferred.
- One-page personal essay outlining how the MHPE Doctoral degree will help the applicant reach their professional goals. The Personal Essay should include a brief discussion of the applicant's educational research interest related to health professions education.
- An original two-page single-spaced academic writing sample providing an introduction and brief review of the literature related to the applicant's research interest related to health professions education. The writing sample should follow the APA 7 style guide and include five - eight scholarly references.
- Curriculum vitae and/or resume
- Recommendations from two academic references (electronic form provided in GradCAS).

Official transcripts from each college/university attended, including an official transcript from any degree-granting institution that specifies the date upon which the degree was issued. Transcripts must be sent electronically or by mail directly to GradCAS. Any **official transcript** received by the program or the School of Health Professions Admissions and Enrollment department will not be accepted. If you do not list or send official transcripts for all institutions attended, processing of your application will be delayed.

- Click here (https://help.liaisonedu.com/GradCAS_Applicant_Help_Center/) to send transcripts electronically
- GradCAS only accepts electronic transcripts from:
 - National Student Clearinghouse (<http://www.studentclearinghouse.org/>)
 - Parchment (<http://www.parchment.com/order/>)
 - Credentials Solutions (<http://www.transcriptsplus.net/order/>)

- To send transcripts to GradCAS by mail:
- Provide the registrar with the following items:
 - GradCAS Transcript Request Form. Ask the registrar to attach it to your official transcripts. This form is not required but strongly recommended as it helps ensure your official transcripts are properly matched to your application.
 - If you cannot use this form, make sure the registrar prints "GradCAS" and your full GradCAS ID# on the transcript before mailing it.
 - Any school-specific forms required by the registrar.
 - Any transcript fees required by the registrar.
 - All information needed by the registrar to properly identify you in the school's database including any name changes.
 - Your GradCAS ID#.
- Institutions must send transcripts directly to GradCAS to the following address:

GradCAS Transcript Processing Center
P.O. Box 9217
Watertown, MA 02471

Submit an application (<https://gradcas.liaisoncas.org/apply/>) to the Doctoral Program in Medical & Health Professions Education program.

Transfer Credits

Requests to transfer graduate credits from another accredited U.S. or Canadian institution are considered on an individual basis after students are admitted to the MHPE Doctoral program. International credits are reviewed on a case-by-case basis.

A student may transfer up to 12 graduate credit hours, if all of the following conditions hold:

- Graduate course credits were completed at an accredited U.S. or Canadian institution and are reflected on an official transcript
- Transfers can feasibly occur within the five-year matriculation limit of this MHPE program
- Grade earned is a B or better

All requests must be made no later than one full term prior to graduation from the program.

All requests must be made by the end of the first term in the program. Students who wish to request that graduate credits be transferred into the MHPE program must submit a copy of the syllabus for the course to the program director who will consult with teaching faculty as appropriate and render a decision. Approved transfer grades are included on student's transcript; however, transfer grades are not included in semester or cumulative GPA calculations.

Additional Requirements for International Applicants

Requirements for admission include:

- English proficiency exams (may be waived)
 - TOEFL Minimum Scores: Paper 550, Computer 213, iBT 80
 - IELTS Minimum Scores: Total 6.5, Subscores 6
- A transcript evaluation and translation
 - Please refer to Educational Credential Evaluators or World Education Services.
 - Applicants must supply a course-by-course evaluation and an overall GPA calculation
- GradCAS will ONLY accept the evaluation report from the credentialing agency. Do not send your foreign transcript to GradCAS.
 - All other foreign transcript evaluations from the credentialing agency must be sent directly to GradCAS to the following address:

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P.O. Box 9217
Watertown, MA 02471

Technical Standards

The essential abilities and skills that candidates and students must possess in order to complete the education and training associated with this program are referred to as Technical Standards.

1.0 Observation Skills Technical Standard

1.01 Demonstrate sufficient attention and accuracy in observation skills (visual, auditory and tactile) in the lecture hall, in clinical and educational settings and online. Indicators include but are not limited to accurate visualization and discrimination of text, numbers, patterns, graphic illustrations and other imaging texts.

2.0 Communication Skills Technical Standard

2.01 Demonstrate effective communication skills with professionals of varying cultures, ethnicities and personalities.

2.02 Indicators include, but are not limited to, these examples:

1. Clear, efficient and intelligible articulation of spoken English language.
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5. Ability to accurately follow directions (oral and written).

3.0 Critical Reasoning Skills Technical Standard

3.01 Demonstrate critical reasoning skills, including but not limited to intellectual, conceptual, integrative and quantitative abilities.

3.02 Indicators include but are not limited to these examples:

1. Demonstrate ability to measure, calculate, reason, analyze, integrate and synthesize information.
2. Demonstrate ability to acquire, retain and apply new and learned information.

4.0 Motor and Sensory Function Technical Standard

4.01 Demonstrate sufficient motor and sensory function.

4.02 Indicators include but are not limited to these examples:

1. Execute motor movements that demonstrate safety and efficiency in the various learning settings (i.e., classroom, online).
2. Physical stamina sufficient to complete online didactic study, which will include prolonged periods of sitting.

5.0 Behavioral and Social Attributes Technical Standard

5.01 Demonstrate the behavioral and social attributes vital to participation in a graduate-level academic program.

5.02 Indicators include but are not limited to these examples:

1. Possess the emotional health required for full utilization of mental faculties (judgment, orientation, affect and cognition).
2. Ability to develop mature and effective professional relationships with faculty and other members of the educational and healthcare team.
3. Possess personal qualities that facilitate effective therapeutic interactions (compassion, empathy, integrity, honesty, benevolence, confidentiality).
4. Demonstrate impartial motives, attitudes and values in roles, functions and relationships.
5. Ability to monitor and react appropriately to one's own emotional needs and responses.
6. Display appropriate flexibility and adaptability in the face of stress or uncertainty in teaching and learning environments.
7. Compliance with standards, policies and practices set forth in the program handbook.

Curriculum Requirements

The 48-credit hour distance learning program is designed to be completed in 3.5 - 4.5 years: Seven (12-16 week) terms of coursework with 6 - 7 credit hours per term and one year for research and dissertation completion.

The curriculum for the MHPE Doctoral Program has been constructed with the input from the course and program directors. The curriculum is designed to prepare educational leaders in various medical and health professions' organizational settings. The PhD is a research-based terminal degree that allows individuals to work in academia or research at the university level.

1. Teaching and Learning Core Courses

MHPE 720	Exploring Paradigms in Higher Education	3
MHPE 808	Contexts of Teaching and Learning	3
MHPE 809	Designing Educational Experiences	3
MHPE 869	Practicum	3

2. Research Core Courses

MHPE 702	Program Evaluation	3
MHPE 705	Applied Statistics	3
MHPE 715	Educational Scholarship Method	3
MHPE 806	Mixed Method Research Design	3
MHPE 807	Advanced Research Methods	3

3. Dissertation Courses

MHPE 804	Educational Scholarship Seminar *	3
MHPE 830	Candidacy Seminar	3
MHPE 900	Research **	6

4. Concentration Courses (Please select one concentration.)

Contemporary Human Anatomy Education Concentration Courses

CHAE 813	Stewards of Anatomy Education	
CHAE 814	Anatomy Education Foundations	
CHAE 815	Teaching & Tech for Anatomy	

Higher Education Concentration Courses

MHPE 813	Community Partnerships in Health Professions Education	
MHPE 814	Organization and Management	
MHPE 815	Current Issues in Higher Education	

Simulation Education Concentration Courses

MHPE 704	Simulation in Healthcare	
MHPE 725	Business of Simulation	
MHPE 814	Organization and Management	

Total Credit Hours	48

* You must repeat MHPE 804 three times for a total of 3 credits.

** After completing the 6 credits of MHPE 900, you may register for MHPE 905 for additional dissertation credits if needed.

Certificate

MHPE Scholarship Certificate

MHPE Program Overview

The Medical and Health Professions Education (MHPE) Program offers the Master's of Medical and Health Professions Education (MMHPE), Doctor of Philosophy (PhD), and the Doctor of Education (EdD) degrees along with graduate certificates in Scholarship, Teaching, and Simulation Program Management.

Mission

The Medical & Health Professions Education program is dedicated to building an interprofessional learning community of scholars committed to advancing ethical, community-oriented education, research, and service in

the health professions. Students who enroll in MHPE programs will engage in transformational learning that connects their experiences, coursework, and knowledge to develop a more sophisticated understanding of the world that informs their teaching, research, and professional practice.

Program Director: Peggy Gesing gesingme@odu.edu

Admission

Requirements for Admission:

- Completion of all undergraduate degree requirements from an accredited college or university, with a minimum GPA of 2.5 on a 4.0 scale, prior to matriculating in the MHPE program.
- A personal statement detailing reasons for interest in the MHPE Graduate Certificate program.
- Official transcripts from each college/university attended, including an official transcript from any degree-granting institution that specifies the date upon which the degree was issued. Transcripts must be sent electronically or by mail directly to GradCAS. Any **official transcript** received by the program or the School of Health Professions Admissions and Enrollment department will not be accepted. If you do not list or send official transcripts for all institutions attended, processing of your application will be delayed.
- Sending Transcripts Electronically (Click here (https://help.liaisonedu.com/GradCAS_Applicant_Help_Center/) for additional information)
 - GradCAS only accepts electronic transcripts from:
 - Credentials Solutions (<http://www.transcriptsplus.net/order/>)
 - Parchment (<http://www.parchment.com/order/>)
 - National Student Clearinghouse (<http://www.studentclearinghouse.org/>)

GradCAS Transcript Processing Center
P.O. Box 9217
Watertown, MA 02471

- To send transcripts to GradCAS by mail:
 - Provide the registrar with the following items:
 - GradCAS Transcript Request Form. Ask the registrar to attach it to your official transcripts. This form is not required but strongly recommended as it helps ensure your official transcripts are properly matched to your application.
 - If you cannot use this form, make sure the registrar prints “GradCAS” and your full GradCAS ID# on the transcript before mailing it.
 - Any school-specific forms required by the registrar.
 - Any transcript fees required by the registrar.
 - All information needed by the registrar to properly identify you in the school’s database including any name changes.
 - Your GradCAS ID#.
- Institutions must send transcripts directly to GradCAS to the following address:

Applicant Help Center

- Having trouble accessing the GradCAS application? The preferred browsers are Google Chrome or Firefox
- The Applicant Help Center can be accessed here: Applicant Help Center (https://help.liaisonedu.com/GradCAS_Applicant_Help_Center/)
- If you have questions about your application status, please contact your GradCAS Customer Service Representative contact information at (857) 304-2086 or GradCASinfo@liaisonedu.com

Admission will occur on a rolling basis until the cohort is filled.

Curriculum Requirements

Course Sequence

MHPE 606	Mixed Methods Research Design	3
MHPE 705	Applied Statistics	3

MHPE 715	Educational Scholarship Method	3
<i>Optional Course</i>		
MHPE 702	Program Evaluation *	
Total Credit Hours		9

* Optional Course - not required for certificate completion.
The course can be taken Fall 1 or Fall 2.

Certificate MHPE Simulation Program Management Certificate

MHPE Program Overview

The Medical and Health Professions Education (MHPE) Program offers the Master’s of Medical and Health Professions Education (MMHPE), Doctor of Philosophy (PhD), and the Doctor of Education (EdD) degrees along with graduate certificates in Scholarship, Teaching, and Simulation Program Management.

Mission

The Medical & Health Professions Education program is dedicated to building an interprofessional learning community of scholars committed to advancing ethical, community-oriented education, research, and service in the health professions. Students who enroll in MHPE programs will engage in transformational learning that connects their experiences, coursework, and knowledge to develop a more sophisticated understanding of the world that informs their teaching, research, and professional practice.

Program Director: Peggy Gesing gesingme@odu.edu

Admission

Requirements for Admission:

- Completion of all undergraduate degree requirements from an accredited college or university, with a minimum GPA of 2.5 on a 4.0 scale, prior to matriculating in the MHPE program.
- A personal statement detailing reasons for interest in the MHPE Graduate Certificate program.
- Official transcripts from each college/university attended, including an official transcript from any degree-granting institution that specifies the date upon which the degree was issued. Transcripts must be sent electronically or by mail directly to GradCAS. Any **official transcript** received by the program or the School of Health Professions Admissions and Enrollment department will not be accepted. If you do not list or send official transcripts for all institutions attended, processing of your application will be delayed.
- Sending Transcripts Electronically (Click here (https://help.liaisonedu.com/GradCAS_Applicant_Help_Center/) for additional information)
 - GradCAS only accepts electronic transcripts from:
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 - Parchment (<http://www.parchment.com/order/>)
 - National Student Clearinghouse (<http://www.studentclearinghouse.org/>)

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P.O. Box 9217
Watertown, MA 02471

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- If you have questions about your application status, please contact your GradCAS Customer Service Representative contact information at (857) 304-2086 or GradCASinfo@liaisonedu.com

Admission will occur on a rolling basis until the cohort is filled.

Curriculum Requirements

MHPE 725	Business of Simulation	3
Total Credit Hours		3

Certificate

MHPE Teaching Certificate

MHPE Program Overview

The Medical and Health Professions Education (MHPE) Program offers the Master’s of Medical and Health Professions Education (MMHPE), Doctor of Philosophy (PhD), and the Doctor of Education (EdD) degrees along with graduate certificates in Scholarship, Teaching, and Simulation Program Management.

Mission

The Medical & Health Professions Education program is dedicated to building an interprofessional learning community of scholars committed to advancing ethical, community-oriented education, research, and service in the health professions. Students who enroll in MHPE programs will engage in transformational learning that connects their experiences, coursework, and knowledge to develop a more sophisticated understanding of the world that informs their teaching, research, and professional practice.

Program Director: Peggy Gesing gesingme@odu.edu

Admission

Requirements for Admission:

- Completion of all undergraduate degree requirements from an accredited college or university, with a minimum GPA of 2.5 on a 4.0 scale, prior to matriculating in the MHPE program (foreign degrees considered on a case-by-case basis).
- A personal statement detailing reasons for interest in the MHPE Graduate Certificate program.
- Official transcripts from each college/university attended, including an official transcript from any degree-granting institution that specifies the date upon which the degree was issued. Transcripts must be sent electronically or by mail directly to GradCAS. Any **official transcript** received by the program or the School of Health Professions Admissions and Enrollment department will not be accepted. If you do not list or send official transcripts for all institutions attended, processing of your application will be delayed.
- Sending Transcripts Electronically (Click here (https://help.liaisonedu.com/GradCAS_Applicant_Help_Center/) to learn more about additional transcript requirements)

- GradCAS only accepts electronic transcripts from:
 - Credentials Solutions (<http://www.transcriptsplus.net/order/>)
 - Parchment (<http://www.parchment.com/order/>)
 - National Student Clearinghouse (<http://www.studentclearinghouse.org/>)
- To send transcripts to GradCAS by mail:
 - Provide the registrar with the following items:
 - GradCAS Transcript Request Form. Ask the registrar to attach it to your official transcripts. This form is not required but strongly recommended as it helps ensure your official transcripts are properly matched to your application.
 - If you cannot use this form, make sure the registrar prints “GradCAS” and your full GradCAS ID# on the transcript before mailing it.
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Applicant Help Center

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- If you have questions about your application status, please contact your GradCAS Customer Service Representative contact information at (857) 304-2086 or GradCASinfo@liaisonedu.com

Admission will occur on a rolling basis until the cohort is filled.

Curriculum Requirements

MHPE 608	Contexts of Teaching and Learning	3
MHPE 609	Designing Educational Experiences	3
MHPE 669	Practicum	3
Total Credit Hours		9

Medical Science Programs

This program maintains an admission process unique to the program. Prospective students are encouraged to review the admission requirements in order to best prepare themselves for a successful future.

Programs

Doctor of Medical Science Program

- Medical Science (DMSc) (p. 281)

Certificate Programs

- Clinical Leadership and Administration Certificate (p. 283)
- Educational Leadership and Administration Certificate (p. 283)

Doctor of Medical Science Medical Science (DMSc)

The Doctor of Medical Science (D.M.Sc.) is designed for PAs seeking to advance their careers through leadership, scholarly inquiry, and evidence-based practice. This fully online, asynchronous program provides an interdisciplinary approach to healthcare, equipping students with the

knowledge and skills necessary to drive change in clinical practice, education, and healthcare systems.

With a strong emphasis on leadership and quality improvement, the D.M.Sc. program prepares graduates to analyze complex healthcare challenges, implement innovative solutions, and contribute to scholarly research. The curriculum includes advanced topics in health policy, grant writing, and quality improvement initiatives, ensuring that graduates are well-prepared to enhance patient care and improve healthcare delivery.

The program is structured to accommodate working professionals, allowing students to balance their education with professional practice.

As one of the most cost-effective doctoral programs for PAs, we offer a high-quality education at a competitive price. Graduates of the program emerge as leaders, educators, and advocates, capable of influencing healthcare at institutional, community, and national levels. Whether aiming for academic roles, executive leadership positions, or clinical excellence, our graduates are equipped to make a meaningful impact in modern healthcare.

Admission

- A master's degree awarded by a regionally accredited institution in healthcare, education, management, or related disciplines.
- Graduation from an ARC-PA certified PA Program.
- Certification from the NCCPA. Submit this form through the GradCAS
- State Licensure as a Physician as a Physician Assistant
- Applicant must report all institutions attended and send all official transcripts to GradCAS. If you do not list or send official transcripts for all institutions attended, processing of your application may be delayed.
- 2 letters of Reference submitted directly to GradCAS. Submit this form through the GradCAS Evaluator Portal.
- A personal statement, submitted with GradCAS application.
- Following the online instructions, applicants must contact every college or university attended and request transcripts be sent directly to GradCAS.
 - GradCAS accepts electronic transcripts from:
 - Credential Solutions (<http://www.transcriptsplus.net/order/>)
 - Parchment (<https://www.parchment.com/order/my-credentials/>)
 - National Student Clearinghouse (<https://www.studentclearinghouse.org/>)
- Sending transcripts to GradCAS by mail
 - Download a transcript request form after you enter each institution in GradCAS
 - Send the transcript request form to the institution registrar to send transcript by mail to the address below:

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- If you have questions about your application status, please contact your GradCAS Customer Service Representative at 857.304.2086 or GradCASinfo@liaisonedu.com.

Technical Standards

The essential abilities and skills that candidates and students must possess in order to complete the education and training associated with the Doctor of Medical Sciences program are referred to as technical standards.

Observational Skills

Demonstrate sufficient attention and accuracy in observation skills (visual, auditory, and tactile) in the lecture hall, in clinical and education settings and online. Indicators include but are not limited to: accurate visualization

and discrimination of text, numbers, patterns, graphic illustrations and other imaging texts.

Communication Skills

Demonstrate effective communication skills with professionals and with people of varying cultures, ethnicities and personalities.

Indicators include, but are not limited to, these examples:

- Clear, efficient and intelligible articulation of spoken English language.
- Legible, efficient and intelligible written English language.
- Accurate and efficient English language reading skills.
- Accurate and efficient, expressive and receptive communication skills.
- Ability to accurately follow directions (oral and written).

Critical Reasoning Skills

Demonstrate critical reasoning skills including, but not limited to intellectual, conceptual, integrative and quantitative abilities.

Indicators include, but are not limited to these examples:

- Demonstrate ability to measure, calculate, reason, analyze, integrate and synthesize information.
- Demonstrate ability to acquire, retain and apply new and learned information.

Motor and Sensory Function

Demonstrate sufficient motor and sensory function.

Indicators include, but are not limited to, these examples:

- Execute motor movements that demonstrate safety and efficiency in the various learning settings (i.e., classroom, online).
- Physical stamina sufficient to complete online didactic study, which will include prolonged periods of sitting.

Behavioral and Social Attributes Technical Standard

Demonstrate the behavioral and social attributes vital to participation in a graduate-level academic program.

Indicators include, but are not limited to, these examples:

- Possess the emotional health required for full utilization of mental faculties (judgment, orientation, affect and cognition).
- Ability to develop mature and effective professional relationships with faculty and other members of the educational and healthcare team.
- Possess personal qualities that facilitate effective therapeutic interactions (compassion, empathy, integrity, honesty, benevolence, confidentiality).
- Demonstrate impartial motives, attitudes, and values in roles, functions and relationships.
- Ability to monitor and react appropriately to one's own emotional needs and responses.
- Display appropriate flexibility and adaptability in the face of stress or uncertainty in teaching and learning environments.
- Compliance with standards, policies and practices set forth in the program handbook.

Curriculum Requirements

Clinical Leadership and Administration Track

Course Sequence - One Year Program

Term 1 - Fall		10
DMSC 704	Quality Improvement in Healthcare	
DHSC 800	Essentials of Financial Management	
DMSC 802	Capstone I	
Term 2 - Spring		10
DMSC 705	Advanced Clinical Practicum I	

DHSC 804	Leadership and Professionalism	
DMSC 805	Capstone II	
<i>Term 3 - Summer</i>		<i>10</i>
DMSC 801	Advanced Clinical Practicum II	
DMSC 806	Capstone III	
DMSC 808	Healthcare Policy for PAs	
Total Credit Hours		30

Educational Leadership and Administration Track

Course Sequence - One Year Program

<i>Term 1 - Fall</i>		<i>10</i>
MHPE 715	Educational Scholarship Method	
DHSC 800	Essentials of Financial Management	
DMSC 802	Capstone I	
<i>Term 2 - Spring</i>		<i>10</i>
DHSC 804	Leadership and Professionalism	
DHSC 805	Population Health & Preventive Care	
DMSC 809	Teaching & Learning in PA Education	
<i>Term 3 - Summer</i>		<i>10</i>
DMSC 806	Capstone III	
DMSC 807	Learning Assessment and Evaluation	
DMSC 808	Healthcare Policy for PAs	
Total Credit Hours		30

Certificate Clinical Leadership and Administration Certificate

The Medical Science (D.M.Sc.) program offers two Graduate Certificates in Clinical Leadership and Administration (https://www.evms.edu/education/doctoral_programs/medical_science/graduate_certificates/#den312349) and Educational Leadership and Administration (https://www.evms.edu/education/doctoral_programs/medical_science/graduate_certificates/#den312350). The nine credits earned in these one-year programs can be applied to fulfill the doctoral courses if a student chooses to continue the degree.

Admission

View Admissions Requirements and Application Procedure. (https://www.evms.edu/education/doctoral_programs/medical_science/admission/)

Curriculum Requirements

Classes begin in the fall

Fall		
DMSC 704	Quality Improvement in Healthcare	3
Spring		
DMSC 705	Advanced Clinical Practicum I	3
Summer		
DMSC 801	Advanced Clinical Practicum II	3
Total Credit Hours		9

Educational Format

Classes are taught online in the terms designated above. They are designed to be taken in the order presented.

Certificate Educational Leadership and Administration Certificate

The Medical Science (D.M.Sc.) program offers two Graduate Certificates in Clinical Leadership and Administration (https://www.evms.edu/education/doctoral_programs/medical_science/graduate_certificates/#den312349) and Educational Leadership and Administration (https://www.evms.edu/education/doctoral_programs/medical_science/graduate_certificates/#den312350). The nine credits earned in these one-year programs can be applied to fulfill the doctoral courses if a student chooses to continue the degree.

Admission

View Admissions Requirements and Application Procedure. (https://www.evms.edu/education/doctoral_programs/medical_science/admission/)

Curriculum Requirements

Classes begin in the fall

Fall		
MHPE 715	Educational Scholarship Method	3
Spring		
DMSC 809	Teaching & Learning in PA Education	3
Summer		
DMSC 807	Learning Assessment and Evaluation	3
Total Credit Hours		9

Educational Format

Classes are taught online in the terms designated above. They are designed to be taken in the order presented.

Pathologists' Assistant Programs

This program maintains an admission process unique to the program. Prospective students are encouraged to review the admission requirements in order to best prepare themselves for a successful future.

Programs

Master of Health Sciences, Pathologists' Assistant Program

- Pathologists' Assistant (MHSPA) (p. 283)

Master of Health Sciences, Pathologists' Assistant Pathologists' Assistant (MHSPA)

This program maintains an admission process unique to the program. Prospective students are encouraged to review the admission requirements in order to best prepare themselves for a successful future at VHS.

Admission

Candidates must have completed all undergraduate degree requirements and have been issued a bachelor's degree prior to matriculating as a Macon & Joan Brock Virginia Health Sciences at Old Dominion University student. If the bachelor's degree was issued by a U.S. college or university, as a general rule it should be from a regionally accredited institution. Official transcripts from the awarding institution must specify the date upon which the degree was issued.

Applicants must have a bachelor's degree from an accredited university with a weighted undergraduate cumulative grade point average of 3.0 or higher (on a 4-point scale) and must have completed the following:

- Required science courses
 - Two semesters of General Biology with lab or equivalent
 - Two semesters of General Chemistry with lab
 - Two semesters of Organic Chemistry with lab or one semester of Organic Chemistry with lab and one semester of Biochemistry
 - One semester of Mathematics
 - One semester of Physics
- Recommended science courses (if a deficiency is apparent with low GPA on prerequisite course work)
 - One semester of Microbiology
 - One semester of combined Anatomy and Physiology
 - Neuroanatomy and Histology courses
- Required Shadowing Experience
 - The Macon & Joan Brock Virginia Health Sciences at Old Dominion University Pathologists' Assistant Program requires applicants to have shadowing experience. In many instances, 30 to 40 hours of shadowing can be sufficient to fulfill this requirement. The shadowing experience should include observing the dissection and dictation of a variety of complex specimens, exposure to the frozen section technique, and if feasible autopsy cases (medical or forensic). We encourage candidates to obtain as much shadowing experience as is possible prior to the interview process.
- Official transcripts must be sent in an unopened envelope directly to GradCAS.
- Submit three letters of recommendation from faculty (**in the prerequisite courses**) who are familiar with the student's ability to be successful in a graduate program. Letters from employers may be submitted and will be considered as supplemental letters but will not serve in lieu of the three required from faculty.
- Letter of intent/personal essay outlining the applicant's academic and professional goals and their particular interest in the Pathologists' Assistant career.
- Resume/CV with health-related experience listed (including shadowing experience)
- GRE GMAT or MCAT scores will be relevant for five years. Older scores will need to be retaken.
- An interview with Pathologists' Assistant Admissions Committee
- Complete and submit online application (<https://gradcas2019.liaisoncas.com/>) (including \$125 nonrefundable application fee). Application will not be deemed complete until the application fee has been paid.

Additional Requirements for International Applicants

- English Proficiency Exams
 - TOEFL (<https://www.ets.org/toefl/>) (Minimum scores: Paper 550, Computer 213, iBT 80)
 - IELTS (<https://www.ielts.org/en-us/>) (Minimum scores: Total 6.5, Subscores: 6)
- In addition to official transcripts, provide both a transcript evaluation and translation (course-by-course evaluation with an overall GPA calculation) through one of these services:
 - Educational Credential Evaluators (<https://www.ece.org/ECE/>) or World Education Services (<https://www.wes.org/>)

Technical Standards

Technical standards for admission are defined as "physical, cognitive and behavioral abilities required for satisfactory completion of all aspects of the curriculum and for entry into the profession."

The technical standards for admission establish the expectations and abilities considered essential for students admitted to the Macon & Joan Brock Virginia Health Sciences at Old Dominion University Pathologists' Assistant program in order to achieve the level of competency required for graduation and competency in the practice for a Pathologists' Assistant.

Applicants to the program must possess independent ability, aptitude and skills in the following areas - observation, communication, critical reasoning, motor and sensory functions and behavioral and social attributes - as outlined below. It is expected that students also have sufficient computer skills and are comfortable with electronic communication and media to successfully and professionally function as a Pathologists' Assistant student.

Observation Skills Technical Standard

Demonstrate sufficient attention and proficiency in observation skills (visual, auditory and tactile) in the lecture hall, laboratory and clinical rotations and setting.

Indicators include but are not limited to the following examples:

- Accurate observation and participation in the lecture hall and the laboratory and during clinical rotations at affiliated hospitals and other clinical settings.
- Accurate identification of appropriate pathology in frozen and fixed surgical specimens and gross findings in autopsy cases.
- Accurate visualization and discrimination of text, numbers, patterns, graphic illustrations and findings in academic and clinical settings.

Communication Skills Technical Standard

Demonstrate effective verbal and non-verbal communication skills with other students, faculty, pathologists, surgeons and other healthcare providers from different social backgrounds, cultural backgrounds and varying personalities.

Indicators include but are not limited to the following examples:

- Clear, efficient and intelligible articulation of English language.
- Legible, efficient and intelligible written English language.
- Ability to prepare and communicate concise oral and written summaries of gross surgical specimens and case presentations of autopsy findings.
- Ability to provide appropriate dictations of gross specimens.
- Record examination and provide clear, accurate and precise descriptions of autopsy cases.

Critical Reasoning Skills Technical Standard

Demonstrate critical reasoning skills required to undertake the full curriculum, achieve the level of competency required by the faculty and meet the demands of a fully competent Pathologists' Assistant. These skills include, but are not limited to, intellectual, conceptual, integrative and quantitative abilities.

Indicators include, but are not limited to, these examples:

- Accurate and efficient reading skills (English language).
- Demonstrate ability to measure, calculate, reason, analyze, integrate and synthesize information.
- Comprehend the spatial relationships of structures (e.g. three-dimensional relationships)
- Demonstrate ability to acquire, retain, assimilate and apply large amounts of complex, technical and detailed general medical, specific pathological and non-medical information.
- Demonstrate ability to synthesize and apply concepts and information from various disciplines in order to deliver appropriate technical support.
- Demonstrate appropriate judgment in pathological cases, including planning, time management, extraction of critical information from review of medical charts and medical history and use of resources to obtain relevant information.

Motor and Sensory Function Technical Standard

Demonstrate sufficient motor and sensory function to perform typical functions of a Pathologists' Assistant, including, but not limited to, physical examinations of autopsies, assessment of surgical pathology specimens, tissue preparation and fixation techniques and general functions that pertain to a career as a Pathologists' Assistant.

Indicators include but are not limited to the following examples:

- Functional and sufficient sensory capacity (visual, auditory and tactile) to adequately perform a complete physical examination in autopsy cases and elicit information gained from proper use of examination tools and maneuvers.
- Execute fine and gross motor movements with sufficient coordination, postural control, equilibrium and hand-eye coordination to safely participate in laboratory sessions, use standard medical/surgical instruments, assess cadavers, provide appropriate summary and findings and participate in basic and advanced assistance of pathological diagnostic maneuvers and procedures.
- Execute motor movements that demonstrate safety and efficiency in the various learning settings (i.e., classroom, laboratories and clinical rotations, including appropriate negotiation of self in various clinical support environments).
- Physical stamina sufficient to complete the rigorous course of didactic and clinical study, which may include prolonged periods of sitting, standing and/or rapid ambulation.
- Coordination of motor skills necessary to respond to “on-call” emergency situations quickly and appropriately.

Behavioral and Social Attributes Technical Standard

Demonstrate the behavioral and social attributes vital to participation in a professional program and service as a practicing professional Pathologists’ Assistant.

Indicators include but are not limited to the following examples:

- Possess personal qualities that facilitate effective peer interactions (e.g., compassion, empathy, integrity, honesty, benevolence, confidentiality).
- Possess the emotional health required for full utilization of mental faculties (including judgment, orientation, affect and cognition).
- Ability to establish rapport and develop mature and effective professional relationships with faculty, professional peers, the public and other members of the medical profession team.
- Demonstrate impartial motives, attitudes and values in roles, functions and relationships. Communicate and interact with, in a non-judgmental way, persons who differ from oneself and one’s beliefs in a variety of ways, including but not limited to gender, age, race, ethnicity, socio-economic status, culture, creed, military status, sexual orientation and identity and religious or spiritual beliefs.
- Ability to monitor and react appropriately to one’s own emotional needs and responses.
- Display appropriate flexibility, adaptability, composure and emotional stability during periods of high stress or uncertainty associated with didactic and clinical encounters and environments.
- Ability to accurately follow oral and written directions with prompt completion of all responsibilities in the classroom and clinical setting.
- Compliance with standards, policies and practices set forth in the program handbook (https://www.evms.edu/media/evms_public/departments/health_professions/pathologist_assistant/PathA_Student_Handbook_8_09_18_Ver6.0_FINAL.pdf).

These standards will serve as prerequisites for entrance, continuation, promotion and graduation from the Pathologists’ Assistant program. Pathologists’ Assistant students and applicants must be prepared to meet the technical standards, with or without reasonable accommodation, in order to complete the program and indicate possession of such ability prior to their matriculation into the program and during registration for each semester.

Note that the use of an intermediary (a person trained to perform essential skills on behalf of the student) is not permitted.

Macon & Joan Brock Virginia Health Sciences at Old Dominion University must maintain the integrity of the curriculum and preserve those elements deemed essential to the education of a pathologists’ assistant and cannot compromise the health and safety of other students or health officials.

Inquiry by the program faculty and staff regarding disability is strictly prohibited. The Pathologists’ Assistant program, in accordance with Macon & Joan Brock Virginia Health Sciences at Old Dominion University policy and as delineated by federal and Virginia law, does not discriminate in admissions, educational programs or employment against any individual on the basis of that individual’s disability and will make good faith efforts at providing reasonable accommodation as required. However the program reserves the right not to admit or register students who cannot meet the technical standards or who would constitute a direct threat to the health and safety or others.

Applicants or students who may have questions regarding these technical standards or who believe they may need to request reasonable accommodation in order to meet the standards are encouraged to contact the Macon & Joan Brock Virginia Health Sciences at Old Dominion University Disability Officer by email at studentdisability@evms.edu or by phone at 757.446.7261.

Revealing a disability is voluntary; however, such disclosure is necessary before any accommodations may be made in the learning environment or in the program’s procedures. Information regarding disabilities is handled in a confidential manner

Curriculum Requirements

Students rotate through various facilities where they observe and practice the various aspects of anatomical pathology under the supervision of pathologists and pathology assistants. Rotations account for a minimum of 20 credit hours. Review the Supervised Clinical Practice Guidebook for more information.

Course Sequence - 1st Year

<i>Term 1 - Fall</i>	<i>14</i>
PATH 500	Introduction to Anatomical Laboratories
PATH 501	Medical Ethics
PATH 503	Essential Physiology & Anatomy
PATH 512	Histotechnology I
PATH 513	Histology Health Professions
PATH 514	Medical Terminology
<i>Term 2- Spring</i>	<i>16</i>
PATH 504	Anatomical Foundations
PATH 507	Neuroanatomy
PATH 510	Pathophysiology
PATH 515	Embryology
PATH 516	General Mechanisms of Disease
<i>Term 3 - Summer</i>	<i>13</i>
PATH 502	Educational Methodologies
PATH 506	Microbiology
PATH 508	Medical Photography
PATH 509	Autopsy & Surgical Path Techniques
PATH 511	Organ System Pathology

Course Sequence - 2nd Year

<i>Term 4 - Fall</i>	<i>13</i>
PATH 600	Clinical Rotations
PATH 601	Certificate Completion Program
PATH 602	Special Topics: Pediatric Pathology
IPE 700	Inter-Professional Education
<i>Term 5 - Spring</i>	<i>14</i>
PATH 603	Clinical Rotations
PATH 604	Lab Management Certificate
PATH 605	Gross Anatomy Teaching Assistant
PATH 606	Special Topics: Neuropathology
<i>Term 6 - Summer</i>	<i>8</i>
PATH 607	Clinical Rotations
PATH 608	ASCP Certification Exam Prep

Physician Assistant Programs

The PA program is divided into two phases, spanning 28 consecutive months over seven semesters.

Phase I, the 16-month pre-clinical year, spans four consecutive semesters (66.5 credit hours) and incorporates traditional classroom interaction with clinical skills development and simulated patient interaction through the Sentara Center for Simulation and Immersive Learning.

In Phase II (34 credit hours), students complete nine clinical field experiences with supervised, direct patient care in various medical and surgical disciplines, which form the basis of the professional socialization process and adaptation to the role and functions of a physician assistant.

Most of the clinical sites are located throughout Hampton Roads. Opportunities exist for clinical placements outside the region and for students to initiate new rotation sites. However, international clinical placements are not an option.

Graduates are required to pass the Physician Assistant National Certifying Examination (PANCE) and meet state-specific regulations in order to practice clinically.

Programs

Master of Physician Assistant Program

- Physician Assistant (MPA) (p. 286)

Master of Physician Assistant Physician Assistant (MPA)

The program upholds a distinct admissions process tailored specifically to its goals and standards. Prospective students are strongly encouraged to review the admissions criteria (https://www.evms.edu/education/masters_programs/physician_assistant/admissions_information/) thoroughly to ensure they are well-prepared for a successful future at VHS.

Admission

Admission to the PA profession has become increasingly competitive over the years. The PA program evaluates applicants through four lenses: cognitive/academic, personal/non-cognitive, healthcare experience and community service. Detailed information about admissions criteria for a competitive application can be found on our Admissions page (https://www.evms.edu/education/masters_programs/physician_assistant/admissions_information/).

Curriculum Requirements

The PA program is divided into two phases, spanning 28 consecutive months over seven semesters.

Phase I, the 16-month pre-clinical year, spans four consecutive semesters (66.5 credit hours) and incorporates traditional classroom interaction with clinical skills development and simulated patient interaction through the Sentara Center for Simulation and Immersive Learning.

In Phase II (34 credit hours), students complete nine clinical field experiences with supervised, direct patient care in various medical and surgical disciplines, which form the basis of the professional socialization process and adaptation to the role and functions of a physician assistant.

Most of the clinical sites are located throughout Hampton Roads. Opportunities exist for clinical placements outside the region and for students to initiate new rotation sites. However, international clinical placements are not an option.

Graduates are required to pass the Physician Assistant National Certifying Examination (PANCE) and meet state-specific regulations in order to practice clinically.

Course Sequence

PA students are expected to complete the program curriculum in the order specified below. Each semester's coursework is to be considered prerequisite to the next semester. Students may not enter the program with advanced standing, regardless of educational or work experience, and no accelerated curriculum or course waivers are offered.

For the courses that span more than one semester, credit hours are awarded in the last semester that it is taken.

Phase I: Didactic Curriculum

Term 1 - Spring 16

MPAS 601	Introduction to the PA Profession
MPAS 602	Business of Medicine
MPAS 603	Introduction to Medical Diagnostics
MPAS 604	Legal & Ethical Issues in Medicine
MPAS 615	Anatomy for Health Professions
MPAS 619	Physiology and Pathophysiology
MPAS 620	Foundations of IPE *

Term 2 - Summer 16

MPAS 623	Medical Diagnostics I
MPAS 624	Patient Counseling & Education
MPAS 625	Clinical Assessment & Reasoning I
MPAS 628	Clinical Pharmacology I
MPAS 639	Introduction to Clinical Medicine I

Term 3 - Fall 17.5

MPAS 640	Practicum for IPE **
MPAS 643	Medical Diagnostics II
MPAS 644	Introduction to Epidemiology and Evidence-Based Medicine
MPAS 645	Clinical Assessment & Reasoning II
MPAS 648	Clinical Pharmacology II
MPAS 649	Introduction to Clinical Medicine II

Term 4 - Spring 16

MPAS 663	Medical Diagnostics III
MPAS 664	Psychosocial Elements of Wellness
MPAS 665	Clinical Assessment & Reasoning III
MPAS 689	Introduction to Clinical Medicine III
MPAS 688	Clinical Pharmacology III

Phase II: Clinical Curriculum ***

Term 5 - Summer 16

MPAS 701	Introduction to Clinical Practice
MPAS 702	Interprofessional Practice ****
MPAS 794	Senior Seminar ****

3 SCPE Courses from SCPE Pool

Term 6 - Fall 9

3 SCPE Courses from SCPE Pool

Term 7 - Spring 9

3 SCPE Courses from SCPE Pool

SCPE Pool Courses

MPAS 710	SCPE in Family Medicine
MPAS 720	SCPE in Pediatric Medicine
MPAS 730	SCPE in General Internal Medicine
MPAS 740	SCPE in Emergency Medicine
MPAS 750	SCPE in General Surgery
MPAS 760	SCPE in Womens Health
MPAS 770	SCPE in Psychiatry & Behavioral Health

MPAS 780	SCPE in Elective I	
MPAS 785	SCPE in Elective II	
Total Credit Hours		99.5
*	Spans semesters 1 & 2. Grade earned after 2nd semester	
**	Spans semesters 3 & 4. Grade earned after 4th semester	
***	Each semester is approximately four months in duration. The sequence of clinical rotations is subject to change based on the number, specialty and location of preceptor sites, and will vary from student to student. Clinical electives include Orthopedics, Neonatology, Neurology, Dermatology, Cardiothoracic Medicine, Cardiology, Neonatology, Plastic Surgery, Trauma, Endocrinology, Pediatric Neurology, Gastroenterology, Pediatric Gastroenterology, and Nephrology. Additional electives can be pre-arranged with proper planning on the part of the student.	
****	Courses that span the entire clinical year (semesters 5, 6, & 7). Grade earned after 7 th semester.	

Reproductive Clinical Science Programs

This program maintains an admission process unique to the program. Prospective students are encouraged to review the admission requirements in order to best prepare themselves for a successful future.

Programs

Master of Science Program

- Reproductive Clinical Science-Embryology and Andrology (MS) (p. 287)

Doctor of Philosophy Program

- Reproductive Clinical Sciences-Embryology and Andrology (PhD) (p. 289)

Certificate Programs

- Clinical Andrology Certificate (p. 291)
- Clinical Embryology Certificate (p. 292)

Master of Science Reproductive Clinical Science-Embryology and Andrology (MS)

The 24-month program provides coursework and research opportunities that give students general and specialized biomedical sciences training. The program is designed to be completed in six semesters at an average of two to three courses per semester for a total of 16 online courses (36 credits). Those entering the program with no experience will be required to take elective internship courses in their second year to gain clinical IVF experience.

Admissions

Candidates must have completed all undergraduate degree requirements and have been issued a bachelor's degree prior to matriculating as an EVMS student. If the bachelor's degree was issued by a U.S. college or university, as a general rule, it should be from a regionally accredited institution. However, the program may grant exceptions on a case-by-case basis. Official transcripts from the awarding institution must specify the date upon which the degree was issued. Graduate level course transfer credits will be considered on a case-by-case basis.

Applicants must:

- Have a grade point average of 2.75 (B-) or better.
- Have successfully completed two semesters of college-level biology and chemistry with lab.
- Submit two letters of recommendation (https://www.evms.edu/media/evms_public/departments/distance_education/EVMS-GradCAS_Reference-Form2.pdf) (submitted by the reference electronically) from individuals who are acquainted with you academically and/or professionally. References from close friends and family members are unacceptable.
- Submit a personal essay. Complete essay instructions are available inside the online application portal.
- Submit a CV/resume.

If you are applying as an experienced embryologist or andrologist, you must:

- Currently, work or have worked in clinical IVF or basic reproductive research as an embryologist, andrologist, nurse, physician or research scientist.
- Complete a Reproductive Clinical Science MS Degree Program Skills Report Form (https://www.evms.edu/media/evms_public/departments/health_professions/reproductive_clinical_science/Reproductive_Clinical_Science_MS_Degree_Program_Skills_Report.pdf) and submit it within your online application portal.

If you are applying with no experience, you must:

- Shadow at an IVF facility and obtain a letter that lists what was observed.
- Complete a Reproductive Clinical Science Master's Program Shadowing/Observation Report Form (https://www.evms.edu/media/evms_public/departments/health_professions/reproductive_clinical_science/MRCS_Shadowing_Report.pdf) and submit it within your online application portal.

International students, or applicants whose native language is not English, must take the TOEFL and receive a score equal to or greater than 550 for the paper-based test, 213 for the computer-based test or 80 for the iBT exam.

Additional Requirements for International Applicants

In addition to meeting the admissions requirements above, international applicants are required to meet the following:

Foreign Transcripts

- Request a course by course evaluation of all foreign transcripts showing GPA calculation on a four point scale.
- Eastern Virginia Medical School does not endorse any particular evaluating and/or credentialing service. You can use the following agencies:
 - World Education Services (<http://www.wes.org/>)
 - Educational Credential Evaluators (<http://www.ece.org/>)

Translation: If the academic institution that you attended does not issue documents in English, the credentialing agency will require that you submit a word-for-word translation of your transcripts. You can contact University Language Services (<http://www.universitylanguage.com/>) to submit your transcript for translation and instruct them to send the translated transcript to the credentialing agency you choose.

Transcript Evaluation: International students whose native language is not English may contact one of the following credentialing agencies to submit transcripts for official evaluation: WES (<http://www.wes.org/>) or ECE (<https://www.ece.org/>). Instruct the credentialing agency to send the official evaluation (and translation) directly to GradCAS. You must provide both a course-by-course evaluation report along with an overall GPA calculation. Evaluations are mandatory even for transcripts from institutions that report grades in English. This provides EVMS with a U.S. credit equivalency and allows the transcripts to be reviewed accurately. WES and ECE are preferred credentialing services. If you wish to select a company other than these, please contact the program (russelhi@evms.edu) first.

TOEFL: International applicants whose native language is not English must take the TOEFL exam and receive a score as follows: Paper-based test: 550; Computer-based test: 213; iBT exam: 80. Please go to the ETS website (<http://www.ets.org/>) to take the TOEFL exam, and request your TOEFL scores be sent directly to GradCAS. ETS reports scores for two years after the test date. If you have previously taken the TOEFL but the two-year period has expired, the program will accept a personal copy if available.

GradCAS: GradCAS will **ONLY** accept the evaluation report from the credentialing agency. **Do not send** your foreign transcript to GradCAS.

All other foreign transcript evaluations from the credentialing agency must be sent directly to GradCAS to the following address:

GradCAS Transcript Processing Center
P.O. Box 9217
Watertown, MA 02471

GRE School Code: 5729 TOEFL School Code is B886

Applicant Help Center

- Having trouble accessing the application? The preferred browsers are Google Chrome or Firefox
- Applicant Help Center (https://help.liasonedu.com/GradCAS_Applicant_Help_Center/)
- If you have questions about your application status, please contact your GradCAS Customer Service Representative at tel:8573042086 (https://catalog.evms.edu/preview_program.php?catoid=9&poid=2048#tel:8573042086) or GradCASinfo@liaisonedu.com

Technical Standards

The abilities and skills candidates and students must possess in order to complete the education and training associated with the master's in Reproductive Clinical Science are referred to as technical standards. These abilities and skills are essential for clinical laboratory practice as an embryologist and/or andrologist.

1. Observation Skills Technical Standard

- 1.1. Demonstrate sufficient attention and accuracy in observation skills (visual, auditory and tactile) in the lecture hall, laboratory and/or online settings. Indicators include, but are not limited to, accurate visualization and discrimination of text, numbers, patterns, graphic illustrations and other imaging texts.

2. Communication Skills Technical Standard

- 2.1. Demonstrate effective communication skills with healthcare professionals and with people of varying cultures, ethnicities and personalities.
- 2.2. Indicators include, but are not limited to, these examples:
 - Clear, efficient and intelligible articulation of spoken English language.
 - Legible, efficient and intelligible written English language.
 - Accurate and efficient English language reading skills.
 - Accurate and efficient, expressive and receptive communication skills.
 - Ability to accurately follow directions (oral and written).

3. Critical Reasoning Skills Technical Standard

- 3.1. Demonstrate critical reasoning skills, including, but not limited to, intellectual, conceptual, integrative and quantitative abilities.
- 3.2. Indicators include, but are not limited to, these examples:
 - Demonstrate ability to measure, calculate, reason, analyze, integrate and synthesize information.
 - Demonstrate ability to acquire, retain and apply new and learned information.

4. Motor And Sensory Function Technical Standard

4.1. Demonstrate sufficient motor and sensory function to perform typical clinical laboratory duties.

4.2. Indicators include, but are not limited to, these examples:

- Functional and sufficient sensory capacity (visual, auditory and tactile) to use laboratory equipment and perform procedures.
- Execute motor movements that demonstrate safety and efficiency in the various learning settings (i.e., classroom, online and laboratories).
- Physical stamina sufficient to complete the online didactic and some laboratory study, which will include prolonged periods of sitting.

5. Behavioral And Social Attributes Technical Standard

5.1. Demonstrate the behavioral and social attributes vital to participation in a professional program and service as a practicing laboratory professional.

5.2. Indicators include, but are not limited to, these examples:

- Possess the emotional health required for full utilization of mental faculties (judgment, orientation, affect and cognition).
- Ability to develop mature and effective professional relationships with faculty, patients, the public and other members of the healthcare team.
- Possess personal qualities that facilitate effective therapeutic interactions (compassion, empathy, integrity, honesty, benevolence, confidentiality).
- Demonstrate impartial motives, attitudes and values in roles, functions and relationships.
- Ability to monitor and react appropriately to one's own emotional needs and responses.
- Display appropriate flexibility and adaptability in the face of stress or uncertainty associated with clinical encounters and clinical environments.
- Compliance with standards, policies and practices set forth in the EVMS Student Handbook and the program handbook.

Curriculum Requirements

Students must attend two residential courses at Eastern Virginia Medical School's campus in Norfolk, Virginia. First-year students' five-day session is in the third week of July; second-year students take their seven-day course in the third week of June.

Course Sequence

<i>Term 1 - Summer</i>		5
RCS 700	Biochemistry and Molecular Cell Biology	
RCS 701	Introduction IVF, Laboratory Tech and Skills Development	
<i>Term 2 - Fall</i>		7
RCS 702	Molecular Biology & Genetics	
RCS 703	Female Reproductive Endocrinology & Infertility	
RCS 704	Current Topics in IVF - Journal Club	
<i>Term 3 - Spring</i>		8
RCS 705	IVF Technology	
RCS 706	Gametes and Embryos	
RCS 707	Research Methods and Capstone/Thesis: Project and Statistics	
<i>Term 4 - Summer</i>		3
RCS 708	Advanced IVF, Laboratory Tech and Skills Development	
RCS 709	Research Methods Capstone/Thesis: Project Proposal	
<i>Term 5 - Fall</i>		7
RCS 710	Genetics of Reproduction and Infertility	

RCS 711	Research Methods Capstone/Thesis: Master's Project	
RCS 712	Male Reproductive Function and Dysfunction	
<i>Term 6 - Spring *</i>		6
RCS 713	Research Methods Capstone/Thesis: Scientific Writing	
RCS 714	Cryopreservation	
RCS 715	Ethics, Society, & ART	
RCS 768	IVF Clinical Internship	
<i>Additional Course **</i>		
RCS 716	Scientific Writing	
Total Credit Hours		36

* Students who do not have previous experience are required to take internship courses.

** Students who do not successfully complete the thesis requirement will be required to enroll in this extended writing course until it is completed. This course can only be repeated a select number of times.

Doctor of Philosophy Reproductive Clinical Sciences- Embryology and Andrology (PhD)

This is an online program that has been designed for adult learners and working professionals who are in the workforce while they are enrolled in this program, with the exception of one on-campus course during the program. This 49 credit-hour program is projected to be completed in 32 months; however, due to the nature of independent research, more time may be needed.

The program starts in the fall. Students take two years of graduate-level didactic and research development courses and must pass a comprehensive qualifying exam at the end of their third semester to advance to candidacy. The final year of the program focuses on dissertation research. During the final semester, the students will prepare and defend their dissertation projects. Six to eight students are accepted each year to this three-year online program.

Admission

Candidates must have completed all master's degree requirements and have been issued a master's degree prior to matriculating as an EVMS student. If the master's degree was issued by a U.S. college or university, as a general rule it should be from a regionally accredited institution. However, the program may grant exceptions on a case-by-case basis. Official transcripts from the awarding institution must specify the date upon which the degree was issued. Graduate-level transfer credits will be considered on a case-by-case basis.

Listed below are the requirements for application and admission into the RCS PhD program. If you have any questions or concerns about these requirements, please contact the program (<http://catalog.odu.eduemailto:RCSCourses@evms.edu>).

Applicants must:

- Have a Master of Science degree in one of the following areas: Clinical Embryology, Biology, Molecular Biology, Developmental Biology, Reproductive Sciences or Biochemistry. Other Master of Science Degrees may be acceptable; contact the program to inquire.
- Have a grade point average (GPA) of 3.0 (B) or higher in the master's degree.
- Prerequisites: Have successfully completed a master's in Clinical Embryology and Andrology or in an acceptable master's with one semester of each of the following:

- Biochemistry
- Introductory Biostatistics
- Molecular Cellular Biology
- Genetics or Developmental Biology
- Be an established clinical embryologist/andrologist with at least three years of embryology experience. Submit letters of support from employers indicating level of experience and willingness to allow applicant to perform research projects in their current position.
- Submit three letters of recommendation (https://www.evms.edu/media/evms_public/departments/distance_education/EVMS-GradCAS_Reference-Form2.pdf) (submitted by the reference electronically) from individuals who are acquainted with you academically and/or professionally. References from close friends and family members are not acceptable.
- Letters of Support to Conduct Research
 - Submit a letter of support from your employer, lab director or medical director stating that you will be allowed to conduct research where you work as part of the PhD in RCS.
 - This letter is a separate letter from the letters of Recommendation.
- Submit a personal essay that will persuade the faculty that your past experiences will provide the foundation for success in graduate school. The statement will also be reviewed as an example of your ability to communicate effectively.
- Curriculum vitae and/or resume

International students, or applicants whose native language is not English, must take the TOEFL exam.

Additional Requirements for International Applicants

In addition to meeting the admissions requirements above, international applicants are required to meet the following:

Foreign Transcripts

- Request a course by course evaluation of all foreign transcripts showing GPA calculation on a four point scale.
- Eastern Virginia Medical School does not endorse any particular evaluating and/or credentialing service. You can use the following agencies:
 - World Education Services (<https://www.wes.org/>)
 - Educational Credential Evaluators (<https://www.ece.org/>)

Translation: If the academic institution that you attended does not issue documents in English, the credentialing agency will require that you submit a word-for-word translation of your transcripts. You can contact University Language Services (<https://www.universitylanguage.com/>) to submit your transcript for translation and instruct them to send the translated transcript to the credentialing agency you choose.

Transcript Evaluation: International students whose native language is not English may contact one of the following credentialing agencies to submit transcripts for official evaluation: WES (<https://www.wes.org/>) or ECE (<https://www.ece.org/>). Instruct the credentialing agency to send the official evaluation (and translation) directly to GradCAS. You must provide both a course-by-course evaluation report along with an overall GPA calculation. Evaluations are mandatory even for transcripts from institutions that report grades in English. This provides EVMS with a U.S. credit equivalency and allows the transcripts to be reviewed accurately. WES and ECE are preferred credentialing services. If you wish to select a company other than these, please contact the program (russelhi@evms.edu) first.

TOEFL: International applicants whose native language is not English must take the TOEFL exam and receive a score as follows: Paper-based test: 550; Computer-based test: 213; iBT exam: 80. Please go to the ETS (<https://www.ets.org/>) website to take the TOEFL exam, and request your TOEFL scores be sent directly to GradCAS. ETS reports scores for two years after the test date. If you have previously taken the TOEFL but the two-year period has expired, the program will accept a personal copy if available.

GradCAS: GradCAS will **ONLY** accept the evaluation report from the credentialing agency. Do not send your foreign transcript to GradCAS.

All other foreign transcript evaluations from the credentialing agency must be sent directly to GradCAS to the following address:

GradCAS Transcript Processing Center
P.O. Box 9217
Watertown, MA 02471

GRE School Code: 5729 TOEFL School Code is B886

Applicant Help Center

- Having trouble accessing the application? The preferred browsers are Google Chrome or Firefox
- Applicant Help Center (https://help.liaisonedu.com/GradCAS_Applicant_Help_Center/)
- If you have questions about your application status, please contact your GradCAS Customer Service Representative at 857.304.2086 or GradCASinfo@liaisonedu.com.

Technical Standards

The abilities and skills candidates and students must possess in order to complete the education and training associated with Reproductive Clinical Science PhD program are referred to as technical standards. These abilities and skills are essential for clinical laboratory practice as an embryologist and/or andrologist.

1.0 Observation Skills Technical Standard

1.01 Demonstrate sufficient attention and accuracy in observation skills (visual, auditory and tactile) in the lecture hall, laboratory and/or online settings. Indicators include, but are not limited to, accurate visualization and discrimination of text, numbers, patterns, graphic illustrations and other imaging texts.

2.0 Communication Skills Technical Standard

2.01 Demonstrate effective communication skills with healthcare professionals and with people of varying cultures, ethnicities and personalities.

2.02 Indicators include, but are not limited to, these examples:

1. Clear, efficient and intelligible articulation of spoken English language.
2. Legible, efficient and intelligible written English language.
3. Accurate and efficient English language reading skills.
4. Accurate and efficient, expressive and receptive communication skills.
5. Ability to accurately follow directions (oral and written).

3.0 Critical Reasoning Skills Technical Standard

3.01 Demonstrate critical reasoning skills, including, but not limited to, intellectual, conceptual, integrative and quantitative abilities.

3.02 Indicators include, but are not limited to, these examples:

1. Demonstrate ability to measure, calculate, reason, analyze, integrate and synthesize information.
2. Demonstrate ability to acquire, retain and apply new and learned information.

4.0 Motor And Sensory Function Technical Standard

4.01 Demonstrate sufficient motor and sensory function to perform typical clinical laboratory duties.

4.02 Indicators include, but are not limited to, these examples:

1. Functional and sufficient sensory capacity (visual, auditory and tactile) to use laboratory equipment and perform procedures.
2. Execute motor movements that demonstrate safety and efficiency in the various learning settings (i.e., classroom, online and laboratories).

3. Physical stamina sufficient to complete the online didactic and some laboratory study, which will include prolonged periods of sitting.

5.0 Behavioral And Social Attributes Technical Standard

5.01 Demonstrate the behavioral and social attributes vital to participation in a professional program and service as a practicing laboratory professional.

5.02 Indicators include, but are not limited to, these examples:

1. Possess the emotional health required for full utilization of mental faculties (judgment, orientation, affect and cognition).
2. Ability to develop mature and effective professional relationships with faculty, patients, the public and other members of the healthcare team.
3. Possess personal qualities that facilitate effective therapeutic interactions (compassion, empathy, integrity, honesty, benevolence, confidentiality).
4. Demonstrate impartial motives, attitudes and values in roles, functions and relationships.
5. Ability to monitor and react appropriately to one's own emotional needs and responses.
6. Display appropriate flexibility and adaptability in the face of stress or uncertainty associated with clinical encounters and clinical environments.
7. Compliance with standards, policies and practices set forth in the EVMS Student Handbook (https://www.evms.edu/education/resources/student_policies_handbooks/) and the program handbook.

Curriculum Requirements

Course Sequence

<i>Term 1 - Fall</i>		7
RCS 801	Advanced Statistics	
RCS 802	Assisted Reproduction Evidence-Based Practice Journal Club	
RCS 803	Comparative Anatomy and Physiology of Reproduction	
<i>Term 2 - Spring</i>		7
RCS 804	Experimental Design	
RCS 805	Advanced Topics IVF	
RCS 806	Developmental Biology	
<i>Term 3 - Summer</i>		4
RCS 815	Dissertation Research Proposal Development	
Course Sequence		
<i>Term 4 - Fall</i>		7
RCS 809	Toxicology and Infertility	
RCS 810	Research Literature Review	
RCS 811	Male Infertility Research Literature	
<i>Term 5 - Spring</i>		7
RCS 812	Clinical Laboratory Management	
RCS 814	Genetics and Art	
RCS 898	Dissertation Research	
<i>Term 6 - Summer</i>		3
RCS 898	Dissertation Research	
Course Sequence		
<i>Term 7 - Fall</i>		7
RCS 898	Dissertation Research	
RCS 819	The Business of IVF	
<i>Term 8 - Spring</i>		7
RCS 898	Dissertation Research	
Total Credit Hours		49

Add additional course: RCS 898, Dissertation Research, 1 credit hour.
 Students who do not successfully complete the dissertation requirement

will be required to enroll in this extended research/writing course until it is completed. This course can only be repeated a select number of times.

Certificate

Clinical Andrology Certificate

This program maintains an admission process unique to the program. Prospective students are encouraged to review the admission requirements in order to best prepare themselves for a successful future at VHS.

Admissions

Candidates must have completed all undergraduate degree requirements and have been issued a bachelor's degree prior to matriculating as a VHS student. If the bachelor's degree was issued by a U.S. college or university, as a general rule, it should be from a regionally accredited institution. However, the program may grant exceptions on a case-by-case basis. Official transcripts from the awarding institution must specify the date upon which the degree was issued. Graduate-level course transfer credits will be considered on a case-by-case basis.

Applicants must:

- Have a grade point average of 2.75 (B-) or better.
- Have successfully completed two semesters of college-level biology and chemistry with lab.
- Submit two letters of recommendation (https://www.evms.edu/media/evms_public/departments/distance_education/EVMS-GradCAS_Reference-Form2.pdf) (submitted by the reference electronically) from individuals who are acquainted with you academically and/or professionally. References from close friends and family members will not be acceptable.
- Submit a personal essay. Complete essay instructions are available inside the online application portal.
- Curriculum vitae and/or resume

If you are applying as an experienced embryologist or andrologist, you must:

- Currently, work or have worked in clinical IVF or basic reproductive research as an embryologist, andrologist, nurse, physician or research scientist.
- Complete a Reproductive Clinical Science MS Degree Program Skills Report Form (https://www.evms.edu/media/evms_public/departments/health_professions/reproductive_clinical_science/Reproductive_Clinical_Science_MS_Degree_Program_Skills_Report.pdf) and submit it within your online application portal.

If you are applying with no experience, you must:

- Shadow at an IVF facility and obtain a letter that lists what was observed.
- Complete a Reproductive Clinical Science Master's Program Shadowing/Observation Report Form (https://www.evms.edu/media/evms_public/departments/health_professions/reproductive_clinical_science/MRCS_Shadowing_Report.pdf) and submit it within your online application portal.

Contact the program (RCSCourses@evms.edu) for more details and assistance if needed.

International students, or applicants whose native language is not English, must take the TOEFL and receive a score equal to or greater than 550 for the paper-based test, 213 for the computer-based test or 80 for the iBT exam.

Application Procedures

- Log into GradCAS (<http://gradcas.liaisoncas.org/apply/>), create a username/password, and complete and submit the online form, including your personal essay, job history and CV/resume, along with the \$125 application fee. If you cannot complete the form in one sitting, your information will be saved, and you may return to finish the process.
- Using the form provided within the online system, submit two letters of Recommendation (https://www.evms.edu/media/evms_public/

[departments/distance_education/EVMS-GradCAS_Reference-Form2.pdf](#)) from two individuals who can realistically evaluate your abilities and probability of success in the program. Preferably, one of the letters should be from your current employer.

- List all related work or volunteer experience.
- Official transcripts from each college/university attended, including an official transcript from any degree-granting institution that specifies the date upon which the degree was issued. Transcripts must be sent electronically or by mail directly to GradCAS. Any **official transcript** received by the program or the School of Health Professions Admissions and Enrollment department will not be accepted. If you do not list or send official transcripts for all institutions attended, processing of your application will be delayed.
- < >Sending Transcripts Electronically (Click here (https://help.liaisonedu.com/GradCAS_Applicant_Help_Center/Sending_Your_Official_Transcripts_and_Test_Scores_to_GradCAS/Sending_Official_Transcripts_to_GradCAS/1_US_and_English_Canadian_Transcripts/#How_to_Send_US_or_English_Canadian_Transcripts) for additional information) GradCAS only accepts electronic transcripts from: Credentials Solutions (<http://www.transcriptsplus.net/order/>) Parchment (<http://www.parchment.com/order/>) National Student Clearinghouse (<http://www.studentclearinghouse.org/>) To send transcripts to GradCAS by mail: Provide the registrar with the following items: GradCAS Transcript Request Form. Ask the registrar to attach it to your official transcripts. This form is not required but strongly recommended as it helps ensure your official transcripts are properly matched to your application. If you cannot use this form, make sure the registrar prints "GradCAS" and your full GradCAS ID# on the transcript before mailing it. Any school-specific forms required by the registrar. Any transcript fees required by the registrar. All information needed by the registrar to properly identify you in the school's database including any name changes. Your GradCAS ID#. Institutions must send transcripts directly to GradCAS to the following address: A completed application requires a paid application fee, all transcripts and at least 2 letters of recommendation (https://www.evms.edu/media/evms_public/departments/distance_education/EVMS-GradCAS_Reference-Form2.pdf)
- All coursework must be entered in GradCAS in the Transcript Entry section

International Applicant Procedures

In addition to meeting the admissions requirements above, international applicants are required to meet the following:

Foreign Transcripts

- Request a course by course evaluation of all foreign transcripts showing GPA calculation on a four point scale.
- Eastern Virginia Medical School does not endorse any particular evaluating and/or credentialing service. You can use the following agencies:
 - World Education Services (<http://www.wes.org/>)
 - Educational Credential Evaluators (<http://www.ece.org/>)

Translation: If the academic institution that you attended does not issue documents in English, the credentialing agency will require that you submit a word-for-word translation of your transcripts. You can contact University Language Services (<http://www.universitylanguage.com/>) to submit your transcript for translation and instruct them to send the translated transcript to the credentialing agency you choose.

Transcript Evaluation: International students whose native language is not English may contact one of the following credentialing agencies to submit transcripts for official evaluation: WES (<http://www.wes.org/>) or ECE (<https://www.ece.org/>). Instruct the credentialing agency to send the official evaluation (and translation) directly to GradCAS. You must provide both a course-by-course evaluation report along with an overall GPA calculation. Evaluations are mandatory even for transcripts from institutions that report grades in English. This provides EVMS with a U.S. credit equivalency and allows the transcripts to be reviewed accurately. WES and ECE are preferred

credentialing services. If you wish to select a company other than these, please contact the program (russelhi@evms.edu) first.

TOEFL: International applicants whose native language is not English must take the TOEFL exam and receive a score as follows: Paper-based test: 550; Computer-based test: 213; iBT exam: 80. Please go to the ETS website (<http://www.ets.org/>) to take the TOEFL exam, and request your TOEFL scores be sent directly to GradCAS. ETS reports scores for two years after the test date. If you have previously taken the TOEFL but the two-year period has expired, the program will accept a personal copy if available.

GradCAS: GradCAS will **ONLY** accept the evaluation report from the credentialing agency. **Do not send** your foreign transcript to GradCAS.

All other foreign transcript evaluations from the credentialing agency must be sent directly to GradCAS to the following address:

GradCAS Transcript Processing Center
P.O. Box 9217
Watertown, MA 02471

GRE School Code: 5729 TOEFL School Code is B886

Curriculum Requirements

Course Sequence

<i>Term 1 - Fall</i>		4
RCS 704	Current Topics in IVF - Journal Club	
RCS 712	Male Reproductive Function and Dysfunction	
<i>Term 2 - Spring</i>		2
RCS 714	Cryopreservation	
<i>Term 3 - Summer</i>		3
RCS 701	Introduction IVF, Laboratory Tech and Skills Development	
Total Credit Hours		9

Internal Transfer Credits: Students taking courses in and completing the Clinical Andrology Certificate may apply to transfer these course credits into the Reproductive Clinical Science - Embryology & Andrology (M.S.) program. A grade of 'B' or better is required for each transferred course. If accepted into the program, approved internal transfer courses will be included on the student's transcript and will be used to calculate the cumulative GPA for the master's degree.

Certificate

Clinical Embryology Certificate

This program maintains an admission process unique to the program. Prospective students are encouraged to review the admission requirements in order to best prepare themselves for a successful future at VHS.

Admissions

Candidates must have completed all undergraduate degree requirements and have been issued a bachelor's degree prior to matriculating as a VHS student. If the bachelor's degree was issued by a U.S. college or university, as a general rule, it should be from a regionally accredited institution. However, the program may grant exceptions on a case-by-case basis. Official transcripts from the awarding institution must specify the date upon which the degree was issued. Graduate-level course transfer credits will be considered on a case-by-case basis.

Applicants must:

- Have a grade point average of 2.75 (B-) or better.
- Have successfully completed two semesters of college-level biology and chemistry with lab.
- Submit two letters of recommendation (https://www.evms.edu/media/evms_public/departments/distance_education/EVMS-GradCAS_Reference-Form2.pdf) (submitted by the reference electronically) from individuals who are acquainted with you

academically and/or professionally. References from close friends and family members will not be acceptable.

- Submit a personal essay. Complete essay instructions are available inside the online application portal.
- Curriculum vitae and/or resume

If you are applying as an experienced embryologist or andrologist, you must:

- Currently, work or have worked in clinical IVF or basic reproductive research as an embryologist, andrologist, nurse, physician or research scientist.
- Complete a Reproductive Clinical Science MS Degree Program Skills Report Form (https://www.evms.edu/media/evms_public/departments/health_professions/reproductive_clinical_science/Reproductive_Clinical_Science_MS_Degree_Program_Skills_Report.pdf) and submit it within your online application portal.

If you are applying with no experience, you must:

- Shadow at an IVF facility and obtain a letter that lists what was observed.
- Complete a Reproductive Clinical Science Master's Program Shadowing/Observation Report Form (https://www.evms.edu/media/evms_public/departments/health_professions/reproductive_clinical_science/MRCS_Shadowing_Report.pdf) and submit it within your online application portal.

Contact the program (RCSCourses@evms.edu) for more details and assistance if needed.

International students, or applicants whose native language is not English, must take the TOEFL and receive a score equal to or greater than 550 for the paper-based test, 213 for the computer-based test or 80 for the iBT exam.

Application Procedures

- Log into GradCAS (<http://gradcas.liaisoncas.org/apply/>), create a username/password, and complete and submit the online form, including your personal essay, job history and CV/resume, along with the \$125 application fee. If you cannot complete the form in one sitting, your information will be saved, and you may return to finish the process.
- Using the form provided within the online system, submit two letters of Recommendation (https://www.evms.edu/media/evms_public/departments/distance_education/EVMS-GradCAS_Reference-Form2.pdf) from two individuals who can realistically evaluate your abilities and probability of success in the program. Preferably, one of the letters should be from your current employer.
- List all related work or volunteer experience.
- Official transcripts from each college/university attended, including an official transcript from any degree-granting institution that specifies the date upon which the degree was issued. Transcripts must be sent electronically or by mail directly to GradCAS. Any **official transcript** received by the program or the School of Health Professions Admissions and Enrollment department will not be accepted. If you do not list or send official transcripts for all institutions attended, processing of your application will be delayed.
- <>Sending Transcripts Electronically (Click here (https://help.liaisonedu.com/GradCAS_Applicant_Help_Center/Sending_Your_Official_Transcripts_and_Test_Scores_to_GradCAS/Sending_Official_Transcripts_to_GradCAS/1_US_and_English_Canadian_Transcripts/#How_to_Send_US_or_English_Canadian_Transcripts) for additional information) GradCAS only accepts electronic transcripts from: Credentials Solutions (<http://www.transcriptsplus.net/order/>) Parchment (<http://www.parchment.com/order/>) National Student Clearinghouse (<http://www.studentclearinghouse.org/>) To send transcripts to GradCAS by mail: Provide the registrar with the following items: GradCAS Transcript Request Form. Ask the registrar to attach it to your official transcripts. This form is not required but strongly recommended as it helps ensure your official transcripts are properly matched to your application. If you cannot use this form, make sure the registrar prints "GradCAS" and your full GradCAS ID# on the transcript before mailing it. Any school-specific forms

required by the registrar. Any transcript fees required by the registrar. All information needed by the registrar to properly identify you in the school's database including any name changes. Your GradCAS ID#. Institutions must send transcripts directly to GradCAS to the following address: A completed application requires a paid application fee, all transcripts and at least 2 letters of recommendation (https://www.evms.edu/media/evms_public/departments/distance_education/EVMS-GradCAS_Reference-Form2.pdf)

- All coursework must be entered in GradCAS in the Transcript Entry section

International Applicant Procedures

In addition to meeting the admissions requirements above, international applicants are required to meet the following:

Foreign Transcripts

- Request a course by course evaluation of all foreign transcripts showing GPA calculation on a four point scale.
- Eastern Virginia Medical School does not endorse any particular evaluating and/or credentialing service. You can use the following agencies:
 - World Education Services (<http://www.wes.org/>)
 - Educational Credential Evaluators (<http://www.ece.org/>)

Translation: If the academic institution that you attended does not issue documents in English, the credentialing agency will require that you submit a word-for-word translation of your transcripts. You can contact University Language Services (<http://www.universitylanguage.com/>) to submit your transcript for translation and instruct them to send the translated transcript to the credentialing agency you choose.

Transcript Evaluation: International students whose native language is not English may contact one of the following credentialing agencies to submit transcripts for official evaluation: WES (<http://www.wes.org/>) or ECE (<https://www.ece.org/>). Instruct the credentialing agency to send the official evaluation (and translation) directly to GradCAS. You must provide both a course-by-course evaluation report along with an overall GPA calculation. Evaluations are mandatory even for transcripts from institutions that report grades in English. This provides EVMS with a U.S. credit equivalency and allows the transcripts to be reviewed accurately. WES and ECE are preferred credentialing services. If you wish to select a company other than these, please contact the program (russelhi@evms.edu) first.

TOEFL: International applicants whose native language is not English must take the TOEFL exam and receive a score as follows: Paper-based test: 550; Computer-based test: 213; iBT exam: 80. Please go to the ETS website (<http://www.ets.org/>) to take the TOEFL exam, and request your TOEFL scores be sent directly to GradCAS. ETS reports scores for two years after the test date. If you have previously taken the TOEFL but the two-year period has expired, the program will accept a personal copy if available.

GradCAS: GradCAS will **ONLY** accept the evaluation report from the credentialing agency. **Do not send** your foreign transcript to GradCAS.

All other foreign transcript evaluations from the credentialing agency must be sent directly to GradCAS to the following address:

GradCAS Transcript Processing Center
P.O. Box 9217
Watertown, MA 02471

GRE School Code: 5729 TOEFL School Code is B886

Curriculum Requirements

Course Sequence

<i>Term 1 - Fall</i>		3
RCS 703	Female Reproductive Endocrinology & Infertility	
<i>Term 2 - Spring</i>		4
RCS 706	Gametes and Embryos	

RCS 715	Ethics, Society, & ART	
<i>Term 3 - Summer</i>		3
RCS 701	Introduction IVF, Laboratory Tech and Skills Development	
Total Credit Hours		10

Internal Transfer Credits: Students taking courses in and completing the Clinical Embryology Certificate may apply to transfer these course credits into the Reproductive Clinical Science - Embryology & Andrology (M.S.) program. A grade of 'B' or better is required for each transferred course. If accepted into the program, approved internal transfer courses will be included on the student's transcript and will be used to calculate the cumulative GPA for the master's degree.

Surgical Assisting Programs

Through our guided training curriculum, the Surgical Assisting certificate program is designed to deliver candidates an approved curriculum. This 12-month program will start in May each year and be offered online. Students will be required to complete didactic and clinical content requirements. The program will pair students with educational liaisons to support their success in completion of the program.

Eligible candidates must be currently employed in the operating room and must have two years of work experience. These individuals include certified surgical technologists, registered nurses or practicing surgical assistants.

The institution is currently seeking Commission on Accreditation of Allied Health Education Programs accreditation.

As states continue to enact greater legislation requirements for the practice of surgical assisting, the goal of the Certificate of Surgical Assisting program is to assist current professionals and those seeking to enter the profession a training avenue that meets the changing requirements of the professional.

Programs

Master of Surgical Assisting Program

- Surgical Assisting (MSA) (p. 293)

Certificate Program

- Surgical Assistant Certificate (p. 295)

Master of Surgical Assisting Surgical Assisting (MSA)

The VHS Surgical Assisting program is the only CAAHEP-accredited surgical assistant program that does not require its students to be trained as surgical technicians. Our graduates earn a Master of Surgical Assisting degree and become certified in 22 months.

Our mission is to train competent surgical assistants in a dynamic academic environment and nurture future educators and leaders of the profession.

Admission

Candidates must have completed all undergraduate degree requirements and have been issued a bachelor's degree prior to matriculating as an VHS student. If the bachelor's degree was issued by a U.S. college or university, as a general rule it should be from a regionally accredited institution. However, the program may grant exceptions on a case-by-case basis. Official transcripts from the awarding institution must specify the date upon which the degree was issued. All individuals must satisfy the admission requirements. Currently the program does not accept international students or medical graduates.

Candidates must:

- be a U.S. citizen or have proof of permanent residency status. Applicants born outside the U.S. must provide proof of U.S. citizenship

- or permanent residency status upon agreeing to accept a student position at VHS.
- have a baccalaureate degree (in any area of study) and a qualifying grade point average of 3.0 (B) or better.
- have completed all prerequisite courses listed (https://www.evms.edu/education/masters_programs/surgical_assisting/admission/#prerequisites) with a grade of B- or better.
- submit an online application (<https://gradcas.liaisoncas.org/apply/>)
- pay a nonrefundable \$125 application fee
- submit two (2) evaluations of recommendation
- submit a personal statement
- submit official transcripts of all college-level coursework

Applications will be accepted between October 1 and May 31.

Following the online instructions, applicants must contact every college or university attended and request transcripts to be sent directly to GradCAS. GradCAS only accepts electronic transcripts from:

- Credentials Solutions (<http://www.transcriptsplus.net/order/>)
- Parchment (<https://www.parchment.com/order/>)
- National Student Clearinghouse (<https://www.studentclearinghouse.org/>)

To send transcripts to GradCAS by mail, download a transcript request form after you enter each institution in GradCAS. Send the transcript request form to the registrar at the institution and mail to:

**GradCAS Transcript Processing Center
P.O. Box 9217
Watertown, MA 02471**

The VHS SA program will not accept applications from practicing or retired physicians as these individuals can enter the surgical assistant profession by taking the Certified Surgical Assistant (CSA) Exam (<https://www.csaexam.com/>).

The application review process takes approximately eight weeks. The program director will send letters to all applicants indicating the determination of the admissions review committee. The program has a capacity to admit a maximum of 24 students a year. New classes are admitted in August, and students are enrolled for 22 consecutive months.

Prerequisite Courses

All prerequisite courses must have been completed within the past 10 years with a B- or better for acceptance. Waivers may be granted based on experience and other factors.

- Anatomy and Physiology I and II with lab (human anatomy/physiology recommended): 6-8 credit hours
- General Biology with lab {*an equivalent or a higher-level course in this subject matter*}: 3 credit hours
- General or Intro Chemistry with lab {*an equivalent or a higher-level course in this subject matter*}: 3 credit hours
- Microbiology with lab: 3 credit hours

TOEFL Scores

All applicants who entered the U.S. after the age of 12, have a foreign degree and/or English as a second language are required to provide TOEFL (<https://www.ets.org/toefl/>) scores. This requirement must be fulfilled before your application will be considered complete and eligible for review.

Due to the importance of communication in the English language for both learning and practicing, further demonstration of English proficiency may be requested as a condition of acceptance for applicants exhibiting difficulty with the written or spoken language.

To ensure an ability to function at the graduate level in this healthcare program, the following are acceptable TOEFL scores:

- Internet-based test (preferred): 85
- Computer-based test: 220
- Minimum of 25 in the speaking component

Early Assurance Program

The Early Assurance Program (EAP) offers early acceptance to undergraduate students in their junior year at a participating institution. Applicants must have expressed interest in Surgical Assisting, are in good academic standing and are enrolled at an accredited undergraduate institution. The following institutions are participating in the Early Assurance Program with the VHS Surgical Assisting Program:

- Hampton University
- Norfolk State University
- Regent University
- Virginia Wesleyan University

Eligibility

To be eligible for the Early Assurance Program, a student must:

- Be at least in their Junior Year at participating institution, having been enrolled as a “career student” at the institution from Freshman year of college (this program is not available to students transferring into the institution) and with only one academic year left to complete in their undergraduate education. Interested students should meet with the institution EAP Advisor during their freshman year or within the first semester of coursework to express interest in the EAP.
- Meet citizenship requirements of the Program.
- Meet all undergraduate institutional and degree requirements to continue as a student in good standing.
- Maintain an overall (cumulative) GPA of 3.00 or better.
- Have satisfactorily completed, by the time of application, 4 or 5 prerequisite courses at the institution as indicated on the Program’s EAP website and not having withdrawn from or repeated any course(s) used to satisfy the prerequisites.
- Have no academic or other code of conduct violations.

Technical Standards

The abilities and skills students must possess in order to complete the education and training associated with surgical assistant education are referred to as technical standards. These abilities and skills are essential for clinical practice as a surgical assistant. These technical standards reflect five categorical areas - observation, communication, critical reasoning (intellectual), motor and sensory, and behavioral and social - and represent minimum competency levels.

Students must attest that they meet these technical standards prior to or at the time of matriculation into the surgical assisting program. Students found to be in violation of technical standards are at risk for dismissal from the program. Each standard is defined and includes examples of indicators of minimum competence in that area.

1.0 Observation Skills Technical Standard

1.01 Demonstrate sufficient attention and accuracy in observation skills (visual, auditory and tactile) in the lecture hall, laboratory and the operating room and or clinical settings.

1.02 Indicators include, but are not limited to, these examples:

1. Accurate identification of changes in color of fluids, skin and culture media.
2. Accurate visualization and discrimination of text, numbers, patterns, graphic illustrations and findings on X-ray and other imaging texts.

2.0 Communication Skills Technical Standard

2.01 Demonstrate effective communication skills with healthcare professionals and with people of varying cultures, ethnicities and personalities.

2.02 Indicators include, but are not limited to, these examples:

1. Clear, efficient and intelligible articulation of verbal language.
2. Legible, efficient and intelligible written English language.
3. Accurate and efficient English language reading skills.
4. Accurate and efficient expressive and receptive communication skills.
5. Ability to accurately follow oral and written directions.

3.0 Critical Reasoning Skills Technical Standard

3.01 Demonstrate critical reasoning skills, including, but not limited to, intellectual, conceptual, integrative and quantitative abilities.

3.02 Indicators include, but are not limited to, these examples:

1. Demonstrate ability to measure, calculate, reason, analyze, integrate and synthesize information.
2. Demonstrate ability to acquire, retain and apply new and learned information.

4.0 Motor and Sensory Function Technical Standard

4.01 Demonstrate sufficient motor and sensory function to perform typical surgical assistant duties.

4.02 Indicators include, but are not limited to, these examples:

1. Functional and sufficient sensory capacity (visual, auditory and tactile) to use surgical tools and perform procedures.
2. Execute motor movements that demonstrate safety and efficiency in the various learning settings, (i.e., classroom, laboratories and clinical settings) including appropriate negotiation of self and patient's in-patient care environments.
3. Proper use of clinical instruments and devices for clinical intervention including, but not limited to, suturing needles, catheters, retractors, etc.
4. Ability to lift over 50 lbs. with good body mechanics or 25-50 lbs. with improper body mechanics.
5. Physical stamina sufficient to complete the rigorous course of didactic and clinical study, which may include prolonged periods of sitting, standing, rapid ambulation and/or wearing personal protective equipment, such as lead aprons, for extended periods of time.

5.0 Behavioral and Social Attributes Technical Standard

5.01 Demonstrate the behavioral and social attributes vital to participation in a professional program and service as a practicing professional surgical assistant.

5.02 Indicators include, but are not limited to, these examples:

1. Possess the emotional health required for full utilization of mental faculties (judgment, orientation, affect and cognition).
2. Ability to develop mature and effective professional relationships with faculty, patients, the public and other members of the healthcare team.
3. Possess personal qualities that facilitate effective therapeutic interactions (compassion, empathy, integrity, honesty, benevolence, confidentiality).
4. Demonstrate impartial motives, attitudes and values in roles, functions and relationships.
5. Ability to monitor and react appropriately to one's own emotional needs and responses.
6. Display appropriate flexibility and adaptability in the face of stress or uncertainty associated with clinical encounters and clinical environments.
7. Compliance with standards, policies and practices set forth in the VHS Student Handbook and the SA Academic Student Handbook.

Curriculum Requirements

Our 71-credit-hour program includes 36 credits of training in our 10 month didactic phase and 35 credits of clinical practice in the second year.

Didactic Phase

Our immersive experience allows for direct observation and active participation with the surgical team to develop the critical clinical skills surgical assistants need. Students are exposed to surgical services, including perioperative, intraoperative and postoperative patient care, and ancillary surgical services, such as central sterile services and pathology.

This training complements the hands-on instruction students receive in the surgical environment. Our students enter the clinical phase of the program with practical experience in the operating room and a strong foundation of surgical knowledge.

Clinical Phase

In contrast to other accredited programs, our program manages and assigns students' clinical placements. At the end of the clinical phase, students:

- Have completed eight clinical rotations.
- Have performed the duties of and served in the role of the surgical assistant in at least 240 cases.
- Have the equivalent competencies expected of a junior surgical resident.
- Are eligible to sit for a national certification exam.

Course Sequence

<i>Term 1 - Fall</i>		<i>18</i>
MSA 602	Medical Terminology	
MSA 603	Surgical Microbiology with Lab	
MSA 604	Advanced Topics of Surgical Assisting I	
MSA 606	Operative Practices	
MSA 610	Advanced Surgical Pharmacology	
MSA 612	Surgical Physiology	
MSA 613	Principles of Surgical Assisting I Lecture	
MSA 614	Principles of Surgical Assisting I Lab	
<i>Term 2 - Spring</i>		<i>18</i>
MSA 605	Advanced Topics of Surgical Assisting II	
MSA 607	Surgical Rounds	
MSA 608	Clinical Anatomy for Health Professions	
MSA 611	Minimally Invasive Surgery	
MSA 615	Principles of Surgical Assisting II Lecture	
MSA 616	Principles of Surgical Assisting II Lab	
MSA 617	Clinical Reasoning for Surgical Assisting	
<i>Term 3 - Summer</i>		<i>9</i>
MSA 620	Medical Ethics of Surgical Assisting	
MSA 622	Leadership in Healthcare	
<i>Clinical Rotation - choose two</i>		
MSA 700	General Surgery	
<i>Term 4 - Fall</i>		<i>14</i>
MSA 618	Trauma	
MSA 619	Business of Surgical Assisting Services	
<i>Term 5 - Spring</i>		<i>12</i>
MSA 621	Capstone Project	

Certificate

Surgical Assistant Certificate

Through our guided training curriculum, the Surgical Assisting certificate program is designed to deliver candidates an approved curriculum. This 12-month program will start in May each year and be offered online. Students will be required to complete didactic and clinical content requirements. The program will pair students with educational liaisons to support their success in completion of the program.

Eligible candidates must be currently employed in the operating room and must have two years of work experience. These individuals include certified surgical technologists, registered nurses or practicing surgical assistants.

The institution is currently seeking Commission on Accreditation of Allied Health Education Programs accreditation.

As states continue to enact greater legislation requirements for the practice of surgical assisting, the goal of the Certificate of Surgical Assisting program is to assist current professionals and those seeking to enter the profession a training avenue that meets the changing requirements of the professional.

Admission

This program maintains an admission process unique to the program. Prospective students are encouraged to review the admissions requirements in order to best prepare themselves for a successful future.

Candidates must:

Grade Point Average: An overall grade point average (GPA) of 3.0 or higher in their surgical technology program is required.

Transcripts: Transcript(s) should demonstrate a conferred associate’s degree in surgical technology before the start of the CSA program.

Certification: Current certification as a Surgical Technologists (CST).

Employment Verification and Employer’s Attest to Training

Requirements: Current employment in at least level 2 hospital and signed statement from employer(s) to release time and/or access time to doctors, patients, and facilitate resources for training purposes.

Curriculum Requirements

Course Sequence

Term 1 - Summer		
MSA 613	Principles of Surgical Assisting I Lecture	2

Ellmer College of Health Sciences

Bonnie L. Van Lunen, Dean

Christopher K. Rhea, Associate Dean for Research & Innovation

Barbara Kraj, Associate Dean for Education & Innovation

3000 Ellmer Health Sciences Building

1019 W 41st. Street, Norfolk, VA 23529

757-683-4960

<http://www.odu.edu/hs> (<http://www.odu.edu/hs/>)

College Mission

The Ellmer College of Health Sciences mission is to engage learners, make discoveries and improve health. We are a forward-focused College that improves health in our communities through innovative and interdisciplinary approaches. The college values integrity, inclusiveness, excellence and partnership.

The college consists of the School of Exercise Science, the Gene W. Hirschfeld School of Dental Hygiene, the School of Medical Diagnostic and Translational Sciences, the School of Rehabilitation Sciences and the School of Speech-Language Pathology. These schools offer a variety of master's and doctoral degrees, non-degree certificate programs, linked and degree completion programs, and professional continuing education programs. In addition, many of these programs are offered in a variety of online learning formats. The degree programs are competitive, fully accredited (if applicable), and nationally recognized for their quality graduates.

Program Application, Acceptance, and Continuance

A separate application must be submitted to be considered for acceptance into the majority of health sciences majors. Application information, qualifications, deadlines, and advisors are listed in the specific program sections of this catalog and on the web site.

Acceptance to the University does not constitute or guarantee acceptance into a health sciences program. Students are notified by the program director of their acceptance and any other program specific requirements such as physicals, immunizations, technical standards, etc. Continuance in the health sciences programs requires strong academic achievement, including successful demonstration of knowledge and use of practical and critical thinking skills in laboratory and/or in clinical or rotations. Criminal background checks may be required as specified in course syllabi. Any student deemed unacceptable for field/clinical rotation due to results from a criminal background check will not be allowed to complete the program of study.

The Ellmer College of Health Sciences has developed graduate programs in the health-related professions that prepare individuals for practice, teaching, research, or administration in health-care delivery to meet the needs of the region, the state, and the nation. These programs include Master of Science degrees in Athletic Training, Dental Hygiene, Exercise Science, Medical Diagnostics and Precision Medicine, and in Speech-Language Pathology, the Doctor of Occupational Therapy degree, the Doctor of Physical Therapy, the Doctor of Applied Science in Kinesiology and the Ph.D. in Kinesiology and Rehabilitation.

Continuing Education Programs

Short courses, national conferences, workshops, refresher courses, certificate programs and seminars are offered by the different schools in the college on and off campus on a noncredit continuing education (CEU) basis. Professional continuing education programs cover a wide range of topics, including dental hygiene, dental assisting, nuclear medicine technology, medical laboratory science, physical therapy, mental health and speech-language pathology.

Continuing education serves the following functions:

- licensure and certification for professionals and practitioners and
- credential and degree achievement and professional development to update knowledge and skills.

Clientele served by the programs include nursing and allied health professionals, human service workers, managers and supervisory personnel, technicians, laboratory personnel, and health educators.

Visit the website to view current offerings.

Departments

- Gene W. Hirschfeld School of Dental Hygiene (p. 297)
- School of Exercise Science (<http://catalog.odu.edu/graduate/health-sciences/exercise-science/>)
- School of Medical Diagnostic and Translational Sciences (p. 309)
- School of Rehabilitation Sciences (p. 311)
- School of Speech-Language Pathology (p. 316)

Programs

Doctor of Applied Science Program

- Kinesiology (DAS) (<http://catalog.odu.edu/graduate/health-sciences/programs/kinesiology-das/>)

Doctor of Occupational Therapy Program

- Occupational Therapy (OTD) (p. 314)

Doctor of Philosophy Program

- Kinesiology and Rehabilitation (PhD) (p. 313)

Doctor of Physical Therapy Program

- Physical Therapy (DPT) (p. 315)

Master of Science Programs

- Dental Hygiene (MS) (p. 298)
- Dental Hygiene with a Concentration in Administration and Management (MS) (p. 300)
- Dental Hygiene with a Concentration in Community and Public Health (MS) (p. 301)
- Dental Hygiene with a Concentration in Education (MS) (p. 303)
- Dental Hygiene with a Concentration in Global Health (MS) (p. 305)
- Dental Hygiene with a Concentration in Marketing (MS) (p. 306)
- Dental Hygiene with a Concentration in Research (MS) (p. 308)
- Exercise Science (MS) (<http://catalog.odu.edu/graduate/health-sciences/exercise-science/exercise-science-ms/>)
- Molecular Diagnostics and Precision Medicine (MS) (p. 309)
- Speech-Language Pathology (MS) (p. 316)

Master of Science in Athletic Training Program

- Athletic Training (MSAT) (p. 312)

Certificate Programs

- Modeling and Simulation - Health Sciences Certificate (p. 311)
- Molecular Diagnostics Certificate (p. 311)

Gene W. Hirschfeld School of Dental Hygiene

Web Site: <http://www.odu.edu/dental> (<http://www.odu.edu/dental/>)

757-683-5949

<http://www.odu.edu/dental> (<http://www.odu.edu/dental/>)

Denise C. McKinney, PhD, RDH, Graduate Program Director

The challenge of effecting change in the scope and direction of dental hygiene and health care requires competencies in collaborative problem solving, evidence-based ethical decision making, and leadership.

Recipients of the Master of Science degree in dental hygiene develop skills to meet complex national and global health challenges in interprofessional education, knowledge-generation, information transfer, and health care for all members of society. Within a multidisciplinary, multicultural curricular framework that integrates theory, research, and practical experience, the competency-based program links goals and career aspirations of the student with relevant learning experiences, technologies, and resources to facilitate career advancement. Through specialized skills training, graduates are prepared to assume leadership roles necessary for quality professional dental hygiene care and advancing knowledge and practice.

Solutions to complex health problems need the participation of dental hygienists educated in community health, research, management, education, public policy, and advocacy, just to name a few. Therefore, the program offers distinct specialty areas in which students may specialize: education, administration/management, research, marketing, community health, global health and modeling and simulation. Although graduate education focuses on developing a specialty, such specialization is viewed as secondary to generating evidence-based knowledge and theory through research. Demand for master's level dental hygienists in these key areas of specialization continues to be strong and students are able to develop competencies essential in today's employment market.

Applicants are encouraged to contact the graduate program director to obtain additional information regarding requirements, experiential credit, cognate offerings, travel abroad, practica and externship opportunities. The program is available on campus, online, or as a hybrid of the two. Up to 12 approved graduate credit hours may be taken at another university and applied toward degree requirements, making this program one of the most flexible in the nation. The student-focused, nationally and internationally recognized faculty are committed to the educational preparation of dental hygienists leading to degrees at advanced levels; and the opportunity to segue to doctoral education in health services research within the College of Health Sciences. *This program is available on-campus and online.*

Programs

Master of Science

- Dental Hygiene (MS) (p. 298)
- Dental Hygiene with a Concentration in Administration and Management (MS) (p. 300)
- Dental Hygiene with a Concentration in Community and Public Health (MS) (p. 301)
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- Dental Hygiene with a Concentration in Global Health (MS) (p. 305)
- Dental Hygiene with a Concentration in Marketing (MS) (p. 306)
- Dental Hygiene with a Concentration in Research (MS) (p. 308)

Linked Bachelor of Science in Dental Hygiene to Master of Science Program

Entry-level and BSDH Post-Licensure online dental hygiene students who have a cumulative 3.30 grade point average and senior standing may complete the Bachelor of Science in Dental Hygiene to Master of Science (BSDH-MS) dental hygiene linked program application. This program allows exceptional undergraduate students the opportunity to take up to 12 credit hours of graduate course work and apply them to both the undergraduate and graduate degrees. Students in the linked program must earn a minimum of 150 credit hours (120 discrete credit hours for the undergraduate degree and 30 discrete credit hours for the graduate degree). Consult with the graduate program director for more information.

Master of Science Dental Hygiene (MS)

Master of Science- Dental Hygiene

757-683-5949

<http://www.odu.edu/dental> (<http://www.odu.edu/dental/>)

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Admission Information

To qualify for admission, the applicant must possess a baccalaureate degree in dental hygiene, or a certificate or an associate's degree from an accredited dental hygiene program and a baccalaureate degree in a related field. International students who have graduated from a dental hygiene program, other than a CODA accredited dental hygiene program, will be considered on an individual basis. The applicant must have an overall grade point average (GPA) of at least 3.00 (on a 4.00 scale) in undergraduate education and a minimum of 3.00 in the undergraduate dental hygiene major. Applicants whose qualifications are slightly below the required level will be considered for admission to provisional status and may be required to take additional course work.

For consideration, the documents listed below must be submitted to the Office of Graduate Admissions, Old Dominion University, Rollins Hall, Norfolk, VA 23529.

International Students must submit their documents for consideration to the Office of International Admissions, Old Dominion University, 2101 Dragas Hall, Norfolk, VA 23529.

Students can apply online at the Office of Admissions (<http://www.odu.edu/admission/apply/>) website.

Visit: International Admissions at <http://www.odu.edu/admission/international> (<http://www.odu.edu/admission/international/>)
 Visit: VISA & Immigration Services Advising at: <https://www.odu.edu/visa> (<https://www.odu.edu/visa/>).

Applicants must provide the following documents:

1. Graduate Application.
2. Scores from the National Board Dental Hygiene Examination Note: International dental hygiene students who have not graduated from an CODA accredited dental hygiene program and who do not have National Board Dental Hygiene scores, will be considered for admission on a case-by-case basis. A current active dental hygiene license in at least one state may be submitted for national board scores; consult with the graduate program director.
3. Two letters of recommendation from academic sources.
4. A written statement including educational and professional goals, how the anticipated degree will assist in achieving those goals, and a detailed statement of research interests.
5. International applicants must present satisfactory evidence of competence in English by submitting score of at least 550 on the TOEFL, 79 on the TOEFL iBT or 6.5 or higher on IELTS.
6. If you are interested in competing for a University Fellowship, the GRE or Millers Analogy scores are required.
7. Evidence of a Bachelor's degree in dental hygiene or a related field and, in the latter case, have completed an accredited certificate or associate degree program in dental hygiene.
8. Evidence of an undergraduate overall quality point average of at least 3.0 (on a 4.0 scale).
9. Official transcripts of all college work.

The master's degree program is available under the Southern Regional Education Board's (SREB) Academic Common Market. Applicants who are legal residents of Delaware, Kentucky, Mississippi, or South Carolina may enroll, if accepted, as Academic Common Market students at in-state tuition rates. Students also may be required to take undergraduate courses or non-credit courses to make-up deficiencies in other areas.

For additional information, visit <http://www.schev.edu/index/tuition-aid/academic-common-market>. (<http://www.schev.edu/index/tuition-aid/academic-common-market/>)

Curriculum Requirements

Students must complete all courses within a eight-year time period with a minimum GPA of a 3.0 on a 4.0 scale. Students must also successfully present and defend a thesis or non-thesis project and pass an oral comprehensive examination.

Thesis option requirements include a minimum of 34 semester hours.

Non-Thesis option requirements include a minimum of 37 semester hours.

Students pursuing the generalist option will complete 6-12 elective credit hours from areas such as education, research, public health, marketing, administration and management. All core requirements may be taken on campus, online, or hybrid. Candidates are required to fulfill 25-28 credit hour core requirements to include:

Core Courses

Core Courses

DNTH 514	Educational Concepts for the Health Professional I	3
DNTH 515	Research Methods in the Health Sciences	3
DNTH 516	Administrative Leadership and Professional Development	3
DNTH 604	Clinical Administration and Teaching	3
DNTH 669	Clinical Administration & Teaching Practicum	1
DNTH 660	Educational Concepts for the Health Professional II	3

DNTH 668	Internship	3-9
Select one statistics course		
FOUN 722	Introduction to Applied Statistics and Data Analysis	3
MPHO 605	Introduction to Biostatistics for Public Health	3
Concentration Credits		6-12
Research Credits		3-6
<i>Non-Thesis Option</i>		
DNTH 698	Research	
<i>Thesis Option</i>		
DNTH 698	Research	
DNTH 699	Thesis	
Total Credit Hours		34-37

Generalist Option Courses

Students will select between 6-12 credits of the following courses 6-12

TLED 623	Introduction to the Contemporary Student	3
TLED 620	Education and Public Policy	3
TLED 640	The Management of Learning and Instruction	3
FOUN 612	Applied Research Methods in Education	3
FOUN 641	Assessment and Evaluation of Student Learning	3
IDT 617	Foundations of Instructional Technology	3
IDT 647	Online Learning	3
MGMT 602	Organizational Management	3
MGMT 630	Motivation and Leadership	3
PADM 723	Ethics in Public Administration	3
PADM 671	Public Budgeting and Financial Management	3
PADM 714	Public-Private Partnerships	3
PADM 715	Management and Governance of Nonprofit Organizations	3
PADM 716	Introduction to Nonprofit Sector	3
PADM 717	Nonprofit Financial Management	3
PADM 719	Leadership	3
PADM 724	Administration of Human Services	3
PADM 745	Managing Development and Change in Organizations	3
PADM 736	Diversity, Equity, & Inclusion: A Public Administration and Public Policy Perspective	3
MKTG 630	Ethics and Marketing Decision-Making	3
MKTG 640	Global Marketing Management	3
MPHO 630	Health Communication and Social Marketing for Public Health	3
MPHO 633	Financing Healthcare	3
MPHO 640	Health Disparities and Social Justice	3
MPHO 670	Cultural Issues in Health Promotion and Education	3
MPHO 688	Grant Writing for Public Health Practice	3
MPHO 776	Global Health	3
MPHO 712	Applied Biostatistics	3
MPHO 713	Applied Statistical Programming	3

This is not an exhaustive list of possible elective courses.

Thesis Option. (34 credit hours). This option requires original thesis research and writing for a total minimum program requirement of 34 credit hours and is considered essential for students interested in developing investigative and data management skills. The student is encouraged to become familiar with possible research areas soon after admission and contact the graduate program director to discuss the research proposal, funding options and the selection of the thesis committee. The student will be provided with a committee consisting of the thesis advisor and two other

faculty members selected by the graduate program director and the student. Prior to beginning the research, the student will present a written proposal to the thesis committee for approval. Candidates choosing the thesis option must satisfactorily complete the thesis at least four weeks prior to graduation with copies delivered to the thesis committee. An oral comprehensive examination and thesis defense will be conducted by the student's thesis committee during the last four weeks of the semester prior to graduation. The cost of the thesis is a student expense. The thesis option is not available to distance learning (on-line) students. Students should expect a minimum of two semesters enrolled to complete the course.

Non-Thesis Option. (37 credit hours). Candidates are required to complete: DNTH 698 (3 credits) and a minimum of three (3) additional credits of approved elective course work. This option is designed for students pursuing a less research-oriented program of study. A student in this program is required to complete an in-depth literature or systematic review, or execute a modest project as approved by the faculty. An oral comprehensive examination and project defense will be conducted prior to graduation. Students should expect a minimum of two semesters enrolled to complete the course.

The graduate dental hygiene degree is a writing-intensive program. Students deemed deficient in writing skills will be required to remedy their deficiency through the services of the Writing Center prior to the completion of 12 graduate credits. Students who fail to participate in the diagnostic writing exercise or to complete recommended developmental work through the Writing Center will not be allowed to register for subsequent semesters.

All faculty members in the school require written assignments, which will be evaluated on the basis of form and content. If needed, resources are available through the Writing Center. Graduate students and faculty employ the current edition of the Publication Manual of the American Psychological Association as the standard reference text for written assignments within the School of Dental Hygiene.

Master of Science Dental Hygiene with a Concentration in Administration and Management (MS) Master of Science - Dental Hygiene

757-683-5949

<http://www.odu.edu/dental> (<http://www.odu.edu/dental/>)

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Visit: International Admissions at <http://www.odu.edu/admission/international/>

Visit: VISA & Immigration Services Advising at: <https://www.odu.edu/visa> (<https://www.odu.edu/visa/>).

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Curriculum Requirements

Students must complete all courses within a eight-year time period with a minimum GPA of a 3.0 on a 4.0 scale. Students must also successfully present and defend a thesis or non-thesis project and pass an oral comprehensive examination.

Thesis option requirements include a minimum of 34 semester hours.

Non-Thesis option requirements include a minimum of 37 semester hours.

Students must select one specialty area for elective courses. Additional courses within the specialty area may be substituted with advisor's approval. Note - The Global Health certificate requires a separate admission into the program. All core requirements may be taken on campus, online or hybrid. Candidates are required to fulfill 25-28 credit hour core requirements to include:

Core Courses		
DNTH 514	Educational Concepts for the Health Professional I	3
DNTH 515	Research Methods in the Health Sciences	3
DNTH 516	Administrative Leadership and Professional Development	3
DNTH 604	Clinical Administration and Teaching	3
DNTH 669	Clinical Administration & Teaching Practicum	1
DNTH 660	Educational Concepts for the Health Professional II	3
DNTH 668	Internship	3-9
FOUN 722	Introduction to Applied Statistics and Data Analysis	3
or MPOH 605	Introduction to Biostatistics for Public Health	
Concentration Credits		6-12
Research Credits		3-6
<i>Non-Thesis Option</i>		
DNTH 698	Research	
<i>Thesis Option</i>		
DNTH 698	Research	
DNTH 699	Thesis	
Total Credit Hours		34-37

Administration and Management Concentration

Concentration Courses		6 to 12
Students will select between 6-12 credits of the following courses		
PADM 724	Administration of Human Services	3
PADM 671	Public Budgeting and Financial Management	3
PADM 714	Public-Private Partnerships	3
PADM 715	Management and Governance of Nonprofit Organizations	3
PADM 716	Introduction to Nonprofit Sector	3
PADM 717	Nonprofit Financial Management	3
PADM 719	Leadership	3
PADM 736	Diversity, Equity, & Inclusion: A Public Administration and Public Policy Perspective	3

This is not an exhaustive list of possible elective courses.

Thesis Option. (34 credit hours). This option requires original thesis research and writing for a total minimum program requirement of 34 credit hours and is considered essential for students interested in developing investigative and data management skills. The student is encouraged to become familiar with possible research areas soon after admission and contact the graduate program director to discuss the research proposal, funding options and the selection of the thesis committee. The student will be provided with a committee consisting of the thesis advisor and two other faculty members selected by the graduate program director and the student. Prior to beginning the research, the student will present a written proposal to the thesis committee for approval. Candidates choosing the thesis option must satisfactorily complete the thesis at least four weeks prior to graduation with copies delivered to the thesis committee. An oral comprehensive examination and thesis defense will be conducted by the student's thesis committee during the last four weeks of the semester prior to graduation. The cost of the thesis is a student expense. The thesis option is not available to online students. Students should expect a minimum of two semesters enrolled to complete the course.

Non-Thesis Option. (37 credit hours). Candidates are required to complete: DNTH 698 (3 credits) and a minimum of three (3) additional credits of approved elective course work. This option is designed for students pursuing a less research-oriented program of study. A student in this program is required to complete an in-depth literature or systematic review, or execute a modest project as approved by the faculty. An oral comprehensive examination and project defense will be conducted prior to graduation. Students should expect a minimum of two semesters enrolled to complete the course.

The graduate dental hygiene degree is a writing-intensive program. Students deemed deficient in writing skills will be required to remedy their deficiency through the services of the Writing Center prior to the completion of 12 graduate credits. Students who fail to participate in the diagnostic writing exercise or to complete recommended developmental work through the Writing Center will not be allowed to register for subsequent semesters.

All faculty members in the school require written assignments, which will be evaluated on the basis of form and content. If needed, resources are available through the Writing Center. Graduate students and faculty employ the current edition of the Publication Manual of the American Psychological Association as the standard reference text for written assignments within the School of Dental Hygiene.

Master of Science Dental Hygiene with a Concentration in Community and Public Health (MS)

Master of Science - Dental Hygiene

757-683-5949

<http://www.odu.edu/dental> (<http://www.odu.edu/dental/>)

Denise C. McKinney, PhD, RDH, Graduate Program Director

The challenge of effecting change in the scope and direction of dental hygiene and health care requires competencies in collaborative problem solving, evidence-based ethical decision making, and leadership.

Recipients of the Master of Science degree in dental hygiene develop skills to meet complex national and global health challenges in interprofessional education, knowledge-generation, information transfer, and health care for all members of society. Within a multidisciplinary, multicultural curricular framework that integrates theory, research, and practical experience, the competency-based program links goals and career aspirations of the student with relevant learning experiences, technologies, and resources to facilitate career advancement. Through specialized skills training, graduates are

prepared to assume leadership roles necessary for quality professional dental hygiene care and advancing knowledge and practice.

Solutions to complex health problems need the participation of dental hygienists educated in community health, research, management, education, public policy, and advocacy, just to name a few. Therefore, the program offers distinct specialty areas in which students may specialize: education, administration/management, research, marketing, community health, global health and modeling and simulation. Although graduate education focuses on developing a specialty, such specialization is viewed as secondary to generating evidence-based knowledge and theory through research. Demand for master's level dental hygienists in these key areas of specialization continues to be strong and students are able to develop competencies essential in today's employment market.

Applicants are encouraged to contact the graduate program director to obtain additional information regarding requirements, experiential credit, cognate offerings, travel abroad, practica and externship opportunities. The program is available on campus, online, or as a hybrid of the two. Up to 12 approved graduate credit hours may be taken at another university and applied toward degree requirements, making this program one of the most flexible in the nation. The student-focused, nationally and internationally recognized faculty are committed to the educational preparation of dental hygienists leading to degrees at advanced levels; and the opportunity to segue to doctoral education in health services research within the College of Health Sciences. *This program is available on-campus and online.*

Admission Information

To qualify for admission, the applicant must possess a baccalaureate degree in dental hygiene, or a certificate or an associate's degree from an accredited dental hygiene program and a baccalaureate degree in a related field. International students who have graduated from a dental hygiene program, other than a CODA accredited dental hygiene program, will be considered on an individual basis. The applicant must have an overall grade point average (GPA) of at least 3.00 (on a 4.00 scale) in undergraduate education and a minimum of 3.00 in the undergraduate dental hygiene major. Applicants whose qualifications are slightly below the required level will be considered for admission to provisional status and may be required to take additional course work.

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Visit: International Admissions at <http://www.odu.edu/admission/international/>
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3. Two letters of recommendation from academic sources.
4. A written statement including educational and professional goals, how the anticipated degree will assist in achieving those goals, and a detailed statement of research interests.
5. International applicants must present satisfactory evidence of competence in English by submitting score of at least 550 on the TOEFL, 79 on the TOEFL iBT or 6.5 or higher on IELTS.

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7. Evidence of a Bachelor's degree in dental hygiene or a related field and, in the latter case, have completed an accredited certificate or associate degree program in dental hygiene.
8. Evidence of an undergraduate overall quality point average of at least 3.0 (on a 4.0 scale).
9. Official transcripts of all college work.

The master's degree program is available under the Southern Regional Education Board's (SREB) Academic Common Market. Applicants who are legal residents of Delaware, Kentucky, Mississippi, or South Carolina may enroll, if accepted, as Academic Common Market students at in-state tuition rates. Students also may be required to take undergraduate courses or non-credit courses to make-up deficiencies in other areas.

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Curriculum

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Concentration Credit Hours		6-12
Research Credits		3-6
Non-Thesis Option		
DNTH 698	Research	
Thesis Option		
DNTH 698	Research	
DNTH 699	Thesis	
Total Credit Hours		34-37

Community and Public Health Concentration

Select 6-12 credits of the following:

MPHO 611	Social and Behavioral Sciences for Public Health	3

MPHO 614	Principles of Epidemiology	3
MPHO 620	Health Management and Systems Thinking	3
MPHO 630	Health Communication and Social Marketing for Public Health	3
MPHO 717	Epidemiology of Infectious Diseases	3
MPHO 778	Global Environmental Health	3
MPHO 673	Policy and Politics of Health	3
MPHO 661	Program Planning and Evaluation	3
MPHO 688	Grant Writing for Public Health Practice	3

This is not an exhaustive list of possible elective courses.

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Master of Science Dental Hygiene with a Concentration in Education (MS) Master of Science - Dental Hygiene

757-683-5949

<http://www.odu.edu/dental> (<http://www.odu.edu/dental/>)

Denise C. McKinney, PhD, RDH, Graduate Program Director

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education, knowledge-generation, information transfer, and health care for all members of society. Within a multidisciplinary, multicultural curricular framework that integrates theory, research, and practical experience, the competency-based program links goals and career aspirations of the student with relevant learning experiences, technologies, and resources to facilitate career advancement. Through specialized skills training, graduates are prepared to assume leadership roles necessary for quality professional dental hygiene care and advancing knowledge and practice.

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3. Two letters of recommendation from academic sources.

4. A written statement including educational and professional goals, how the anticipated degree will assist in achieving those goals, and a detailed statement of research interests.
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7. Evidence of a Bachelor's degree in dental hygiene or a related field and, in the latter case, have completed an accredited certificate or associate degree program in dental hygiene.
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Curriculum Requirements

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Thesis degree requirements include a minimum of 34 semester hours.

Non-Thesis degree requirements include a minimum of 37 semester hours.

Students must select one specialty area for elective courses. Additional courses within the specialty area may be substituted with advisor's approval. Note - The Global Health certificate requires admission to the program. All core requirements may be taken on campus, online, or hybrid. Candidates are required to fulfill a 22 credit hour core requirement to include:

Core Courses

DNTH 514	Educational Concepts for the Health Professional I	3
DNTH 515	Research Methods in the Health Sciences	3
DNTH 516	Administrative Leadership and Professional Development	3
DNTH 604	Clinical Administration and Teaching	3
DNTH 669	Clinical Administration & Teaching Practicum	1
DNTH 660	Educational Concepts for the Health Professional II	3
DNTH 668	Internship	3-9
FOUN 722	Introduction to Applied Statistics and Data Analysis	3
or MPH 605	Introduction to Biostatistics for Public Health	

Concentration Courses **6-12**

Research Credits **3-6**

Thesis and Non-Thesis Options

DNTH 698 Research

Thesis Option

DNTH 699 Thesis

Total Credit Hours **34-37**

Education Concentration

Select 6-12 credits of the following:

COUN 601	Principles of Professional Counseling and Ethics
COUN 633	Counseling and Psychotherapy Techniques
TLED 640	The Management of Learning and Instruction
IDT 617	Foundations of Instructional Technology
IDT 746	Foundations of Distance Education
IDT 756	Instructional Gaming: Theories and Practice
IDT 763	Instructional Design Theory
TLED 632	Multicultural Education
FOUN 641	Assessment and Evaluation of Student Learning
FOUN 640	Fundamentals of Measurement and Assessment

This is not an exhaustive list of possible elective courses.

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Master of Science Dental Hygiene with a Concentration in Global Health (MS)

Master of Science - Dental Hygiene

757-683-5949

<http://www.odu.edu/dental> (<http://www.odu.edu/dental/>)

Denise C. McKinney, PhD, RDH, Graduate Program Director

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Recipients of the Master of Science degree in dental hygiene develop skills to meet complex national and global health challenges in interprofessional education, knowledge-generation, information transfer, and health care for all members of society. Within a multidisciplinary, multicultural curricular framework that integrates theory, research, and practical experience, the competency-based program links goals and career aspirations of the student with relevant learning experiences, technologies, and resources to facilitate career advancement. Through specialized skills training, graduates are prepared to assume leadership roles necessary for quality professional dental hygiene care and advancing knowledge and practice.

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Concentration Courses		6-12
Research Credits		3-6
<i>Non-Thesis Option</i>		
DNTH 698	Research	
<i>Thesis Option</i>		
DNTH 698	Research	
DNTH 699	Thesis	
Total Credit Hours		34-37

Global Health Concentration

Global Health (Certificate Option) 15 hrs

HSR 746	Epidemiology	3
HSR 776	Global Health	3
HSR 802	Health Management	3
Elective courses (4 credit hrs) As determined by Director of Global Health		4
Practicum (2 credit hours) As determined by Director of Global Health		2
Total Credit Hours		15

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Master of Science Dental Hygiene with a Concentration in Marketing (MS) Master of Science - Dental Hygiene

757-683-5949

<http://www.odu.edu/dental> (<http://www.odu.edu/dental/>)

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The challenge of effecting change in the scope and direction of dental hygiene and health care requires competencies in collaborative problem solving, evidence-based ethical decision making, and leadership.

Recipients of the Master of Science degree in dental hygiene develop skills to meet complex national and global health challenges in interprofessional education, knowledge-generation, information transfer, and health care for all members of society. Within a multidisciplinary, multicultural curricular framework that integrates theory, research, and practical experience, the competency-based program links goals and career aspirations of the student with relevant learning experiences, technologies, and resources to facilitate career advancement. Through specialized skills training, graduates are prepared to assume leadership roles necessary for quality professional dental hygiene care and advancing knowledge and practice.

Solutions to complex health problems need the participation of dental hygienists educated in community health, research, management, education, public policy, and advocacy, just to name a few. Therefore, the program offers distinct specialty areas in which students may specialize: education, administration/management, research, marketing, community health, global health and modeling and simulation. Although graduate education focuses on developing a specialty, such specialization is viewed as secondary to generating evidence-based knowledge and theory through research. Demand for master's level dental hygienists in these key areas of specialization continues to be strong and students are able to develop competencies essential in today's employment market.

Applicants are encouraged to contact the graduate program director to obtain additional information regarding requirements, experiential credit, cognate offerings, travel abroad, practica and externship opportunities. The program is available on campus, online, or as a hybrid of the two. Up to 12 approved graduate credit hours may be taken at another university and applied toward degree requirements, making this program one of the most flexible in the nation. The student-focused, nationally and internationally recognized faculty are committed to the educational preparation of dental hygienists leading to degrees at advanced levels; and the opportunity to segue to doctoral education in health services research within the College of Health Sciences. *This program is available on-campus and online.*

Admission Information

To qualify for admission, the applicant must possess a baccalaureate degree in dental hygiene, or a certificate or an associate's degree from an accredited dental hygiene program and a baccalaureate degree in a related field. International students who have graduated from a dental hygiene program, other than a CODA accredited dental hygiene program, will be considered on an individual basis. The applicant must have an overall grade point average (GPA) of at least 3.00 (on a 4.00 scale) in undergraduate education and a minimum of 3.00 in the undergraduate dental hygiene major. Applicants whose qualifications are slightly below the required level will be considered for admission to provisional status and may be required to take additional course work.

For consideration, the documents listed below must be submitted to the Office of Graduate Admissions, Old Dominion University, Rollins Hall, Norfolk, VA 23529.

International Students must submit their documents for consideration to the Office of International Admissions, Old Dominion University, 2101 Dragas Hall, Norfolk, VA 23529.

Students can apply online at the Office of Admissions (<http://www.odu.edu/admission/apply/>) website.

Visit: International Admissions at <http://www.odu.edu/admission/international/>

Visit: VISA & Immigration Services Advising at: <https://www.odu.edu/visa/> (<https://www.odu.edu/visa/>).

Applicants must provide the following documents:

1. Graduate Application.
2. Scores from the National Board Dental Hygiene Examination Note: International dental hygiene students who have not graduated from an CODA accredited dental hygiene program and who do not have National Board Dental Hygiene scores, will be considered for admission on a case-by-case basis. A current active dental hygiene license in at least one state may be submitted for national board scores; consult with the graduate program director.
3. Two letters of recommendation from academic sources.
4. A written statement including educational and professional goals, how the anticipated degree will assist in achieving those goals, and a detailed statement of research interests.
5. International applicants must present satisfactory evidence of competence in English by submitting score of at least 550 on the TOEFL, 79 on the TOEFL iBT or 6.5 or higher on IELTS.
6. If you are interested in competing for a University Fellowship, the GRE or Millers Analogy scores are required.
7. Evidence of a Bachelor's degree in dental hygiene or a related field and, in the latter case, have completed an accredited certificate or associate degree program in dental hygiene.
8. Evidence of an undergraduate overall quality point average of at least 3.0 (on a 4.0 scale).
9. Official transcripts of all college work.

The master's degree program is available under the Southern Regional Education Board's (SREB) Academic Common Market. Applicants who are legal residents of Delaware, Kentucky, Mississippi, or South Carolina may enroll, if accepted, as Academic Common Market students at in-state tuition rates. Students also may be required to take undergraduate courses or non-credit courses to make-up deficiencies in other areas.

For additional information, visit <http://www.schev.edu/index/tuition-aid/academic-common-market>. (<http://www.schev.edu/index/tuition-aid/academic-common-market/>)

Curriculum Requirements

Students must complete all courses within a eight-year time period with a minimum GPA of a 3.0 on a 4.0 scale. Students must also successfully present and defend a thesis or non-thesis project and pass an oral comprehensive examination.

Thesis degree requirements include a minimum of 34 semester hours.

Non-Thesis degree requirements include a minimum of 37 semester hours.

Students must select one specialty area for elective courses. Additional courses within the specialty area may be substituted with advisor's approval. Note- Global Health and Modeling and Simulation certificates require admissions to the respective program. All core requirements may be taken on campus, online or hybrid. Candidates are required to fulfill a 22 credit hour core requirement to include:

Core Courses

DNTH 514	Educational Concepts for the Health Professional I	3
DNTH 515	Research Methods in the Health Sciences	3
DNTH 516	Administrative Leadership and Professional Development	3

DNTH 604	Clinical Administration and Teaching	3
DNTH 669	Clinical Administration & Teaching Practicum	1
DNTH 660	Educational Concepts for the Health Professional II	3
DNTH 668	Internship	3-9
Select one statistics course		
FOUN 722	Introduction to Applied Statistics and Data Analysis	3
MPHO 605	Introduction to Biostatistics for Public Health	3
Concentration Courses		6-12
Research Credits		3-6
<i>Non-Thesis Option</i>		
DNTH 698	Research	
<i>Thesis Option</i>		
DNTH 698	Research	
DNTH 699	Thesis	
Total Credit Hours		34-37

Marketing Concentration

Select 6-12 credits of the following:

MKTG 603	Marketing Management	3
MKTG 640	Global Marketing Management	3
MKTG 621	Managerial Problems in Marketing Strategy	3
MKTG 628	Marketing of Services	3
MKTG 630	Ethics and Marketing Decision-Making	3
MPHO 630	Health Communication and Social Marketing for Public Health	3

This is not an exhaustive list of possible elective courses.

Thesis Option. (34 credit hours). This option requires original thesis research and writing for a total minimum program requirement of 34 credit hours and is considered essential for students interested in developing investigative and data management skills. The student is encouraged to become familiar with possible research areas soon after admission and contact the graduate program director to discuss the research proposal, funding options and the selection of the thesis committee. The student will be provided with a committee consisting of the thesis advisor and two other faculty members selected by the graduate program director and the student. Prior to beginning the research, the student will present a written proposal to the thesis committee for approval. Candidates choosing the thesis option must satisfactorily complete the thesis at least four weeks prior to graduation with copies delivered to the thesis committee. An oral comprehensive examination and thesis defense will be conducted by the student's thesis committee during the last four weeks of the semester prior to graduation. The cost of the thesis is a student expense. The thesis option is not available to online students. Students should expect a minimum of two semesters enrolled to complete the course.

Non-Thesis Option. (37 credit hours). Candidates are required to complete: DNTH 698 (3 credits) and a minimum of three (3) additional credits of approved elective course work. This option is designed for students pursuing a less research-oriented program of study. A student in this program is required to complete an in-depth literature or systematic review, or execute a modest project as approved by the faculty. An oral comprehensive examination and project defense will be conducted prior to graduation. Students should expect a minimum of two semesters enrolled to complete the course.

The graduate dental hygiene degree is a writing-intensive program. Students deemed deficient in writing skills will be required to remedy their deficiency through the services of the Writing Center prior to the completion of 12 graduate credits. Students who fail to participate in the diagnostic writing exercise or to complete recommended developmental work through the Writing Center will not be allowed to register for subsequent semesters. All faculty members in the school require written assignments, which

will be evaluated on the basis of form and content. If needed, resources are available through the Writing Center. Graduate students and faculty employ the current edition of the Publication Manual of the American Psychological Association as the standard reference text for written assignments within the School of Dental Hygiene.

Master of Science Dental Hygiene with a Concentration in Research (MS)

Master of Science - Dental Hygiene

757-683-5949

<http://www.odu.edu/dental> (<http://www.odu.edu/dental/>)

Denise C. McKinney, PhD, RDH, Graduate Program Director

The challenge of effecting change in the scope and direction of dental hygiene and health care requires competencies in collaborative problem solving, evidence-based ethical decision making, and leadership.

Recipients of the Master of Science degree in dental hygiene develop skills to meet complex national and global health challenges in interprofessional education, knowledge-generation, information transfer, and health care for all members of society. Within a multidisciplinary, multicultural curricular framework that integrates theory, research, and practical experience, the competency-based program links goals and career aspirations of the student with relevant learning experiences, technologies, and resources to facilitate career advancement. Through specialized skills training, graduates are prepared to assume leadership roles necessary for quality professional dental hygiene care and advancing knowledge and practice.

Solutions to complex health problems need the participation of dental hygienists educated in community health, research, management, education, public policy, and advocacy, just to name a few. Therefore, the program offers distinct specialty areas in which students may specialize: education, administration/management, research, marketing, community health, global health and modeling and simulation. Although graduate education focuses on developing a specialty, such specialization is viewed as secondary to generating evidence-based knowledge and theory through research. Demand for master's level dental hygienists in these key areas of specialization continues to be strong and students are able to develop competencies essential in today's employment market.

Applicants are encouraged to contact the graduate program director to obtain additional information regarding requirements, experiential credit, cognate offerings, travel abroad, practica and externship opportunities. The program is available on campus, online, or as a hybrid of the two. Up to 12 approved graduate credit hours may be taken at another university and applied toward degree requirements, making this program one of the most flexible in the nation. The student-focused, nationally and internationally recognized faculty are committed to the educational preparation of dental hygienists leading to degrees at advanced levels; and the opportunity to segue to doctoral education in health services research within the College of Health Sciences. *This program is available on-campus and online.*

Admission Information

To qualify for admission, the applicant must possess a baccalaureate degree in dental hygiene, a certificate or an associate's degree from an accredited dental hygiene program and a baccalaureate degree in a related field. International students who have graduated from a dental hygiene program, other than a CODA accredited dental hygiene program, will be considered on an individual basis. The applicant must have an overall grade point average (GPA) of at least 3.00 (on a 4.00 scale) in undergraduate education and a minimum of 3.00 in the undergraduate dental hygiene major. Applicants whose qualifications are slightly below the required level will be considered for admission to provisional status and may be required to take additional course work.

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Visit: International Admissions at <http://www.odu.edu/admission/international/>

Visit: VISA & Immigration Services Advising at: <https://www.odu.edu/visa> (<https://www.odu.edu/visa/>).

Applicants must provide the following documents:

1. Graduate Application.
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3. Two letters of recommendation from academic sources.
4. A written statement including educational and professional goals, how the anticipated degree will assist in achieving those goals, and a detailed statement of research interests.
5. International applicants must present satisfactory evidence of competence in English by submitting score of at least 550 on the TOEFL, 79 on the TOEFL iBT or 6.5 or higher on IELTS.
6. If you are interested in competing for a University Fellowship, the GRE or Millers Analogy scores are required.
7. Evidence of a Bachelor's degree in dental hygiene or a related field and, in the latter case, have completed an accredited certificate or associate degree program in dental hygiene.
8. Evidence of an undergraduate overall quality point average of at least 3.0 (on a 4.0 scale).
9. Official transcripts of all college work.

The master's degree program is available under the Southern Regional Education Board's (SREB) Academic Common Market. Applicants who are legal residents of Delaware, Kentucky, Mississippi, or South Carolina may enroll, if accepted, as Academic Common Market students at in-state tuition rates. Students also may be required to take undergraduate courses or non-credit courses to make-up deficiencies in other areas.

For additional information, visit <http://www.schev.edu/index/tuition-aid/academic-common-market>. (<http://www.schev.edu/index/tuition-aid/academic-common-market/>)

Curriculum Requirements

Students must complete all courses within a eight-year time period with a minimum GPA of a 3.0 on a 4.0 scale. Students must also successfully present and defend a thesis or non-thesis project and pass an oral comprehensive examination.

Thesis degree requirements include a minimum of 34 semester hours.

Non-Thesis degree requirements include a minimum of 37 semester hours.

Students must select one specialty area for elective courses. Additional courses within the specialty area may be substituted with advisor's approval. Note - The Global Health certificate requires admission to the program. All core requirements may be taken on campus, online, or hybrid. Candidates are required to fulfill a 22 credit hour core requirement to include:

Core Courses

DNTH 514	Educational Concepts for the Health Professional I	3

DNTH 515	Research Methods in the Health Sciences	3
DNTH 516	Administrative Leadership and Professional Development	3
DNTH 604	Clinical Administration and Teaching	3
DNTH 669	Clinical Administration & Teaching Practicum	1
DNTH 660	Educational Concepts for the Health Professional II	3
FOUN 722	Introduction to Applied Statistics and Data Analysis	3
or MPHO 605	Introduction to Biostatistics for Public Health	
DNTH 668	Internship	3-9
Concentration Courses		6-12
Research Credits		3-6
<i>Non-Thesis Option</i>		
DNTH 698	Research	
<i>Thesis Option</i>		
DNTH 698	Research	
DNTH 699	Thesis	
Total Credit Hours		34-37

Research Concentration

Select 6-12 of the following:

MPHO 614	Principles of Epidemiology	3
MPHO 688	Grant Writing for Public Health Practice	3
MPHO 661	Program Planning and Evaluation	3
MPHO 712	Applied Biostatistics	3
MPHO 605	Introduction to Biostatistics for Public Health	3
MPHO 713	Applied Statistical Programming	3
MPHO 716	Application of Epidemiological Methods	3

This is not an exhaustive list of possible elective courses.

Thesis Option. (34 credit hours). This option requires original thesis research and writing for a total minimum program requirement of 34 credit hours and is considered essential for students interested in developing investigative and data management skills. The student is encouraged to become familiar with possible research areas soon after admission and contact the graduate program director to discuss the research proposal, funding options and the selection of the thesis committee. The student will be provided with a committee consisting of the thesis advisor and two other faculty members selected by the graduate program director and the student. Prior to beginning the research, the student will present a written proposal to the thesis committee for approval. Candidates choosing the thesis option must satisfactorily complete the thesis at least four weeks prior to graduation with copies delivered to the thesis committee. An oral comprehensive examination and thesis defense will be conducted by the student's thesis committee during the last four weeks of the semester prior to graduation. The cost of the thesis is a student expense. The thesis option is not available to online students. Students should expect a minimum of two semesters enrolled to complete the course.

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The graduate dental hygiene degree is a writing-intensive program. Students deemed deficient in writing skills will be required to remedy their deficiency through the services of the Writing Center prior to the completion of 12 graduate credits. Students who fail to participate in the diagnostic writing exercise or to complete recommended developmental work through the

Writing Center will not be allowed to register for subsequent semesters.

All faculty members in the school require written assignments, which will be evaluated on the basis of form and content. If needed, resources are available through the Writing Center. Graduate students and faculty employ the current edition of the Publication Manual of the American Psychological Association as the standard reference text for written assignments within the School of Dental Hygiene.

School of Medical Diagnostic and Translational Sciences

Overview

School of Medical Diagnostic and Translational Sciences
Ellmer College of Health Sciences
Macon & Joan Brock Virginia Health Sciences at Old Dominion University
1019 W. 41st Street, Norfolk, VA 23508
757-683-3247

The School of Medical Diagnostic and Translational Sciences at Old Dominion University prepares students for dynamic careers in healthcare, biotechnology, clinical diagnostics, research, and public health. Our graduate programs equip students with the scientific expertise and technical skills needed to thrive in hospital and commercial laboratories, biotechnology and pharmaceutical industries, government agencies, and academic institutions.

Our **Master of Science in Molecular Diagnostics & Precision Medicine** program empowers students to become leaders in the rapidly evolving fields of molecular diagnostics and targeted therapeutics. Built on the foundation of advances from the Human Genome Project, this program explores how precision medicine is transforming the detection and treatment of complex diseases. Students gain hands-on experience with cutting-edge molecular technologies while learning how these innovations influence clinical decision-making, medical research, population health, and drug development.

Learn more about the Molecular Diagnostics & Precision Medicine M.S. program

The Post-Baccalaureate **Certificate in Molecular Diagnostics** provides essential training in the principles and laboratory techniques of clinical molecular biology. Designed for individuals seeking to enhance their credentials or transition into clinical or research roles, this program emphasizes real-world application of molecular diagnostic procedures, preparing students to contribute meaningfully in high-complexity lab settings and molecular diagnostics environments.

Explore the Molecular Diagnostics Certificate program

Programs

Master of Science Program

- Molecular Diagnostics and Precision Medicine (MS) (p. 309)

Certificate Programs

- Modeling and Simulation - Health Sciences Certificate (p. 311)
- Molecular Diagnostics Certificate (p. 311)

Master of Science Molecular Diagnostics and Precision Medicine (MS)

The discipline of molecular diagnostics includes all tests and methods to identify disease, a predisposition for a disease, diagnosis and prognosis of disease, and potential responses to drug therapy by analysis of an individual's DNA, RNA, and proteins. The field is the fastest growing segment of clinical diagnostic testing as molecular techniques become standard practice in medicine. Precision medicine requires the application of molecular information to enable new approaches to the detection and treatment of complex diseases. This program is designed to prepare students

for possible careers in industry, academic, and/or clinical settings within molecular diagnostics and precision medicine.

Students will acquire the advanced knowledge required to complete high-complexity testing with a master's degree in Molecular Diagnostics & Precision Medicine.

Admission Criteria

For U.S. students

- A baccalaureate degree in biology, chemistry, medical laboratory science, health sciences, or related health and scientific disciplines, from a regionally accredited institution of higher education is required.
- A GPA of at least 2.7 on a 4.0 scale in the last 60 credits completed.
- Two (2) letters of recommendation.
- A personal statement describing how the Molecular Diagnostics & Precision Medicine (M.S.) program will enhance the applicant's academic and/or professional career goals.
- Current resume/CV documenting professional experience and educational achievements.
- Official transcripts from all colleges/universities attended. Ensure the degree conferral date is listed on the awarding institution's transcript. **Please note: Transcripts must be sent to GradCAS only. GradCAS only accepts electronic transcripts from Credentials Solutions, Parchment, and National Student Clearinghouse. If your school does not offer either of these services, your transcript must be sent via mail.**

Below are three ways to send your transcripts.

- Credentials Solutions (<http://www.transcriptsplus.net/order/>)
- Parchment (<https://www.parchment.com/students/order-status/>)
- National Student Clearinghouse (<https://www.studentclearinghouse.org/>)

To send transcripts to GradCAS by mail, after you enter each institution in GradCAS, download a transcript request form. Fill out and send the transcript request form to the institution registrar, asking them to mail the transcript to the address below:

GradCAS Transcript Processing Center
P.O. Box 9217
Watertown, MA 02471

For international students

- A baccalaureate degree in biology, chemistry, medical laboratory science, health sciences, or related health and scientific disciplines from a regionally accredited institution of higher education is required.
- A GPA of at least 2.7 on a 4.0 scale in the last 60 credits completed.
- Three letters of recommendation.
- Test of English as a Foreign Language (TOEFL) - Minimum scores:
 - Paper 550,
 - Computer 213,
 - iBT 80
 - TOEFL School Code is B886
- A personal statement describing how the Molecular Diagnostics & Precision Medicine (M.S.) program will enhance the applicant's academic and/or professional career goals.
- Current resume/CV documenting professional experience and educational achievements.
- Official transcripts from all colleges/universities attended. Ensure the degree conferral date is listed on the awarding institution's transcript. In cases where a non-U.S. grading system has been used, verification must be provided by one of the following services:
 - World Education Services (<https://www.wes.org/>) (WEC)
 - Educational Credential Evaluators (<https://www.ece.org/>) (ECE)

- GradCAS will ONLY accept the evaluation report from the credentialing agency. Do not send your foreign transcript to GradCAS.
- All foreign transcript evaluations from the credentialing agency must be sent directly to GradCAS to the following address:

GradCAS Transcript Processing Center
PO Box 9217
Watertown, MA 02471

- **Translation:** If the academic institution that you attended does not issue documents in English, the credentialing agency will require that you submit a word-for-word translation of your transcripts. You can contact University Language Services (<http://www.universitylanguage.com/>) to submit your transcript for translation and instruct them to send the translated transcript to the credentialing agency you choose.
- **Transcript Evaluation:** International students whose native language is not English may contact one of the following credentialing agencies to submit transcripts for official evaluation: WES (<http://www.wes.org/>) or ECE (<https://www.ece.org/>). Instruct the credentialing agency to send the official evaluation (and translation) directly to GradCAS. You must provide both a course-by-course evaluation report along with an overall GPA calculation. Evaluations are mandatory even for transcripts from institutions that report grades in English. This provides the school with a U.S. credit equivalency and allows the transcripts to be reviewed accurately. WES and ECE are preferred credentialing services. If you wish to select a company other than these, please hpadmissions@evms.edu first.

International students must abide by all U.S. Immigration laws throughout their enrollment in the program. This includes, but is not limited to, qualifying and obtaining a proper visa prior to attendance. For further information, please contact Human Resources (evmsshr@evms.edu) at 757-446-6043.

Curriculum Requirements

The Molecular Diagnostics & Precision Medicine (M.S.) (https://www.evms.edu/education/masters_programs/molecular_diagnostics_precision_medicine/) curriculum will consist of online asynchronous didactic courses, hybrid courses consisting of online asynchronous didactic instruction, and in-person laboratory, laboratory rotations, and practicum.

The rotations and practicum can be completed at ODU/EVMS laboratories or at student arranged off-site locations (e.g. current employer) with approval of the program director and agreement of the institution.

In all, 21 credit hours of didactic/laboratory training will be combined with 21 credit hours of independent laboratory rotations and practicum.

Course Sequence

Term 1 Fall		9
MDPM 500	Principles of Molecular Diagnostics	
MDPM 501	Molecular Diagnostics Lab	
MDPM 698	Molecular Diagnostics Lab	
Term 2 Spring		9
MDPM 600	Advanced Clinical Molecular Diagnostics	
MDPM 601	Advanced Molecular Diagnostics Lab	
MDPM 698	Molecular Diagnostics Lab	
Term 3 Summer		6
MDPM 620	Human Subjects Regulations and Ethics	
MDPM 669	Molecular Diagnostics Pract	
Term 4 Fall		9
MDPM 640	Molecular Cytology & Histology	
MDPM 669	Molecular Diagnostics Pract	
MDPM 720	Genomics and Bioinformatics	
Term 5 Spring		9

Certificate

Modeling and Simulation - Health Sciences Certificate

The Modeling and Simulation in Health Sciences certificate program is designed for students to develop competency in the use of modeling and simulation theory, methods and technologies to support health sciences research, policy-making, and training in the health care domain. The core course of this program covers the basic knowledge of Modeling and Simulation while the other three courses focus on the applications of M&S in health care related fields.

This program is targeted to graduate students interested in pursuing a career in modeling and simulation in health care or graduate students enrolled in the PhD program at the College of Health Sciences who desire to focus their research and/or course of study in modeling and simulation. The expected time to complete the certificate is four semesters.

Admission

Admission to this certificate program requires a bachelor's degree (or equivalent) and a previous knowledge of calculus and statistics. The basic certificate requirements are four three-hour courses for a total of twelve required credits. The basic simulation core class called Introduction to Modeling and Simulation of three credits is required, plus nine credits of discipline specific classes. A 3.00 GPA for the four-course sequence is required for successful completion. Total amount of credit: 12.

Curriculum Requirements

MSIM 601	Introduction to Modeling and Simulation	3
HSR 815	Decision Analysis in Health Care	3
Discipline Specific Class		3
Discipline Specific Class		3
Total Credit Hours		12

Since Modeling and Simulation is a highly multidisciplinary science, other colleges can offer discipline specific classes, such as:

BIOL 772	Modeling and Simulation in the Life Sciences	4
PSYC 731	Human Cognition	3
BIOL 732	GIS in the Life Sciences	3
BNAL 722	Agent-Based Simulation and Modeling	3

Certificate

Molecular Diagnostics Certificate

<http://www.odu.edu/mdts/molecular-diagnostics> (<http://www.odu.edu/mdts/molecular-diagnostics/>)

Robert Bruno, PhD, Program Director

The discipline of molecular diagnostics includes all tests and methods to identify disease, a predisposition for a disease, diagnosis and prognosis of disease, and potential responses to drug therapy by analysis of an individual's DNA, RNA, and proteins. The field is the fastest growing segment of clinical diagnostic testing as molecular techniques become standard practice in medicine.

The post-baccalaureate molecular diagnostics certificate program is designed to provide fundamental principles, advanced applications and laboratory skills needed for molecular diagnostic and molecular biology procedures conducted in clinical and research environments.

Curriculum Requirements

The Certificate is awarded upon completion of 12 credit hours in a coherent sequence with a 3.0 GPA.

Required Courses

MDTS 500	Principles of Molecular Diagnostics	3
MDTS 501	Molecular Diagnostics Laboratory	3
MDTS 600	Advanced Clinical Applications of Molecular Diagnostics	3
MDTS 601	Advanced Molecular Diagnostics Laboratory	3

Optional Course

MDTS 668	Clinical Laboratory Internship	

Total Credit Hours

12

School of Rehabilitation Sciences

3000 Ellmer Health Sciences Building
1019 W 41st. Street, Norfolk, VA 23529
757-683-4960

<http://www.odu.edu/rehabsci/dpt> (<http://www.odu.edu/rehabsci/dpt/>)

Patricia Laverdure, Chair

Center for Brain Research and Rehabilitation

The School of Rehabilitation Sciences has opened a 3,800 square foot research facility (<http://www.odu.edu/ptat/resources/>) with a large gait/movement assessment area, a room for virtual reality and rehabilitation studies, a multipurpose room for neurologic testing, and office space for faculty and graduate students. A primary research focus relates to neuromechanical basis of human movement under healthy and pathological conditions, with more clinically oriented studies on methods to improve gait and function in people with neurologic impairments. This research laboratory is designed for multidisciplinary use by faculty and graduate students in Athletic Training, Occupational Therapy, Physical Therapy, Human Movement Sciences, and Electrical and Computer Engineering. Collaboration among disciplines and with the Virginia Modeling and Simulation Center (VMASC) allows us to participate in exciting research projects exploring new technology in rehabilitation.

Faschini Wallach Center for Restorative Therapies

The School of Rehabilitation Sciences, in collaboration with the Ellmer College of Health Sciences and Old Dominion University, operates a multidisciplinary therapy clinic on the ODU campus. Located at 1019 W 41st Street, Norfolk, VA 23529, the clinic offers physical, occupational, and speech therapy services to ODU faculty, staff, students, and the surrounding community. In addition to providing high-quality care, the clinic serves as a hands-on learning environment where students develop skills in assessment, clinical decision-making, and treatment. It also supports clinical research initiatives in partnership with the Center for Brain Research and Rehabilitation, the Kinesiology and Rehabilitation PhD Program, and university and community research partners.

Programs

Doctor of Occupational Therapy Program

- Occupational Therapy (OTD) (p. 314)

Doctor of Philosophy Program

- Kinesiology and Rehabilitation (PhD) (p. 313)

Doctor of Physical Therapy Program

- Physical Therapy (DPT) (p. 315)

Master of Science in Athletic Training Program

- Athletic Training (MSAT) (p. 312)

Master of Science in Athletic Training Athletic Training (MSAT)

PROFESSIONAL (ENTRY-LEVEL) DEGREE PROGRAM

Ryan McCann, PhD, ATC, CSCS

Graduate Program Director of Athletic Training
School of Rehabilitation Sciences
3064 Ellmer College of Health Sciences Building
757-683-6131

The Master of Science of Athletic Training degree program is a professional (entry-level) athletic training program that addresses the curricular content necessary for safe and proficient patient care. The curriculum addresses the six core competencies expected of all healthcare providers (evidence-based practice, quality improvement, use of healthcare informatics, patient-centered care, interprofessional education and collaborative practice, and professionalism). Classroom learning is enhanced through clinical education experiences which provide students with supervised hands-on learning opportunities necessary to develop the knowledge, skills, and abilities needed for autonomous clinical practice.

Admission and Entrance Requirements Requirements for Admission

Students are admitted to the program after completion of a bachelor's degree and prerequisite coursework. Courses for the program begin in May, during the first summer session, and continue for two calendar years. Specific procedures for admission must be followed, including the verification of meeting the technical standards. Admission into the program is competitive.

An application to the Athletic Training Centralized Application Service (ATCAS) must be submitted. The ATCAS website will be open to applicants on July 1 each year at <https://atcas.liaisoncas.com/applicant-ux/#/login>. Applications are reviewed on an ongoing basis as they are received each year and continue until all positions are filled. Please follow the directions for the application found at the ATCAS site.

An applicant seeking admission to the MSAT degree program must have:

1. a bachelor's degree and official transcripts from each undergraduate and graduate program attended at a regionally-accredited institution or an equivalent foreign institution;
2. a minimum overall grade point average of 3.0 in undergraduate coursework.

Acceptance into the graduate school does not imply automatic acceptance into the athletic training program.

Other Application Requirements & Prerequisite Courses

The applicant will also need to submit documentation (via ATCAS) demonstrating the following requirements:

- Verification of 15 clock hours of observation with an athletic trainer;
- Two recommendations from professional or academic references; and
- Completion of the following prerequisites at Old Dominion University or another regionally-accredited institution (or international equivalent), with a minimum grade point average of 3.0 (the first **five must be** laboratory science courses):
 - Biology
 - Chemistry
 - Physics
 - Anatomy OR Anatomy & Physiology I
 - Physiology OR Anatomy & Physiology II
 - Biomechanics OR Kinesiology

- Psychology
- Nutrition
- Statistics

Curriculum Requirements

ATHLETIC TRAINING CORE COURSES

AT 602	Foundations of Sports Medicine for Health Care Providers	3
AT 603	Clinical Examination and Patient Care-Spine & Head	4
AT 604	Clinical Examination and Patient Care-Lower Extremity	4
AT 605	Clinical Examination and Patient Care-Upper Extremity	4
AT 607	Management of Medical Conditions for Healthcare Providers I	3
AT 612	Functional Movement for Healthcare Providers	3
AT 617	Management of Medical Conditions for Healthcare Providers II	3
AT 638	Documentation & Quality Improvement for Healthcare Providers	3
AT 640	Clinical Medicine for Healthcare Providers I	3
AT 641	Clinical Medicine for Healthcare Providers II	3
AT 652	Pharmacology	3
AT 661	Behavioral Health in Sports Medicine	3
AT 664	Ethics in Healthcare	3
AT 673	Healthcare Administration and Policy	3
AT 686	Performance Enhancement in Sports Medicine	3
AT 687	Contemporary Issues in Athletic Training	2
AT 689	Professional Competence Assessment in Athletic Training	3
AT 691	Gross Anatomy for the Rehabilitation Sciences (Credits range from 0 to 6 credits. AT students should register for 4 credits.)	6

RESEARCH CORE COURSES

AT 615	Research I	2
AT 625	Research II	1
AT 635	Research III	1
AT 645	Research IV	1

PRACTICUM CORE COURSES

AT 647	Interprofessional Clinical I	1
AT 648	Interprofessional Clinical II	1
AT 666	Athletic Training Practicum I	1
AT 667	Athletic Training Practicum II	1
AT 668	Athletic Training Practicum III	2
AT 669	Athletic Training Practicum IV	1
Total Credit Hours		69

Additional Requirements

Continuance and Exit Requirements

Students must meet all requirements for continuance as outlined in the graduate continuance policy for the University. Students completing the program of study must:

1. have an overall grade point average of 3.0;
2. have a GPA of 3.0 in the major;
3. demonstrate writing proficiency;
4. satisfy all course competencies;
5. pass comprehensive examinations;

- complete a research project;
- provide exit feedback to the program director; and
- file the necessary paperwork for graduation.

Doctor of Philosophy Kinesiology and Rehabilitation (PhD)

Eric Schussler and Patrick Wilson, Graduate Program Directors

The Ph.D. in Kinesiology and Rehabilitation is designed for aspiring professionals who already have a master's degree or entry-level clinical doctorate and are interested in becoming leaders, teachers, and scholars in the fields of athletic training, biomechanics, exercise science, kinesiology, occupational therapy, physical therapy, or speech-language pathology. This inter-professional program features faculty from different schools in the Ellmer College of Health Sciences. Students are immersed in research experiences in and out of the classroom and complete a flexible curriculum that encompasses motor control, motor learning, neuroscience, biomechanics, exercise physiology, rehabilitation, communication, and research methodology. In addition to 4 core courses, students will complete research courses, teaching and/or research apprenticeship courses, and at least four electives for a total of at least 51 credit hours.

Requirements for Admission

Five to seven students will be admitted to the Ph.D. program annually, starting with the fall term. Applications for admission are reviewed by the Ph.D. In Kinesiology and Rehabilitation admissions committee. To qualify for admission, an applicant must meet the general University admission requirements at the graduate level as well as specific program requirements including:

- Completed graduate degree (Master's or Clinical Doctorate) from a regionally-accredited institution in kinesiology, exercise science, athletic training, occupational therapy, physical therapy, speech and language pathology, or a related field.
- A minimum grade point average (GPA) of 3.25 on a 4.0 scale for the graduate degree.
- A personal statement that explains your qualifications, professional and career goals, and reasons for seeking the Ph.D. Be sure to also identify potential professor(s) at ODU who could mentor you based on your research interests.
- Three letters of reference a least two of which are from former professors familiar with the applicant's academic performance.
- English Proficiency Requirement for those whose first language is not English. (See Admissions website)

Enrollment in the program is limited by number of available faculty mentors matching an applicant's desired area of research. Interested individuals are advised to contact the program to find out whether a mentor is available for their research area of interest.

Application Dates

Applications to the program and for assistantships are due by February 1 for students planning to enter in the fall semester, however applications will be accepted until the cohort is full.

Curriculum Requirements

Coursework consists of a total of 51 credit hours, including 12 credit hours of core courses, at least 9 credit hours of research courses, 6 credit hours of experiential learning/apprenticeships, and 12 credit hours of electives. Each student will also complete 12 credit hours of dissertation research. Up to 12 hours of graduate credit may be transferred from another program to be applied to non-core courses. Transfer of credits is approved at the discretion of the guidance committee and the graduate program director.

Kinesiology and Rehabilitation Core Courses		12
KRS 830	Theoretical Models in Kinesiology and Rehabilitation *	
KRS 835	Critical Appraisal and Synthesis of Evidence in Kinesiology and Rehabilitation	
KRS 851	Motor Performance: Rhythmic/Cyclic Tasks	
KRS 857	Kinesiology in Rehabilitation	
Research Core		9
<i>Courses to be selected in consultation with advisor.</i>		
FOUN 812	Research Design and Analysis	
FOUN 816	Single Subject Research Designs	
FOUN 822	Applied Linear Models in Educational Research	
FOUN 823	Analysis of Variance Applied to Educational Research	
HLSC 810	Research Design and Application	
HLSC 811	Quantitative Research Methods in Health Care	
KRS 825	Mixed and Multi Methods in Health Sciences Research	
TLCI 814	Qualitative Research Design in Education	
Experiential Learning/Apprenticeships		6
<i>Courses may be taken more than one time.</i>		
KRS 887	Structured Teaching Experience for Kinesiology and Rehabilitation Professions	
KRS 898	Supervised Research	
Electives		12
<i>Courses to be selected in consultation with advisor.</i>		
BIOL 747/847	Responsible and Ethical Conduct of Research	
CSD 850	Neuromotor Speech Disorders	
EXSC 827	Advanced Biomechanics	
EXSC 830	Advanced Cardiovascular Exercise Physiology	
EXSC 838	Exercise Endocrinology	
EXSC 840	Ergogenic Aids in Sport and Human Performance	
HLSC 873	Planning Proposals and Developing Grants in Health Research	
KRS 820	MATLAB Programming for Kinesiology and Rehabilitation	
KRS 852	Motor Performance: Discrete Tasks	
KRS 855	Neurosciences of Motor Control	
KRS 856	Balance and Postural Control	
KRS 895	Special Topics in Kinesiology and Rehabilitation	
PT 792	Neuroscience I	
PT 793	Neuroscience II	
SPED 802	Cognitive Processes and Learning Strategies for Students with Special Needs	
Dissertation Research		12
KRS 899	Dissertation	
Total Credit Hours		51

* Must be completed in student's first year in program.
KRS 830

Additional Requirements

Degree Requirements

- Satisfactory completion of at least 51 semester hours of graduate level coursework with a grade point average of 3.0 or higher, including all

required courses as listed below. (Students who receive two or more grades of C or one grade of F may not continue in the program).

2. Acceptable performance on written and oral candidacy examinations to be completed at the end of the program of coursework. Students may re-take the candidacy exams only once.
3. Successful defense of a dissertation proposal.
4. Completion of a dissertation representing the candidate's ability to conduct scholarly, original research.
5. Successful oral defense of the dissertation.
6. Submission of the approved final copy of the dissertation.

Time frames for completion of degree requirement

1. The entire process from admission to dissertation defense must be completed within eight years. Exceptions to this time limit require the approval of the graduate program director, the department chair, and the college dean.
2. Academic credit which is more than eight years old at the time of graduation must be re-validated by an examination before the work can be applied to a doctoral degree.
3. The dissertation must be completed within five years after the candidacy exams are passed.
4. Dissertations should be defended at least four weeks prior to the deadline for electronic submission.

Each student is required to have a faculty advisor who will meet with the student upon admission to the program. The faculty advisor, with the graduate program director, approves the student's plan of study and conducts the written and oral competency exams.

Doctor of Occupational Therapy Occupational Therapy (OTD)

Occupational Therapy doctoral program is a 105 credit, capstone-based, cohort-designed professional doctoral degree program culminating in student eligibility to sit for the national certification examination to obtain state licensure.

We provide an active learning, professional curriculum with didactic, clinical education (fieldwork), service-learning and capstone components designed to meet the accreditation standards of the Accreditation Council for Occupational Therapy Education.

Our goal

Our goal is to meet the needs of diverse individuals, communities, and populations and lead teams in health management, maintenance, and promotion and illness, injury and disability prevention.

Note that a felony conviction and professional license revocation may affect a graduate's ability to sit for the NBCOT certification examination or attain state licensure.

Accreditation statement

The entry-level Occupational Therapy doctoral degree program has applied for accreditation and has been granted Candidacy Status by the Accreditation Council for Occupational Therapy Education (<http://www.acoteonline.org/>) (ACOTE) of the American Occupational Therapy Association (<https://www.aota.org/>) (AOTA).

The program must have a pre-accreditation review, complete an on-site evaluation, and be granted Accreditation Status before its graduates will be eligible to sit for the national certification examination for the occupational therapist administered by the National Board for Certification in Occupational Therapy (<https://www.nbcot.org/>) (NBCOT). After successful completion of this exam, the individual will be an Occupational Therapist, Registered (OTR). In addition, all states require licensure in order to practice; however, state licenses are usually based on the results of the NBCOT Certification Examination.

Accreditation Council for Occupational Therapy Education (ACOTE)
7501 Wisconsin Avenue, Suite 510E
Bethesda, MD 20814
301-652-6611
accred@aota.org

The Occupational Therapy doctoral program is designed to graduate diverse, intellectually inquisitive, and innovative occupational therapy practice leaders, advocates, and scholars, who, through their understanding of the relationship of occupation, health, and well being gained through rigorous didactic and clinical academic pursuit, find scientifically grounded practical solutions to the everyday occupational needs of society.

This rigorous academic program teaches effective clinical decision-making skills to prepare healthcare providers capable of treating diverse clients across the lifespan. Through its collaborative network of strategic partnerships involving regional healthcare, educational, and community-based infrastructure, the program leverages in-class didactic learning with service learning (civic engagement) and practicum experience to improve the health and well being of the citizens of the Commonwealth of Virginia, the nation, and the world.

Admission

- A completed application through the Occupational Therapy Centralized Application Service (OTCAS) that includes transcripts, a statement of interest, and three professional and/or academic recommendations.
- A bachelor's degree and official transcripts from each regionally accredited institution or foreign equivalent undergraduate and graduate program attended. We accept students with a wide variety of undergraduate backgrounds
- A minimum overall grade point average of 3.0 in undergraduate coursework
- Completion of the following prerequisite coursework:
 - **Anatomy and Physiology** - 8 credit hours with labs; the course content must address the organization of cells, tissues, organs, and organ systems in humans
 - **Developmental Psychology** - 3 credit hour child development or a lifespan course that includes learning principles and motor, language, cognitive, emotional, and social development
 - **Abnormal Psychology or Psychopathology** - 3 credit hour course addressing psychopathology
 - **Social Science** - 6 credit hours in courses that can include psychology, sociology, anthropology, political science, public health, epidemiology, gerontology, and urban studies
 - **Statistics** - 3 credit hour course addressing behavioral, educational, psychological, or mathematical statistics. Business statistics does not fulfill this requirement.
- Attestation of acknowledgment of the National Board for Certification in Occupational Therapy Character Review (<https://www.nbcot.org/en/Students/Services/>) (page 8) eligibility requirements for certifying occupational therapy practitioners
- No standardized achievement tests are required.
- A virtual interview with faculty and practitioners.
- Participation in the Occupational Therapy virtual observation experience (<https://sites.google.com/odu.edu/odu-otd-introductorymodule/home/>).

Curriculum Requirements

The Doctor of Occupational Therapy program consists of 36 courses for a total of 105 credit hours, delivered in nine consecutive semesters with classes being taught onsite and with asynchronous online instruction during fieldwork experiences.

Course Sequence

Year 1

Summer

8

OCCT 721	Foundations of Occupational Therapy Practice	
OCCT 749	Occupations I	
<i>Fall</i>		16
OCCT 750	Occupations II	
OCCT 752	Occupation, Health and Wellness Across the Lifespan	
OCCT 754	Professional Reasoning and the Occupational Therapy Process	
OCCT 756	Professional Identity and Ethical Formation	
OCCT 821	Elements of Research I: Theories of Inquiry and Scholarly Literature	
<i>Spring</i>		16
OCCT 751	Occupations III	
OCCT 753	Pediatric Habilitation and Rehabilitation: Theory and Practice	
OCCT 755	Evaluation of Occupational Performance	
OCCT 768	Fieldwork I Pediatrics	
OCCT 822	Elements of Research II: Using Evidence to Inform Practice	
Year 2		
<i>Summer</i>		8
OCCT 841	Education and Learning in Healthcare and Academic Settings	
OCCT 843	Leadership and Advocacy	
OCCT 845	Health Care Policy and Program Management	
OCCT 847	Therapeutic Relationships and Client Communication	
<i>Fall</i>		16
OCCT 848	Fieldwork I Adults	
OCCT 850	Adult Rehabilitation: Theory and Practice	
OCCT 852	Evaluation and Intervention of the Upper Extremity	
OCCT 854	Technology and Environment Adaptation	
OCCT 858	Elements of Research III: Critical Analysis of Occupational Therapy Practice	
<i>Spring</i>		15
OCCT 851	Productive Aging and Rehabilitation: Theory and Practice	
OCCT 853	Mental Health Promotion and Recovery: Theory and Practice	
OCCT 855	Occupational Adaptation in the Community	
OCCT 857	Fieldwork I Psychosocial	
OCCT 859	Elements of Research IV: Scholarship of Practice Approaches and Design	
OCCT 890	Practice-Scholar Seminar I	
Year 3		
<i>Summer</i>		7
OCCT 868	Fieldwork II A	
OCCT 891	Practice-Scholar Seminar II	
<i>Fall</i>		10
OCCT 869	Fieldwork II B	
OCCT 870	Community and Population Health	
OCCT 871	Professional Development Planning	
OCCT 892	Practice-Scholar Seminar III	
<i>Spring</i>		9
OCCT 893	Doctoral Capstone	
OCCT 894	Practice Scholar Symposium	
Total Credit Hours		105

Doctor of Physical Therapy Physical Therapy (DPT)

Archana Vatwani, Physical Therapy Graduate Program Director

The Doctor of Physical Therapy (<https://ww1.odu.edu/rehabsci/dpt/>) degree is designed to professionally prepare students with the knowledge and clinical experiences to become licensed physical therapists who will enter general physical therapy practice. Upon graduation, students will be prepared to sit for licensure in any United States jurisdiction and practice in any health care setting where physical therapy is offered. The curriculum consists of 116 credit hours over a three-year period of time including summers. There are three full-time clinical internships totaling 32 weeks. The first two are completed over the second and third summers, with the final 14 weeks of clinical education occurring in the spring semester preceding graduation. A variety of clinical facilities locally, throughout Virginia, and the United States are used for internship experiences. Students are responsible for providing their own transportation to these off-campus clinical sites.

Requirements for Admission

Students are admitted to the program after completion of a bachelor's degree and prerequisite course work. The application deadline is October 1 of each year, and the program begins in late May. Specific procedures for admission must be followed including the verification of meeting the technical standards. Admission into the program is competitive.

An application to the University and a separate application to the Physical Therapy Centralized Application Service (PTCAS) must be submitted. The PTCAS website will be open to applicants mid June each year at www.PTCAS.org (<http://www.PTCAS.org>). Deadline for application submission is October 1 each year. Please follow the directions for application found at the PTCAS site.

A competitive admission process is used for determining acceptance. Excellent ODU students may qualify for guaranteed entry into the Doctor of Physical Therapy program. For criteria and additional information, please contact the Pre-Health Undergraduate Advisor from Exercise Science (757) 683-4995 or College of Health Sciences advisor at (757) 683-5137.

Prerequisite courses include the following:

STAT 130M	Elementary Statistics	3
BIOL 121N	General Biology I	3
BIOL 122N	General Biology I Lab	1
BIOL 123N	General Biology II	3
BIOL 124N	General Biology II Lab	1
BIOL 240 or BIOL 250	Fundamentals of Anatomy and Physiology I Human Anatomy and Physiology I	4
BIOL 241 or BIOL 251	Fundamentals of Anatomy and Physiology II Human Anatomy and Physiology II	4
Two semesters of Chemistry, including labs		8
Two semesters of Physics, including labs		8
Psychology		3
An introductory course in Biomechanics or Kinesiology recommended but not required		
Total Credit Hours		38

DPT Curriculum

Year 1

<i>Summer Year 1</i>		
PT 621	Introduction to Physical Therapy	2
AT 691	Gross Anatomy for the Rehabilitation Sciences	6
<i>Fall Year 1</i>		
PT 627	Theory and Practice I	4

PT 630	Mechanical Properties of Human Tissues in Rehabilitation	1
PT 634	Clinical Sciences I	3
PT 638	Exercise Physiology	2
PT 640	Patient Evaluation I	3
PT 655	Clinical Problem Solving I	3
PT 665	Biomechanics/Kinesiology I	3
<i>Spring Year 1</i>		
PT 628	Theory and Practice II	4
PT 635	Clinical Sciences II	3
PT 641	Patient Evaluation II	3
PT 656	Clinical Problem Solving II	3
PT 666	Biomechanics/Kinesiology II	2
PT 792	Neuroscience I	3
Year 2		
<i>Summer Year 2</i>		
PT 669	Clinical Experience I	4
<i>Fall Year 2</i>		
PT 793	Neuroscience II	3
PT 810	Scientific Inquiry I	3
PT 826	Theory and Practice III	4
PT 836	Clinical Sciences III	3
PT 857	Clinical Problem Solving III	3
PT 880	Psychosocial Aspects of Patient Care	2
PT 884	Clinical Teaching and Professional Communication	3
<i>Spring Year 2</i>		
PT 822	Scientific Inquiry II	2
PT 827	Theory and Practice IV	4
PT 837	Clinical Sciences IV	3
PT 842	Patient Evaluation III	3
PT 858	Clinical Problem Solving IV	3
PT 881	Inter-Professional Case Management for Special Populations	3
Year 3		
<i>Summer Year 3</i>		
PT 875	Clinical Experience II	6
<i>Fall Year 3</i>		
PT 870	Pediatric Rehabilitation	3
PT 882	Practice Management	3
PT 883	Professional Issues in Physical Therapy	2
PT 890	Differential Diagnosis Seminar	3
PT 891	Seminar in Scientific Inquiry	3
PT 896	Topics in Physical Therapy II	1
<i>Spring Year 3</i>		
PT 876	Clinical Experience III	7
Total Credit Hours		116

School of Speech-Language Pathology

School of Speech-Language Pathology
 Dr. Stacie Raymer, Chair, Graduate Program Director
 Dr. Rachel Johnson, Undergraduate Program Director

The School of Speech-Language Pathology offers undergraduate and graduate degrees that prepare professionals to address communication and swallowing disorders and differences that disrupt learning, health, and quality of life for people across the lifespan. As stipulated by our accreditation status, the degrees are offered primarily in face-to-face format. The bachelor's degree offers elective opportunities for early clinical

experiences in preparation for master's degree programs in speech-language pathology (offered at Old Dominion University) or clinical doctoral programs in audiology (offered at other universities) where students become licensed and certified for clinical practice. The MS Speech-Language Pathology program prepares professionals for national certification and state licensure as a speech-language pathologist.

Programs

MS Speech-Language Pathology (p. 316)

Master of Science Speech-Language Pathology (MS)

Stacie Raymer, Graduate Program Director
 241 Lions Child Study Center
 757-683-4522

The Master of Science - Speech-Language Pathology education program (residential) is accredited by the Council on Academic Accreditation (CAA) in Audiology and Speech-Language Pathology, which is affiliated with the American Speech-Language-Hearing Association (2200 Research Boulevard #310, Rockville, Maryland 20850, phone: 800-498-2071 or 301-296-5700).

In compliance with federal disclosure regulations, the ODU M.S. in Speech-Language Pathology program meets the educational requirements for professional speech-language pathology licensure in the Commonwealth of Virginia. The degree prepares professionals to meet certification standards to apply for the Certificate of Clinical Competence in Speech-Language Pathology through curriculum and clinical activities that guide students to understand, identify, assess, and develop intervention programs for children and adults who present a wide array of speech, language, and swallowing disorders and differences. In addition to coursework, students engage in supervised on-campus practica in the ODU Speech and Hearing Clinic/Scottish Rite Center for Childhood Speech and Language Disorders. Students also complete two off-campus externships in settings such as public schools, hospitals, private practices, rehabilitation centers, and clinics. Graduate students also must successfully pass a written comprehensive examination. Upon graduation, all students will be prepared to complete the national examination in Speech-Language Pathology (Praxis) and apply for ASHA certification and licensure in the Commonwealth of Virginia and most other states. Student outcome data and the program strategic plan can be accessed on the program website: M.S. Speech-Language Pathology | Old Dominion University (odu.edu) (<https://www.odu.edu/speech-language-pathology/academics/msed/>).

Admission

Application and Admission

Application to the ODU MS Speech-Language Pathology program takes place through Communication Sciences and Disorders Centralized Application System (CSDCAS, <https://csdcas.liaisoncas.org/csdcas-students/>). The deadline to submit all documents (application, all transcripts, three letters of recommendation, essay) to CSDCAS is February 1 of each year. After submission of the CSDCAS application, students will receive an email from ODU Graduate Admissions to submit an ODU application fee. No additional documents are needed with the ODU application. Admission decisions take place after March 1 for admissions in Fall of that year.

Students with an undergraduate degree in speech-language pathology/communication sciences and disorders and students with bachelors degrees outside the discipline who have completed leveling coursework are eligible for acceptance into the program. The normal matriculation for a student who has completed undergraduate requirements in the field is two full years (6 semesters) of full-time enrollment. Prerequisite courses are accepted from other institutions and include: introduction to communication disorders; anatomy of speech and language; phonetics; speech sound disorders; language development; speech science; intro to audiology; and aural rehabilitation.

Admission to the graduate program in speech-language pathology is granted after a competitive review completed by the program faculty. Individuals

entering the master's degree program in speech-language pathology must possess an undergraduate degree by the Fall and will be required to submit final official transcripts to ODU prior to graduate enrollment.

The following minimum requirements are necessary to be considered for admission to the program's competitive application cycle:

1. a baccalaureate degree from an institution accredited by a regional accrediting body or an equivalent degree from a foreign institution;
2. an undergraduate grade point average of 2.80 or better;
3. three letters of recommendation, at least two of which should be from prior university instructors;
4. a 500 word essay describing the student's personal experiences and background that influence their potential to meet professional practice competencies (accountability, integrity, cultural competence, collaborative practice).
5. Please note: At this time, no GRE score is required.

Curriculum Requirements

Prerequisite Courses (or Equivalent from another Institution)

CSD 350	Survey in Communication Disorders	3
or CSD 452	Introduction to Voice and Fluency Disorders	
CSD 351	Anatomy of Speech, Language, and Swallowing	3
CSD 352	Phonetics	3
CSD 451/551	Introduction to Speech Sound Disorders	3
CSD 453/553	Speech and Language Development	3
CSD 458/558	Speech and Hearing Science	3
CSD 460/560	Hearing Disorders and Basic Audiometry	3
CSD 461/561	Aural Rehabilitation I	3
Total Credit Hours		24

Core Courses

CSD 612	Research and Evidence Based Practice in Speech-Language Pathology	3
CSD 651	Spoken and Written Language Disorders: School-Aged Children	3
CSD 652	Speech Sound Disorders	3
CSD 653	Language Disorders: Birth to Five Years	3
CSD 655	Voice and Resonance Disorders	2
CSD 656	Theories and Therapies in Stuttering	2
CSD 657	Aphasia	3
CSD 658	Swallowing Disorders	3
CSD 659	Augmentative and Alternative Communication	3
CSD 660	Procedures in Audiology	3
CSD 662	Cognitive-Communication Disorders	3
CSD 663	Clinical Perspectives on Autism Spectrum Disorders	2
CSD 664	Culturally Sustaining Communication Practices in Speech-Language Pathology	1
CSD 665	Theories of Supervision in Speech-Language Pathology	1
CSD 750	Neuromotor Speech Disorders	3

Clinical Practica

CSD 669	Clinical Practicum in Speech-Language Pathology I, II, III	3
CSD 668	Advanced Clinical Externship in Speech-Language Pathology (I, II)	3
Complete 9 more clinic credits in CSD 668 & CSD 669		9
Total Credit Hours		53

Additional Requirements

Continuance

Once admitted to the program, students must:

1. maintain a grade point average of 3.00;
2. satisfactorily complete all practica and externships;
3. earn no more than two grades below B-. Students must retake courses in which grades below B- are earned and receive grades of B- or higher. Obtaining three grades below B- leads to expulsion from the program;
4. meet prerequisite competencies (25 observation hours) in order to be admitted to clinical practica;
5. complete the CITI Responsible Conduct of Research (Social and Behavioral) training modules. See <https://www.odu.edu/impact/responsible-conduct-of-training> (<https://www.odu.edu/impact/responsible-conduct-of-training/>).

Exit

Students must:

1. have a grade point average of 3.00;
2. pass the department writing proficiency examination;
3. meet all academic competencies;
4. meet all clinical competencies;
5. pass a written comprehensive examination.

Comprehensive Examination

All students seeking a master's degree in speech-language pathology are required to successfully complete a written comprehensive examination. Topics of examination are based upon program coursework and related areas of professional preparation. If any topic is not successfully completed during the first administration, the student is allowed only one more attempt to pass that topic. Failure to pass any topic on the second administration leads to expulsion from the program.

Program Requirements

All students who have met prerequisite requirements must complete 53 semester hours of graduate study in speech-language pathology (38 academic credits and 15 clinical credits). Students are expected to satisfy all professional, academic, and clinical requirements and demonstrate professional, ethical, and communication behaviors commensurate with the certification standards of the profession and accreditation standards of the program.

Ellmer School of Nursing

<http://www.odu.edu/nursing> (<http://www.odu.edu/nursing/>)

1881 University Drive, Virginia Beach Higher Education Center
757-683-4298

Rene Love, Dean

Janice Hawkins, Chair Advanced Practice Nursing, Graduate Program
Director

Graduate Nursing Programs

The Ellmer School of Nursing offers graduate programs leading to the Master of Science in Nursing (M.S.N) and the Doctor of Nursing Practice (D.N.P). All graduate nursing programs are offered in an online/hybrid and on-campus format with the exception of Nurse Anesthesia. Graduate nursing programs are designed to prepare graduates with expertise in theory, research, and advanced nursing practice. Through academic courses and clinical experiences, graduate students are prepared to meet the present nationwide demand for nurses in advanced practice, leadership and education. The graduate nursing program is fully accredited by the Commission on Collegiate Nursing Education (CCNE).

Graduate students may specialize in a variety of roles. All specialties emphasize development of the nursing role through advanced theory and research. The program strives to instill leadership responsibility, professional commitment, and a holistic approach to health and nursing care in its graduates.

The number of credits required for the Master of Science in Nursing degree varies and reflects specific courses and practicum requirements necessary for certification in a specialty area of professional nursing practice. Tracks in the MSN program are designed for completion in five consecutive semesters following a full-time schedule; a part-time curriculum schedule may be available for selected tracks upon request.

NURS 800 and NURS 809, incorporated into the MSN core curriculum, are required prerequisites for the DNP. Before completion of the MSN, graduate students will be asked to indicate whether or not they intend to continue their studies to earn the DNP.

Refer to the Ellmer School of Nursing website at www.odu.edu/nursing (<http://www.odu.edu/nursing/>) for program specific course schedules.

Programs

Doctor of Nursing Practice Programs

- Nursing Practice with a Concentration in Advanced Practice (DNP) (p. 327)
- Nursing Practice with a Concentration in Nurse Anesthesia (DNP) (p. 328)
- Nursing Practice with a Concentration in Nurse Executive (DNP) (p. 329)
- Nursing Practice with a Concentration in Post-Masters Adult Gerontology Clinical Nurse Specialist (DNP) (p. 330)
- Nursing Practice with a Concentration in Post-Masters Neonatal Clinical Nurse Specialist (DNP) (p. 331)
- Nursing Practice with a Concentration in Post-Masters Pediatric Clinical Nurse Specialist (DNP) (p. 331)
- Nursing Practice with a Concentration in Post-Masters Psychiatric Mental Health Nurse Practitioner (DNP) (p. 332)

Master of Science in Nursing Programs

- Nursing with a Concentration in Adult Gerontology Clinical Nurse Specialist-Educator (MSN) (p. 318)
- Nursing with a Concentration in Family Nurse Practitioner (MSN) (p. 319)
- Nursing with a Concentration in Neonatal Clinical Nurse Specialist (MSN) (p. 321)

- Nursing with a Concentration in Neonatal Nurse Practitioner (MSN) (p. 322)
- Nursing with a Concentration in Nurse Midwifery (MSN) (p. 323)
- Nursing with a Concentration in Pediatric Clinical Nurse Specialist (MSN) (p. 324)
- Nursing with a Concentration in Pediatric Nurse Practitioner (MSN) (p. 325)
- Nursing with a Concentration in Psychiatric-Mental Health Nurse Practitioner (MSN) (p. 326)

Certificate Programs

- Neonatal Physician Assistant Certificate (p. 333)
- Nurse Educator Certificate (p. 334)
- Post-Professional - Adult Gerontology, Clinical Nurse Specialist Certificate (p. 334)
- Post-Professional - Family Nurse Practitioner Certificate (p. 334)
- Post-Professional - Psychiatric Mental Health Nurse Practitioner Certificate (p. 335)

Master of Nursing

Nursing with a Concentration in Adult Gerontology Clinical Nurse Specialist-Educator (MSN)

Adult Gerontology Clinical Nurse Specialist/Educator

Pamela Bishop, Program Director

The School of Nursing offers a curriculum leading to the degree of Master of Science in Nursing with an advanced practice area of Adult Gerontology Clinical Nurse Specialist (CNS)/Educator. The program of study prepares students as expert clinicians in the application of evidence-based knowledge within the realms of nursing interventions, teaching and research. Students also receive preparation as nurse educators, and are therefore dually prepared for clinical and academic roles.

The program requires course content in theory, research, education, and Adult Gerontology CNS professional and clinical cores. Applicants are admitted for either full-time or part-time study and begin in the fall. The curriculum is designed to prepare nurses as Adult Gerontology Clinical Nurse Specialists. Graduates of this program are eligible to sit for the American Nurses' Association (ANCC) Adult Gerontology Clinical Nurse Specialist Certification Exam or the American Association of Critical Care Nurses (AACN) Acute Care Adult-Gerontology (AACNS-AG) Exam. *The MSN - Adult Gerontology Clinical Nurse Specialist/Educator program is offered in an online/hybrid format.*

Admission

Program Application Deadlines

Clinical Nurse Specialist - Adult Gerontology Clinical Nurse Specialist/Educator

Priority Deadline: June 1

Admission Requirements for the MSN Graduate Program

In addition to meeting University requirements, applicants must meet the admission criteria below.

*Note: Some MSN tracks may have additional requirements. See program description for more information.

1. Current, unencumbered license as a registered nurse (RN).
2. Must have completed an undergraduate physical/health assessment course and an undergraduate statistics or research course as confirmed

by an official college transcript. Applicants who have not completed these pre-requisites prior to the application deadline will not be reviewed for admission.

3. Baccalaureate degree in nursing or related science field from a regionally accredited college or university with a minimum of a 3.0 grade point average.
4. Three letters of recommendation, with at least one from a former faculty member and at least one from a former employer while in the RN role.
5. A 500-700 word essay that addresses the applicant's goals and reasons for seeking certification as an advanced practice nurse.
6. At least one year of recent clinical nursing practice experience is preferred, but not required. See any specific program requirements.

Curriculum Requirements

Core Courses

Tracks in the MSN programs share a set of core courses that meet nursing accreditation and state approval guidelines for the degree. Regardless of the role concentration, all MSN students are required to complete the following **22 credits*** of core courses.

NURS 709	Evidence-Based Research for Nursing Practice	3
NURS 719	Family and Community Primary Care Assessment	1
NURS 761	Pharmacology for Advanced Practice Nursing	3
NURS 770	Pathophysiology for Advanced Nursing Practice	3
NURS 771	Physical Assessment for Advanced Nursing Practice	3
NURS 800	Integrative Concepts for Advanced Nursing Practice Roles	3
NURS 802	The Business of Advanced Nursing Practice	3
NURS 809	Advocacy for Healthcare Public Policy for Advanced Practice	3
Total Credit Hours		22

Adult Gerontology Clinical Nurse Specialist-Educator Concentration

In addition to the 22 credits of MSN core courses, the following courses are required for degree completion of the CNS/Educator program for a total of 47 credits.

NURS 530	Principles of Practice: Contemporary Issues in Nursing Care of the Older Adult	2
NURS 720	Instructional Delivery Methods & Learner Assessment	3
NURS 730	Nursing Curricular Design and Program Evaluation	3
NURS 734	Educator Internship: Classroom Instruction	3
NURS 738	Clinical Nurse Specialist I: Introduction to Practice	2
NURS 739	Clinical Nurse Specialist Practicum I: Role Socialization	4
NURS 756	Clinical Nurse Specialist II: Transition to Practice	3
NURS 757	Clinical Nurse Specialist Practicum II: Role Transition	5
Total Credit Hours for Concentration		25
Total Credit Hours for Degree		47

Additional Requirements

MSN Degree Requirements

In addition to general University requirements, the following apply to candidates for the Master of Science in Nursing degree:

1. Only degree-seeking students may take graduate MSN nursing courses.
2. Contact the graduate nursing office regarding study options for each program at (757) 683-4298 or the program director for the specific role.
3. A comprehensive portfolio evaluation covering the program of study will be required for MSN students.
4. The student must make clinical site arrangements three months in advance to take a nursing practicum to assure appropriate and available placement for the learning experience. The student must coordinate approval of clinical sites with the Program Director and School of Nursing Student Clinical Services Coordinator.
5. The B grade (3.00) is the minimal acceptable grade for all courses with a NURS prefix or any course required for the degree for continuation in the master's program. Satisfactory performance in the laboratory or practicum component of a nursing course is required. Students achieving less than a B grade (3.00) in a nursing course may request an opportunity from the role program director to repeat the course once. Two course failures will result in termination from the nursing program. Students may not progress with an incomplete in prerequisite courses as listed in the curriculum plan.

Additional requirements include physical exams, CPR certification, immunization requirements, computer competencies and technical standards, background checks and urine drug screening.

Transfers Between MSN Programs

Students may not transfer between programs in the MSN. Any student wishing to change programs may apply to a new program for admission during the regularly scheduled application process and deadline for the program. Their applications will be considered and reviewed as a new admission with the entire application pool.

Progression to the DNP

MSN students wishing to pursue a DNP must declare their intention before the final semester of their MSN program. If pursuing the DNP Advanced Practice program, NURS 805 and NURS 865 are taken in the final semester of the MSN program. Any student who has completed their MSN and did not declare their intent to pursue the DNP must apply and be considered with all post masters applicants as a new admission to the DNP program.

Transfer Credit Evaluation Policy

Any transfer credit requests must be submitted to the concentration program director within two weeks of notification of admission to the program. Once coursework has commenced for your program of study, all coursework must be completed at Old Dominion University, and no further transfer credits will be awarded.

Master of Nursing Nursing with a Concentration in Family Nurse Practitioner (MSN)

Master of Science in Nursing – Family Nurse Practitioner

Lisa Cordero, Program Director

The family nurse practitioner (FNP) role prepares graduate students to provide a full range of primary care services to individuals and families throughout the life span. In collaboration with other health care professionals, graduate students provide health promotion, health maintenance and restorative care to well, at-risk, and chronically ill clients and their families. Student clinical experiences are provided in a variety of primary care settings. Successful completion of the program qualifies

students to register for the AANP or ANCC examination for certification as a family nurse practitioner. *The MSN - Family Nurse Practitioner is offered in an online/hybrid format.*

Admission

Program Application Deadlines

Nurse Practitioner

- Family Nurse Practitioner - March 1

Admission Requirements for the MSN Graduate Program

In addition to meeting University requirements, applicants must meet the admission criteria below.

*Note: Some MSN tracks may have additional requirements. See program description for more information.

1. Current, unencumbered license as a registered nurse (RN).
2. Must have completed an undergraduate physical/health assessment course and an undergraduate statistics or research course as confirmed by an official college transcript. Applicants who have not completed these pre- requisites prior to the application deadline will not be reviewed for admission.
3. Baccalaureate degree in nursing or related science field from a regionally accredited college or university with a minimum of a 3.0 grade point average.
4. Three letters of recommendation, with at least one from a former faculty member and at least one from a former employer while in the RN role.
5. A 500-700 word essay that addresses the applicant's goals and reasons for seeking certification as an advanced practice nurse.
6. At least one year of recent clinical nursing practice experience is preferred, but not required. See any specific program requirements.

Curriculum Requirements

Core Courses

Tracks in the MSN programs share a set of core courses that meet nursing accreditation and state approval guidelines for the degree. Regardless of the role concentration, all MSN students are required to complete the following **22 credits*** of core courses.

NURS 709	Evidence-Based Research for Nursing Practice	3
NURS 719	Family and Community Primary Care Assessment	1
NURS 761	Pharmacology for Advanced Practice Nursing	3
NURS 770	Pathophysiology for Advanced Nursing Practice	3
NURS 771	Physical Assessment for Advanced Nursing Practice	3
NURS 800	Integrative Concepts for Advanced Nursing Practice Roles	3
NURS 802	The Business of Advanced Nursing Practice	3
NURS 809	Advocacy for Healthcare Public Policy for Advanced Practice	3
Total Credit Hours		22

Family Nurse Practitioner Concentration

In addition to the 22 credits of MSN core courses, the following courses are required for degree completion of the FNP/MSN for a program total of 47 credits.

Each semester in the program students are assessed a non-refundable program fee of \$450 to be paid in addition to tuition. The fee covers a variety of program-related expenses outside of tuition and books.

NURS 705	Primary Care Approaches for Children	3
NURS 721	Aging in the 21st Century	3
NURS 760	Advanced Family Nursing I Practicum	3
NURS 762	Advanced Family Nursing I: Management of Acute Illnesses	3
NURS 764	Advanced Family Nursing II Practicum	4
NURS 765	Advanced Family Nursing II: Management of Chronic Illnesses	3
NURS 766	Primary Care Approaches for Women	3
NURS 767	Advanced Family Nursing III Practicum	3
Total Credit Hours for Concentration		25
MSN Core Requirements		22
Total Credit Hours		47

Additional Requirements

MSN Degree Requirements

In addition to general University requirements, the following apply to candidates for the Master of Science in Nursing degree:

1. Only degree-seeking students may take graduate MSN nursing courses.
2. Contact the graduate nursing office regarding study options for each program at (757) 683-4298 or the program director for the specific role.
3. A comprehensive portfolio evaluation covering the program of study will be required for MSN students.
4. The student must make clinical site arrangements three months in advance to take a nursing practicum to assure appropriate and available placement for the learning experience. The student must coordinate approval of clinical sites with the Program Director and School of Nursing Student Clinical Services Coordinator.
5. The B grade (3.00) is the minimal acceptable grade for all courses with a NURS prefix or any course required for the degree for continuation in the master's program. Satisfactory performance in the laboratory or practicum component of a nursing course is required. Students achieving less than a B grade (3.00) in a nursing course may request an opportunity from the role program director to repeat the course once. Two course failures will result in termination from the nursing program. Students may not progress with an incomplete in prerequisite courses as listed in the curriculum plan.

Additional requirements include physical exams, CPR certification, immunization requirements, computer competencies and technical standards, background checks and urine drug screening.

Transfers Between MSN Programs

Students may not transfer between programs in the MSN. Any student wishing to change programs may apply to a new program for admission during the regularly scheduled application process and deadline for the program. Their applications will be considered and reviewed as a new admission with the entire application pool.

Progression to the DNP

MSN students wishing to pursue a DNP must declare their intention before the final semester of their MSN program. If pursuing the DNP Advanced Practice program, NURS 805 and NURS 865 are taken in the final semester of the MSN program. Any student who has completed their MSN and did not declare their intent to pursue the DNP must apply and be considered with all post masters applicants as a new admission to the DNP program.

Transfer Credit Evaluation Policy

Any transfer credit requests must be submitted to the concentration program director within two weeks of notification of admission to the program. Once coursework has commenced for your program of study, all coursework must be completed at Old Dominion University, and no further transfer credits will be awarded.

Master of Nursing Nursing with a Concentration in Neonatal Clinical Nurse Specialist (MSN)

Master of Science in Nursing - Neonatal Clinical Nurse Specialist

Pamela Bishop, Program Director

The School of Nursing offers a curriculum leading to the degree of Master of Science in Nursing with an advanced practice area of Neonatal Clinical Nurse Specialist. The program of study prepares students as expert clinicians in the application of evidence-based knowledge within the realms of nursing interventions, teaching and research.

The program requires course content in theory, research, education, Neonatal CNS professional and clinical cores. Applicants are admitted for full-time or part-time study and can begin in the fall. The curriculum is designed to prepare nurses as Neonatal Clinical Nurse Specialists. Graduates of this program are eligible to sit for the American Association of Critical Care Nurses (AACN) Acute Care Neonatal (ACCNS-N) Exam. *The MSN - Neonatal Clinical Nurse Specialist is offered in an online/hybrid format.*

Admission

Program Application Deadlines

Clinical Nurse Specialist - Completed applications will be reviewed prior to June 1 for fall enrollment for:

- Adult Gerontology Clinical Nurse Specialist/Educator
- Neonatal Clinical Nurse Specialist
- Pediatric Clinical Nurse Specialist

Admission Requirements for the MSN Graduate Program

In addition to meeting University requirements, applicants must meet the admission criteria below.

*Note: Some MSN tracks may have additional requirements. See program description for more information.

1. Current, unencumbered license as a registered nurse (RN), and preferred 1 year of current experience in the role.
2. Must have completed an undergraduate physical/health assessment course and an undergraduate statistics or research course as confirmed by an official college transcript. Applicants who have not completed these pre-requisites prior to the application deadline will not be reviewed for admission.
3. Baccalaureate degree in nursing or related science field from a regionally accredited college or university with a minimum of a 3.0 grade point average.
4. Three letters of recommendation, with at least one from a former faculty member and at least one from a former employer while in the RN role.
5. A 500-700 word essay that addresses the applicant's goals and reasons for seeking certification as an advanced practice nurse.
6. At least one year of recent clinical nursing practice experience is preferred, but not required. See any specific program requirements.

Curriculum Requirements

Core Courses

Tracks in the MSN programs share a set of core courses that meet nursing accreditation and state approval guidelines for the degree. Regardless of the role concentration, all MSN students are required to complete the following **22 credits*** of core courses.

NURS 709	Evidence-Based Research for Nursing Practice	3
NURS 719	Family and Community Primary Care Assessment	1
NURS 761	Pharmacology for Advanced Practice Nursing	3
NURS 770	Pathophysiology for Advanced Nursing Practice	3
NURS 771	Physical Assessment for Advanced Nursing Practice	3
NURS 800	Integrative Concepts for Advanced Nursing Practice Roles	3
NURS 802	The Business of Advanced Nursing Practice	3
NURS 809	Advocacy for Healthcare Public Policy for Advanced Practice	3
Total Credit Hours		22

Neonatal Clinical Nurse Specialist Concentration

In addition to the 22 credits of MSN core courses, the following courses are required for degree completion of the CNS/Neonatal program for a total of 50 credits.

NURS 738	Clinical Nurse Specialist I: Introduction to Practice	2
NURS 739	Clinical Nurse Specialist Practicum I: Role Socialization	4
NURS 751	Developmental Neonatal Physiology	2
NURS 756	Clinical Nurse Specialist II: Transition to Practice	3
NURS 757	Clinical Nurse Specialist Practicum II: Role Transition	5
NURS 772	Foundations of Advanced Neonatal Care	3
NURS 773	Pharmacology for Advanced Neonatal Care	3
NURS 774	Advanced Neonatal Care: High Risk Management I	3
NURS 775	Advanced Neonatal Care: High Risk Management II	3
Total Concentration Credit Hours		28
MSN Core Requirements		22
Total Credit Hours		50

Additional Requirements

MSN Degree Requirements

In addition to general University requirements, the following apply to candidates for the Master of Science in Nursing degree:

1. Only degree-seeking students may take graduate MSN nursing courses.
2. Contact the graduate nursing office regarding study options for each program at (757) 683-4298 or the program director for the specific role.
3. A comprehensive portfolio evaluation covering the program of study will be required for MSN students.
4. The student must make clinical site arrangements three months in advance to take a nursing practicum to assure appropriate and available placement for the learning experience. The student must coordinate approval of clinical sites with the Program Director and School of Nursing Student Clinical Services Coordinator.
5. The B grade (3.00) is the minimal acceptable grade for all courses with a NURS prefix or any course required for the degree for continuation in the master's program. Satisfactory performance in the laboratory or practicum component of a nursing course is required. Students achieving less than a B grade (3.00) in a nursing course may request an opportunity from the role program director to repeat the course once. Two course failures will result in termination from the nursing program.

Students may not progress with an incomplete in prerequisite courses as listed in the curriculum plan.

Additional requirements include physical exams, CPR certification, immunization requirements, computer competencies and technical standards, background checks and urine drug screening.

Transfers Between MSN Programs

Students may not transfer between programs in the MSN. Any student wishing to change programs may apply to a new program for admission during the regularly scheduled application process and deadline for the program. Their applications will be considered and reviewed as a new admission with the entire application pool.

Progression to the DNP

MSN students wishing to pursue a DNP must declare their intention before the final semester of their MSN program. If pursuing the DNP Advanced Practice program, NURS 805 and NURS 865 are taken in the final semester of the MSN program. Any student who has completed their MSN and did not declare their intent to pursue the DNP must apply and be considered with all post masters applicants as a new admission to the DNP program.

Transfer Credit Evaluation Policy

Any transfer credit requests must be submitted to the concentration program director within two weeks of notification of admission to the program. Once coursework has commenced for your program of study, all coursework must be completed at Old Dominion University, and no further transfer credits will be awarded.

Master of Nursing Nursing with a Concentration in Neonatal Nurse Practitioner (MSN)

Master of Science in Nursing - Neonatal Nurse Practitioner

Alyssa Weiss, Program Director

The neonatal nurse practitioner (NNP) provides population-focused health care to preterm (<37 weeks) and term neonates, infants, and children up to 2 years of age. As a key member of an interprofessional team, the NNP participates in a wide variety of complex patient care activities in settings that include, but are not limited to, all levels of neonatal inpatient care in both academic and community-based settings; transport, acute care, and chronic care settings; delivery rooms; and outpatient settings. Student clinical experiences are designed to prepare the graduate to practice as an NNP providing direct patient care in a newborn nursery, or in a Level II, III, or IV NICU. Successful completion of the program qualifies students to register for the examination for certification as neonatal nurse practitioner. For admission requirements see the website for the School of Nursing at <http://www.odu.edu/nursing> or contact the program director. *The MSN - Neonatal Nurse Practitioner program is offered in an online/hybrid format.*

Admission

Program Application Deadlines

Nurse Practitioner

- Neonatal Nurse Practitioner - Priority Deadline May 1

Admission Requirements for the MSN Graduate Program

In addition to meeting University requirements, applicants must meet the admission criteria below.

*Note: Some MSN tracks may have additional requirements. See program description for more information.

1. Current, unencumbered license as a registered nurse (RN), and preferred 1 year of current experience in the role.

2. Must have completed an undergraduate physical/health assessment course and an undergraduate statistics or research course as confirmed by an official college transcript. Applicants who have not completed these prerequisites prior to the application deadline will not be reviewed for admission.
3. Baccalaureate degree in nursing or related science field from a regionally accredited college or university with a minimum of a 3.0 grade point average.
4. Three letters of recommendation with at least one from a former faculty member and at least one from a former employer while in the RN role.
5. A 500-700 word essay that addresses the applicant's goals and reasons for seeking certification as an advanced practice nurse.
6. A minimum of 2 years of neonatal intensive care nursing experience prior to the start of clinical courses is required.

Curriculum Requirements

Core Courses

Tracks in the MSN programs share a set of core courses that meet nursing accreditation and state approval guidelines for the degree. Regardless of the role concentration, all MSN students are required to complete the following **22 credits*** of core courses.

NURS 709	Evidence-Based Research for Nursing Practice	3
NURS 719	Family and Community Primary Care Assessment	1
NURS 761	Pharmacology for Advanced Practice Nursing	3
NURS 770	Pathophysiology for Advanced Nursing Practice	3
NURS 771	Physical Assessment for Advanced Nursing Practice	3
NURS 800	Integrative Concepts for Advanced Nursing Practice Roles	3
NURS 802	The Business of Advanced Nursing Practice	3
NURS 809	Advocacy for Healthcare Public Policy for Advanced Practice	3
Total Credit Hours		22

Neonatal Nurse Practitioner Concentration

In addition to the 22 credits of MSN core courses, the following courses are required for degree completion of the NNP/MSN for a program total of 49 credits.

Each semester in the program students are assessed a non-refundable program fee of \$450 to be paid in addition to tuition. The fee covers a variety of program-related expenses outside of tuition and books.

NURS 751	Developmental Neonatal Physiology	2
NURS 772	Foundations of Advanced Neonatal Care	3
NURS 773	Pharmacology for Advanced Neonatal Care	3
NURS 774	Advanced Neonatal Care: High Risk Management I	3
NURS 775	Advanced Neonatal Care: High Risk Management II	3
NURS 776	Advance Neonatal Nursing Practicum I	3
NURS 778	Advanced Neonatal Nursing: Practicum II	4
NURS 779	Seminar in Pediatrics: Management of Chronic and Complex Neonatal Clinical Problems	2
NURS 789	Advanced Neonatal Nursing Practicum III	4
Total Concentration Credit Hours		27
MSN Core Requirements		22
Total Credit Hours		49

Additional Requirements

MSN Degree Requirements

In addition to general University requirements, the following apply to candidates for the Master of Science in Nursing degree:

1. Only degree-seeking students may take graduate MSN nursing courses.
2. Contact the graduate nursing office regarding study options for each program at (757) 683-4298 or the program director for the specific role.
3. A comprehensive portfolio evaluation covering the program of study will be required for MSN students.
4. The student must make clinical site arrangements three months in advance to take a nursing practicum to assure appropriate and available placement for the learning experience. The student must coordinate approval of clinical sites with the Program Director and School of Nursing Student Clinical Services Coordinator.
5. The B grade (3.00) is the minimal acceptable grade for all courses with a NURS prefix or any course required for the degree for continuation in the master's program. Satisfactory performance in the laboratory or practicum component of a nursing course is required. Students achieving less than a B grade (3.00) in a nursing course may request an opportunity from the role program director to repeat the course once. Two course failures will result in termination from the nursing program. Students may not progress with an incomplete in prerequisite courses as listed in the curriculum plan.

Additional requirements include physical exams, CPR certification, immunization requirements, computer competencies and technical standards, background checks and urine drug screening.

Transfers Between MSN Programs

Students may not transfer between programs in the MSN. Any student wishing to change programs may apply to a new program for admission during the regularly scheduled application process and deadline for the program. Their applications will be considered and reviewed as a new admission with the entire application pool.

Progression to the DNP

MSN students wishing to pursue a DNP must declare their intention before the final semester of their MSN program. If pursuing the DNP Advanced Practice program, NURS 805 and NURS 865 are taken in the final semester of the MSN program. Any student who has completed their MSN and did not declare their intent to pursue the DNP must apply and be considered with all post masters applicants as a new admission to the DNP program.

Transfer Credit Evaluation Policy

Any transfer credit requests must be submitted to the concentration program director within two weeks of notification of admission to the program. Once coursework has commenced for your program of study, all coursework must be completed at Old Dominion University, and no further transfer credits will be awarded.

Master of Nursing Nursing with a Concentration in Nurse Midwifery (MSN)

Master of Science in Nursing - Nurse Midwifery (cooperative program with Shenandoah University)

Alyssa Weiss, Program Director
Penny Marzalik, Shenandoah University Program Director

The Master's in Nursing, with specialization in nurse midwifery, is a joint program with Shenandoah University. The two-year program includes advanced practice nursing content offered by Old Dominion University. Midwifery specific courses taken in the second year are through Shenandoah University. The Master of Science in Nursing is awarded by

Old Dominion University and a certificate of midwifery specialty is awarded by Shenandoah University. Graduates are eligible to take the national midwifery certification examination. The program is full time study. *The MSN - Nurse Midwifery is offered in an online/hybrid format.*

Admission

Program Application Deadlines

Nurse Midwifery - May 1

Admission Requirements for the MSN Graduate Program

In addition to meeting University requirements, applicants must meet the admission criteria below.

*Note: Some MSN tracks may have additional requirements. See program description for more information.

1. Current, unencumbered license as a registered nurse (RN).
2. Must have completed an undergraduate physical/health assessment course and an undergraduate statistics or research course as confirmed by an official college transcript. Applicants who have not completed these pre- requisites prior to the application deadline will not be reviewed for admission.
3. Baccalaureate degree in nursing or related science field from a regionally accredited college or university with a minimum of a 3.0 grade point average.
4. Three letters of recommendation, with at least one from a former faculty member and at least one from a former employer while in the RN role.
5. A 500-700 word essay that addresses the applicant's goals and reasons for seeking certification as an advanced practice nurse.
6. At least one year of recent clinical nursing practice experience is preferred, but not required.

Curriculum Requirements

Core Courses

Tracks in the MSN programs share a set of core courses that meet nursing accreditation and state approval guidelines for the degree. Regardless of the role concentration, all MSN students are required to complete the following **22 credits*** of core courses.

NURS 709	Evidence-Based Research for Nursing Practice	3
NURS 719	Family and Community Primary Care Assessment	1
NURS 761	Pharmacology for Advanced Practice Nursing	3
NURS 770	Pathophysiology for Advanced Nursing Practice	3
NURS 771	Physical Assessment for Advanced Nursing Practice	3
NURS 800	Integrative Concepts for Advanced Nursing Practice Roles	3
NURS 802	The Business of Advanced Nursing Practice	3
NURS 809	Advocacy for Healthcare Public Policy for Advanced Practice	3
Total Credit Hours		22

Nurse Midwifery Concentration

In addition to the 22 credits of MSN core courses, students must complete 26 credits of nurse midwife courses at SU.

Shenandoah Courses:

NM 610 Primary Care of Women	2
NM 612 Women's Health	2
NM 620 Comprehensive Antepartal Care	2

NMLB 624 Midwifery Practicum I	3
NMLB 630 Midwifery Practicum II	4
NM 640 Comprehensive Perinatal Care	3
NM 641 Perinatal Complications	2
NMLB 651 Integrated Midwifery Internship	5
NM 652 Evidence Based Practice Project	1
NM 660 Advanced Nurse-Midwifery Role Development	2
Total Concentration Credit Hours	26
MSN Core Requirements	22
Total Credit Hours	48

Additional Requirements

MSN Degree Requirements

In addition to general University requirements, the following apply to candidates for the Master of Science in Nursing degree:

1. Only degree-seeking students may take graduate MSN nursing courses.
2. Contact the graduate nursing office regarding study options for each program at (757) 683-4298 or the program director for the specific role.
3. A comprehensive portfolio evaluation covering the program of study will be required for MSN students.
4. The student must make clinical site arrangements three months in advance to take a nursing practicum to assure appropriate and available placement for the learning experience. The student must coordinate approval of clinical sites with the Program Director and School of Nursing Student Clinical Services Coordinator.
5. The B grade (3.00) is the minimal acceptable grade for all courses with a NURS prefix or any course required for the degree for continuation in the master's program. Satisfactory performance in the laboratory or practicum component of a nursing course is required. Students achieving less than a B grade (3.00) in a nursing course may request an opportunity from the role program director to repeat the course once. Two course failures will result in termination from the nursing program. Students may not progress with an incomplete in prerequisite courses as listed in the curriculum plan.

Additional requirements include physical exams, CPR certification, immunization requirements, computer competencies and technical standards, background checks and urine drug screening.

Transfers Between MSN Programs

Students may not transfer between programs in the MSN. Any student wishing to change programs may apply to a new program for admission during the regularly scheduled application process and deadline for the program. Their applications will be considered and reviewed as a new admission with the entire application pool.

Progression to the DNP

MSN students wishing to pursue a DNP must declare their intention before the final semester of their MSN program. If pursuing the DNP Advanced Practice program, NURS 805 and NURS 865 are taken in the final semester of the MSN program. Any student who has completed their MSN and did not declare their intent to pursue the DNP must apply and be considered with all post masters applicants as a new admission to the DNP program.

Transfer Credit Evaluation Policy

Any transfer credit requests must be submitted to the concentration program director within two weeks of notification of admission to the program. Once coursework has commenced for your program of study, all coursework must be completed at Old Dominion University, and no further transfer credits will be awarded.

Master of Nursing Nursing with a Concentration in Pediatric Clinical Nurse Specialist (MSN)

Pam Bishop, Program Director

The School of Nursing offers a curriculum leading to the degree of Master of Science in Nursing with an advanced practice area of Pediatric Clinical Nurse Specialist. The program of study prepares students as expert clinicians in the application of evidence-based knowledge within the realms of nursing interventions, teaching and research.

The program requires course content in theory, research, education, and Pediatric CNS professional and clinical cores. The curriculum is designed to prepare nurses as Pediatric Clinical Nurse Specialists. Graduates of this program are eligible to sit for the American Association of Critical Care Nurses (AACN) Acute Care Pediatric (ACCNS-P) Exam. *The MSN - Pediatric Clinical Nurse Specialist is offered in an online/hybrid format.*

Admission

Program Application Deadlines

Clinical Nurse Specialist

- Pediatric Clinical Nurse Specialist Priority Deadline June 1

Admission Requirements for the MSN Graduate Program

In addition to meeting University requirements, applicants must meet the admission criteria below.

*Note: Some MSN tracks may have additional requirements. See program description for more information.

1. Current, unencumbered license as a registered nurse (RN).
2. Must have completed an undergraduate physical/health assessment course and an undergraduate statistics or research course as confirmed by an official college transcript. Applicants who have not completed these pre- requisites prior to the application deadline will not be reviewed for admission.
3. Baccalaureate degree in nursing or related science field from a regionally accredited college or university with a minimum of a 3.0 grade point average.
4. Three letters of recommendation, with at least one from a former faculty member and at least one from a former employer while in the RN role.
5. A 500-700 word essay that addresses the applicant's goals and reasons for seeking certification as an advanced practice nurse.
6. At least one year of recent clinical nursing practice experience is preferred, but not required. See any specific program requirements.

Curriculum Requirements

Core Courses

Tracks in the MSN programs share a set of core courses that meet nursing accreditation and state approval guidelines for the degree. Regardless of the role concentration, all MSN students are required to complete the following **22 credits*** of core courses.

NURS 709	Evidence-Based Research for Nursing Practice	3
NURS 719	Family and Community Primary Care Assessment	1
NURS 761	Pharmacology for Advanced Practice Nursing	3
NURS 770	Pathophysiology for Advanced Nursing Practice	3

NURS 771	Physical Assessment for Advanced Nursing Practice	3
NURS 800	Integrative Concepts for Advanced Nursing Practice Roles	3
NURS 802	The Business of Advanced Nursing Practice	3
NURS 809	Advocacy for Healthcare Public Policy for Advanced Practice	3
Total Credit Hours		22

Pediatric Clinical Nurse Specialist Concentration

In addition to the 22 credits of MSN core courses, the following courses are required for degree completion of the CNS/Pediatric program for a total of 48 credits.

NURS 705	Primary Care Approaches for Children	3
NURS 738	Clinical Nurse Specialist I: Introduction to Practice	2
NURS 739	Clinical Nurse Specialist Practicum I: Role Socialization	4
NURS 756	Clinical Nurse Specialist II: Transition to Practice	3
NURS 757	Clinical Nurse Specialist Practicum II: Role Transition	5
NURS 782	The Growth and Development of Children in the 21st Century	3
NURS 783	Management of Acute Pediatric Conditions I	3
NURS 786	Management of Acute/Critical Pediatric Conditions II	3
Total Concentration Credit Hours		26
MSN Core Requirements		22
Total Credit Hours		48

Additional Requirements

MSN Degree Requirements

In addition to general University requirements, the following apply to candidates for the Master of Science in Nursing degree:

1. Only degree-seeking students may take graduate MSN nursing courses.
2. Contact the graduate nursing office regarding study options for each program at (757) 683-4298 or the program director for the specific role.
3. A comprehensive portfolio evaluation covering the program of study will be required for MSN students.
4. The student must make clinical site arrangements three months in advance to take a nursing practicum to assure appropriate and available placement for the learning experience. The student must coordinate approval of clinical sites with the Program Director and School of Nursing Student Clinical Services Coordinator.
5. The B grade (3.00) is the minimal acceptable grade for all courses with a NURS prefix or any course required for the degree for continuation in the master's program. Satisfactory performance in the laboratory or practicum component of a nursing course is required. Students achieving less than a B grade (3.00) in a nursing course may request an opportunity from the role program director to repeat the course once. Two course failures will result in termination from the nursing program. Students may not progress with an incomplete in prerequisite courses as listed in the curriculum plan.

Additional requirements include physical exams, CPR certification, immunization requirements, computer competencies and technical standards, background checks and urine drug screening.

Transfers Between MSN Programs

Students may not transfer between programs in the MSN. Any student wishing to change programs may apply to a new program for admission

during the regularly scheduled application process and deadline for the program. Their applications will be considered and reviewed as a new admission with the entire application pool.

Progression to the DNP

MSN students wishing to pursue a DNP must declare their intention before the final semester of their MSN program. If pursuing the DNP Advanced Practice program, NURS 805 and NURS 865 are taken in the final semester of the MSN program. Any student who has completed their MSN and did not declare their intent to pursue the DNP must apply and be considered with all post masters applicants as a new admission to the DNP program.

Transfer Credit Evaluation Policy

Any transfer credit requests must be submitted to the concentration program director within two weeks of notification of admission to the program. Once coursework has commenced for your program of study, all coursework must be completed at Old Dominion University, and no further transfer credits will be awarded.

Master of Nursing Nursing with a Concentration in Pediatric Nurse Practitioner (MSN)

Masters of Science in Nursing - Pediatric Nurse Practitioner

Diana Cartagena, Program Director

The pediatric nurse practitioner (PNP) role prepares graduate students to provide a full range of services to pediatric patients in primary care settings. In collaboration with other health care professionals, graduate students provide health promotion, health maintenance and restorative care to well, at-risk, and chronically ill pediatric patients and their families.

Student clinical experiences are provided in a variety of primary care settings for students pursuing the primary care pediatric role. Successful completion of the program qualifies students to register for the examination for certification as a pediatric nurse practitioner. *The MSN - Pediatric Nurse Practitioner is offered in an online/hybrid format.*

Admission

Program Application Deadlines

Nurse Practitioner

- Pediatric Nurse Practitioner - Priority Deadline March 1

Admission Requirements for the MSN Graduate Program

In addition to meeting University requirements, applicants must meet the admission criteria below.

*Note: Some MSN tracks may have additional requirements. See program description for more information.

1. Current, unencumbered license as a registered nurse (RN), and preferred 1 year of current experience in the role.
2. Must have completed an undergraduate physical/health assessment course and an undergraduate statistics or research course as confirmed by an official college transcript. Applicants who have not completed these pre- requisites prior to the application deadline will not be reviewed for admission.
3. Baccalaureate degree in nursing or related science field from a regionally accredited college or university with a minimum of a 3.0 grade point average.
4. Three letters of recommendation, with at least one from a former faculty member and at least one from a former employer while in the RN role.
5. A 500-700 word essay that addresses the applicant's goals and reasons for seeking certification as an advanced practice nurse.

- At least one year of recent clinical nursing practice experience is preferred, but not required. See any specific program requirements.

Curriculum Requirements

Core Courses

Tracks in the MSN programs share a set of core courses that meet nursing accreditation and state approval guidelines for the degree. Regardless of the role concentration, all MSN students are required to complete the following **22 credits*** of core courses.

NURS 709	Evidence-Based Research for Nursing Practice	3
NURS 719	Family and Community Primary Care Assessment	1
NURS 761	Pharmacology for Advanced Practice Nursing	3
NURS 770	Pathophysiology for Advanced Nursing Practice	3
NURS 771	Physical Assessment for Advanced Nursing Practice	3
NURS 800	Integrative Concepts for Advanced Nursing Practice Roles	3
NURS 802	The Business of Advanced Nursing Practice	3
NURS 809	Advocacy for Healthcare Public Policy for Advanced Practice	3
Total Credit Hours		22

Pediatric Nurse Practitioner Concentration

In addition to the 22 credits of MSN core courses, the following courses are required for degree completion of the PNP/MSN for a program total of 47 credits.

Each semester in the program students are assessed a non-refundable program fee of \$450 to be paid in addition to tuition. The fee covers a variety of program-related expenses outside of tuition and books.

NURS 705	Primary Care Approaches for Children	3
NURS 781	Advanced Pediatric Nursing: Practicum I Primary Care	3
NURS 782	The Growth and Development of Children in the 21st Century	3
NURS 783	Management of Acute Pediatric Conditions I	3
NURS 784	Advanced Pediatric Nursing: Practicum II	4
NURS 785	Seminar in Pediatrics: Management of Chronic and Complex Clinical Conditions	3
NURS 786	Management of Acute/Critical Pediatric Conditions II	3
NURS 788	Advanced Pediatric Nursing: Practicum III	3
Total Concentration Credit Hours		25
MSN Core Requirements		22
Total Credit Hours		47

Additional Requirements

MSN Degree Requirements

In addition to general University requirements, the following apply to candidates for the Master of Science in Nursing degree:

- Only degree-seeking students may take graduate MSN nursing courses.
- Contact the graduate nursing office regarding study options for each program at (757) 683-4298 or the program director for the specific role.
- A comprehensive portfolio evaluation covering the program of study will be required for MSN students.
- The student must make clinical site arrangements three months in advance to take a nursing practicum to assure appropriate and available placement for the learning experience. The student must coordinate

approval of clinical sites with the Program Director and School of Nursing Student Clinical Services Coordinator.

- The B grade (3.00) is the minimal acceptable grade for all courses with a NURS prefix or any course required for the degree for continuation in the master's program. Satisfactory performance in the laboratory or practicum component of a nursing course is required. Students achieving less than a B grade (3.00) in a nursing course may request an opportunity from the role program director to repeat the course once. Two course failures will result in termination from the nursing program. Students may not progress with an incomplete in prerequisite courses as listed in the curriculum plan.

Additional requirements include physical exams, CPR certification, immunization requirements, computer competencies and technical standards, background checks and urine drug screening.

Transfers Between MSN Programs

Students may not transfer between programs in the MSN. Any student wishing to change programs may apply to a new program for admission during the regularly scheduled application process and deadline for the program. Their applications will be considered and reviewed as a new admission with the entire application pool.

Progression to the DNP

MSN students wishing to pursue a DNP must declare their intention before the final semester of their MSN program. If pursuing the DNP Advanced Practice program, NURS 805 and NURS 865 are taken in the final semester of the MSN program. Any student who has completed their MSN and did not declare their intent to pursue the DNP must apply and be considered with all post masters applicants as a new admission to the DNP program.

Transfer Credit Evaluation Policy

Any transfer credit requests must be submitted to the concentration program director within two weeks of notification of admission to the program. Once coursework has commenced for your program of study, all coursework must be completed at Old Dominion University, and no further transfer credits will be awarded.

Master of Nursing Nursing with a Concentration in Psychiatric-Mental Health Nurse Practitioner (MSN)

Master of Science in Nursing - Psychiatric Mental Health Nurse Practitioner

Katia Hall, Program Director

The Master's in Nursing with specialization in Psychiatric Mental Health Nurse Practitioner (PMHNP) is a two-year program preparing students with MSN advanced practice skills to care for psychiatric mental health patients across the lifespan. Graduates are eligible to take the national PMHNP certification examination. The program is full time study. *The MSN - Psychiatric Mental Health Nurse Practitioner program is offered in an online/hybrid format.*

Admission

Program Application Deadlines

Nurse Practitioner

- Psychiatric Mental Health Nurse Practitioner - Priority Deadline March 15

Admission Requirements for the MSN Graduate Program

In addition to meeting University requirements, applicants must meet the admission criteria below.

*Note: Some MSN tracks may have additional requirements. See program description for more information.

1. Current, unencumbered license as a registered nurse (RN), and preferred 1 year of current experience in the role.
2. Must have completed an undergraduate physical/health assessment course and an undergraduate statistics or research course as confirmed by an official college transcript. Applicants who have not completed these pre-requisites prior to the application deadline will not be reviewed for admission.
3. Baccalaureate degree in nursing or related science field from a regionally accredited college or university with a minimum of a 3.0 grade point average.
4. Three letters of recommendation, with at least one from a former faculty member and at least one from a former employer while in the RN role.
5. A 500-700 word essay that addresses the applicant's goals and reasons for seeking certification as an advance practice nurse.
6. At least one year of recent clinical nursing practice experience is preferred, but not required. See any specific program requirements.

Curriculum Requirements

Core Courses

Tracks in the MSN programs share a set of core courses that meet nursing accreditation and state approval guidelines for the degree. Regardless of the role concentration, all MSN students are required to complete the following **22 credits*** of core courses.

NURS 709	Evidence-Based Research for Nursing Practice	3
NURS 719	Family and Community Primary Care Assessment	1
NURS 761	Pharmacology for Advanced Practice Nursing	3
NURS 770	Pathophysiology for Advanced Nursing Practice	3
NURS 771	Physical Assessment for Advanced Nursing Practice	3
NURS 800	Integrative Concepts for Advanced Nursing Practice Roles	3
NURS 802	The Business of Advanced Nursing Practice	3
NURS 809	Advocacy for Healthcare Public Policy for Advanced Practice	3
Total Credit Hours		22

Psychiatric-Mental Health Nurse Practitioner Concentration

In addition to the 22 credits of MSN core courses, the following courses are required for degree completion of the PMHNP/MSN for a program total of 40 credits.

NURS 723	Psychotherapeutic Approaches & Treatment Modalities	3
NURS 725	Psychopharmacology and Neurobiology	3
NURS 726	Managing Psychiatric Disorders Across the Lifespan	3
NURS 727	Psychiatric Mental Health Nurse Practitioner Practicum I	4
NURS 728	Psychiatric Mental Health Nurse Practitioner Practicum II	5
Total Concentration Credit Hours		18

327 Nursing Practice with a Concentration in Advanced Practice (DNP)

Additional Requirements

MSN Degree Requirements

In addition to general University requirements, the following apply to candidates for the Master of Science in Nursing degree:

1. Only degree-seeking students may take graduate MSN nursing courses.
2. Contact the graduate nursing office regarding study options for each program at (757) 683-4298 or the program director for the specific role.
3. A comprehensive portfolio evaluation covering the program of study will be required for MSN students.
4. The student must make clinical site arrangements three months in advance to take a nursing practicum to assure appropriate and available placement for the learning experience. The student must coordinate approval of clinical sites with the Program Director and School of Nursing Student Clinical Services Coordinator.
5. The B grade (3.00) is the minimal acceptable grade for all courses with a NURS prefix or any course required for the degree for continuation in the master's program. Satisfactory performance in the laboratory or practicum component of a nursing course is required. Students achieving less than a B grade (3.00) in a nursing course may request an opportunity from the role program director to repeat the course once. Two course failures will result in termination from the nursing program. Students may not progress with an incomplete in prerequisite courses as listed in the curriculum plan.

Additional requirements include physical exams, CPR certification, immunization requirements, computer competencies and technical standards, background checks and urine drug screening.

Transfers Between MSN Programs

Students may not transfer between programs in the MSN. Any student wishing to change programs may apply to a new program for admission during the regularly scheduled application process and deadline for the program. Their applications will be considered and reviewed as a new admission with the entire application pool.

Progression to the DNP

MSN students wishing to pursue a DNP must declare their intention before the final semester of their MSN program. If pursuing the DNP Advanced Practice program, NURS 805 and NURS 865 are taken in the final semester of the MSN program. Any student who has completed their MSN and did not declare their intent to pursue the DNP must apply and be considered with all post masters applicants as a new admission to the DNP program.

Transfer Credit Evaluation Policy

Any transfer credit requests must be submitted to the concentration program director within two weeks of notification of admission to the program. Once coursework has commenced for your program of study, all coursework must be completed at Old Dominion University, and no further transfer credits will be awarded.

Doctor of Nursing Practice Nursing Practice with a Concentration in Advanced Practice (DNP)

Doctor of Nursing Practice

Kelli Garber, Program Director

The Doctor of Nursing Practice program is designed for nurses that are seeking a terminal degree in nursing practice. DNP-prepared nurses are equipped to serve as clinical experts, change agents, and advocates in addressing healthcare in our nation. Specific areas of focus include:

advanced practice skills, healthcare policy, organizational and systems leadership, interprofessional collaboration, evidence-based research, healthcare technology, informatics, and patient advocacy. The DNP program at ODU is fully accredited by the Commission on Collegiate Nursing Education (CCNE).

The Doctor of Nursing Practice (DNP) degree will provide additional education for advanced practice nurses in:

1. Advanced diagnostics and practice skills;
2. Care of the underserved and increasingly diverse population; and
3. Incorporation of emerging care technologies. The program may be completed as a full-time or part-time student and is distance friendly.

To graduate from Old Dominion University's DNP Program, a student must have successfully completed all required course work, including prerequisite courses of NURS 800 and NURS 809, an evidence-based research project and all clinical practicum. It will take a full-time student four semesters (spring, summer, fall and spring) to complete the program. A part-time student will complete the DNP program in seven semesters (spring, summer, fall, spring, summer, fall, and spring). *The DNP - Post Master's Advanced Practice track is offered in an online/hybrid format.*

Admission Requirements for the DNP Program

*Note: For admission requirements to the Nurse Anesthesia program refer to the website at <http://www.odu.edu/nursing> (<http://www.odu.edu/nursing/graduate/dnp-to-post-masters/anesthesia/>).

In addition to meeting University requirements, applicants must meet the admission criteria below..

1. Current, unencumbered license as a registered nurse (RN).
2. Master's degree in nursing or a related field from a regionally accredited college or university with a minimum of 3.0 grade point
3. Baccalaureate degree in nursing or related field from a regionally accredited college or university with a minimum of a 3.0 grade point average.
4. Three letters of recommendation, with at least one from a former faculty member and at least two from former employers.
5. A 500-700 word essay that should speak specifically to the concentration area to which you are applying.
6. Current Resume

Application Deadlines for the DNP Programs

Post Master's Advanced Practice - Early Admission June 1, Deadline Sep 1. Late Applications considered if space available.

Curriculum Requirements

Advanced Practice Concentration

NURS 801	Roles and Responsibilities for Transforming Practice	3
NURS 802	The Business of Advanced Nursing Practice	3
NURS 803	Leadership and Interprofessional Practice in Healthcare	3
NURS 805	Application of Practice-Based Research Methods	2
NURS 806	Proposal Development and Database Management	4
NURS 807	Informatics and Healthcare Technology	3
NURS 865	DNP Clinical Practicum I	2
NURS 866	DNP Clinical Practicum II	2
NURS 867	DNP Clinical Practicum III	3
NURS 868	DNP Clinical Practicum IV	3
NURS 890	DNP Nursing Capstone	3

Prerequisite courses NURS 800* and NURS 809* must also be completed to meet degree requirements for the DNP. NURS 800 and 809 are included in the MSN curricula. NURS 802* is also included in the MSN curricula. If previously completed for the MSN, students may take an elective course to meet these three credits rather than repeating NURS 802

Total Credit Hours

31

* Courses are included in the MSN curricula.

Doctor of Nursing Practice Nursing Practice with a Concentration in Nurse Anesthesia (DNP)

Doctor of Nursing Practice - Nurse Anesthesia

Adrienne Hartgerink, Program Director, ahartger@odu.edu

The Doctor of Nursing Practice (DNP) with a concentration in nurse anesthesia prepares the graduate to provide a variety of anesthetics to patients across the lifespan and wellness continuum. Graduates are groomed to translate research and evidence into clinical practice, to care for underserved and diverse populations, incorporate emerging care technologies, develop leadership skills and measure patient outcomes in an effort to improve safety and quality of patient care.

The Old Dominion University DNP program with a concentration in nurse anesthesia is a 36 month full time program that begins in May each year. The program is a hybrid of on-campus and on-line classes. The curriculum is an assimilation of nurse anesthesia specialty and DNP courses. Each student is required to complete a scholarly project that addresses patient care, quality improvement, process improvement, or practice improvement. The Nurse Anesthesia program is accredited by the Council on Accreditation for Nurse Anesthesia Educational Programs. For admission requirements, please see the website for the School of Nursing (www.odu.edu/nursing) or contact the program director.

Admission Requirements for the Nurse Anesthesia Program

In addition to meeting University requirements, applicants must meet the admission criteria below..

1. Current, unencumbered multi-state compact license as a registered nurse (RN).
2. Baccalaureate degree in nursing from a regionally accredited college or university with a minimum of a 3.0 grade point average.
3. Three letters of recommendation, with at least one from a direct supervisor.
4. A 500-700 word essay that should speak specifically to the concentration area to which you are applying.
5. Critical Care Registered Nurse Certification including score
6. Current American Heart Association certifications in BLS, ACLS, and PALS
7. A minimum of 16 hours of clinical shadowing experience
8. Current Resume with a minimum of two years of full-time nursing experience in a critical care unit at the time of application. Critical care experience must be obtained in a critical care area within the United States, its territories, or a US military hospital outside of the United States.
9. If English is not your native language, TOEFL scores (100 or above)
10. GRE Required: Preferred >300 total score (150 on Verbal and 150 on Quantitative Reasoning and 4 or higher on Analytical Writing)
11. Earned grade of **B** or better in the following courses:

- Anatomy & Physiology
- Organic or biochemistry (200 level or above)
- Statistics
- Pathophysiology
- Pharmacology
- *Please note chemistry and statistics classes must be completed within the last **10 years**

Curriculum Requirements

NURS 709	Evidence-Based Research for Nursing Practice	3
NURA 745	Applied Chemistry and Physics for Nurse Anesthetists	2
NURA 753	Advanced Pharmacology for Nurse Anesthesia Practice	3
NURA 760	Evidence Based Seminar for Anesthesia Practice	1
NURS 761	Pharmacology for Advanced Practice Nursing	3
NURS 771	Physical Assessment for Advanced Nursing Practice	3
NURS 800	Integrative Concepts for Advanced Nursing Practice Roles	3
NURS 801	Roles and Responsibilities for Transforming Practice	3
NURS 802	The Business of Advanced Nursing Practice	3
NURS 803	Leadership and Interprofessional Practice in Healthcare	3
NURS 805	Application of Practice-Based Research Methods	2
NURS 806	Proposal Development and Database Management	4
NURS 807	Informatics and Healthcare Technology	3
NURS 809	Advocacy for Healthcare Public Policy for Advanced Practice	3
NURA 836	Advanced Physiology and Pathophysiology for Nurse Anesthesia I	3
NURA 837	Advanced Physiology and Pathophysiology for Nurse Anesthesia II	3
NURA 838	Professional Aspects for Anesthesia	1
NURA 841	Principles of Anesthesia Practice I	4
NURA 842	Principles of Anesthesia Practice II	4
NURA 843	Principles of Anesthesia Practice III	4
NURA 844	Principles of Anesthesia Practice IV	1
NURA 845	Principles of Anesthesia Practice V	1
NURA 846	Principles of Anesthesia Practice VI	1
NURA 847	Principles of Anesthesia Practice VII	1
NURA 848	Principles of Anesthesia Practice VIII	1
NURA 853	Nurse Anesthesia Practicum: Orientation for Clinical Anesthesia	2
NURA 854	Nurse Anesthesia Practicum I	3
NURA 855	Nurse Anesthesia Practicum II	4
NURA 856	Nurse Anesthesia Practicum III	4
NURA 857	Nurse Anesthesia Practicum IV	4
NURA 858	Nurse Anesthesia Practicum V	4
NURA 859	Nurse Anesthesia Practicum VI	3
NURS 865	DNP Clinical Practicum I	2
NURS 866	DNP Clinical Practicum II	2
NURS 867	DNP Clinical Practicum III	3
NURS 868	DNP Clinical Practicum IV	3

Doctor of Nursing Practice Nursing Practice with a Concentration in Nurse Executive (DNP)

Doctor of Nursing Practice- Post-Master's Nurse Executive

Janice Hawkins, Program Director

The Doctor of Nursing Practice program is designed for nurses that are seeking a terminal degree in nursing practice. DNP-prepared nurses are equipped to serve as clinical experts, change agents, and advocates in addressing healthcare in our nation. Specific areas of focus include: advanced practice skills, healthcare policy, organizational and systems leadership, interprofessional collaboration, evidence-based research, healthcare technology, informatics, and patient advocacy. The DNP program at ODU is fully accredited by the Commission on Collegiate Nursing Education (CCNE).

The Nurse Executive role prepares top level nurse executives for leadership positions in a health system. The program outcomes are consistent with the American Organization of Nurse Executive guidelines for nurse executive practice. Content focuses on executive leadership skills, working with vulnerable populations, fiscal and human resource management, quality magnet achievement, emerging technology, and organizational research in clinical issues. Students participate in executive internships throughout the program in their home area.

To graduate from Old Dominion University's DNP Program, a student must have successfully completed all required course work, including prerequisite courses of NURS 800 and 809, an evidence-based research project and all clinical practicum. Students must successfully complete 1000 hours of supervised clinical practice. The DNP program provides a minimum of 560 clinical hours within four practicum courses. MSN courses with a supervised clinical practicum component will be considered for transfer credit toward the total clinical hour requirement. A review of MSN transcripts or course descriptions/syllabi will be used to determine whether clinical hours are acceptable for transfer. Students entering the Nurse Executive DNP program, who require additional clinical hours, will be advised of their options by the Program Director. *The DNP - Post-Master's Nurse Executive track is offered in an online/hybrid format.*

Admission Requirements for the DNP Program

In addition to meeting University requirements, applicants must meet the admission criteria below..

1. Current, unencumbered license as a registered nurse (RN).
2. Master's degree in nursing or a related field from a regionally accredited college or university with a minimum of 3.0 grade point
3. Baccalaureate degree in nursing or related field from a regionally accredited college or university with a minimum of a 3.0 grade point average.
4. Three letters of recommendation, with at least one from a former faculty member and at least two from former employers.
5. A 500-700 word essay that should speak specifically to the concentration area to which you are applying.
6. Current Resume

Application Deadlines for the DNP Programs

Post Master's Nurse Executive - Priority Deadlines April 1 and September 1

Curriculum Requirements

NURS 805	Application of Practice-Based Research Methods	2
NURS 806	Proposal Development and Database Management	4
NURS 807	Informatics and Healthcare Technology	3
NURS 810	Leadership in Complex Systems and Organizations	3
NURS 812	Evidence-Based Management for Quality Healthcare	3
NURS 814	Competitive Resource Design and Utilization	3
NURS 816	DNP Executive Practicum I	2-5
NURS 817	DNP Executive Practicum II	2-5
NURS 818	DNP Executive Practicum III	3-5
NURS 819	DNP Executive Practicum IV	3-5
NURS 890	DNP Nursing Capstone	3
Prerequisite courses NURS 800* and NURS 809* must also be completed to meet degree requirements for the DNP.		
Total Credit Hours		31-41

*Courses are included in the master's curricula.

Doctor of Nursing Practice Nursing Practice with a Concentration in Post-Masters Adult Gerontology Clinical Nurse Specialist (DNP)

Doctor of Nursing Practice

The Doctor of Nursing Practice program is designed for nurses that are seeking a terminal degree in nursing practice. DNP-prepared nurses are equipped to serve as clinical experts, change agents, and advocates in addressing healthcare in our nation. Specific areas of focus include: advanced practice skills, healthcare policy, organizational and systems leadership, interprofessional collaboration, evidence-based research, healthcare technology, informatics, and patient advocacy. The DNP program at ODU is fully accredited by the Commission on Collegiate Nursing Education (CCNE).

ODU offers seven concentrations in the DNP program. The number of credits required for the Doctor of Nursing degree varies by concentration and reflects specific courses and practicum requirements necessary for the specialty area of professional nursing practice. NURS 800 and NURS 809, incorporated into the MSN core curriculum, are required prerequisites for the DNP.

Refer to the School of Nursing (SON) website for more information: www.odu.edu/nursing.

Post Master's Adult Gerontology Clinical Nurse Specialist DNP

Janice Hawkins, DNP Nurse Executive Program Director

Pam Bishop, Adult Gerontology CNS Program Director

The Post Masters Adult Gerontology CNS Doctor of Nursing Practice (DNP) concentration has been developed to address a growing demand from advanced practice nurses. This Post-Masters Clinical Nurse Specialist DNP program is targeted to licensed, registered nurses with an MSN. The curriculum is designed to prepare nurses as Adult Gerontology Clinical Nurse Specialists.

The program is offered in an online/hybrid format and requires course content in theory, research, and Adult Gerontology CNS professional and

clinical cores. Graduates of this program are eligible to sit for the American Nurses' Association (ANCC) Adult Gerontology Clinical Nurse Specialist Certification Exam or the American Association of Critical Care Nurses (AACN) Acute Care Adult-Gerontology (AACNS-AG) Exam.

Additional requirements include physical exams, CPR certification, immunization requirements, computer competencies and technical standards, background checks and urine drug screening.

To graduate from Old Dominion University's DNP Program, a student must have successfully completed all required course work, including prerequisite courses of NURS 800 and NURS 809, an evidence-based research project, and all clinical practicum.

Admission Requirements

Admission Requirements for the Adult Gerontology CNS DNP

In addition to meeting University requirements, applicants must meet the admission criteria below.

1. Current, unencumbered license as a registered nurse (RN).
2. Master's degree in nursing or a related field from a regionally accredited college or university with a minimum of 3.0 grade point
3. Baccalaureate degree in nursing or related field from a regionally accredited college or university with a minimum of a 3.0 grade point average.
4. Three letters of recommendation, with at least one from a former faculty member and at least two from former employers.
5. A 500-700 word essay that should speak specifically to the concentration area to which you are applying.
6. Current Resume
7. Prior successful completion (grade of B or better) of the following courses in a previous APRN MSN program, preferred within 5 years of admission:
 - a. Advanced Pathophysiology
 - b. Advanced Physical Assessment
 - c. Advanced Pharmacology

Application Deadline

Priority Deadline: June 1

Curriculum Requirements

Adult Gerontology CNS Concentration

NURS 530	Principles of Practice: Contemporary Issues in Nursing Care of the Older Adult	2
NURS 738	Clinical Nurse Specialist I: Introduction to Practice	2
NURS 739	Clinical Nurse Specialist Practicum I: Role Socialization	4
NURS 756	Clinical Nurse Specialist II: Transition to Practice	3
NURS 757	Clinical Nurse Specialist Practicum II: Role Transition	5
NURS 805	Application of Practice-Based Research Methods	2
NURS 806	Proposal Development and Database Management	4
NURS 810	Leadership in Complex Systems and Organizations	3
NURS 807	Informatics and Healthcare Technology	3
NURS 812	Evidence-Based Management for Quality Healthcare	3
NURS 814	Competitive Resource Design and Utilization	3
NURS 816	DNP Executive Practicum I	2
NURS 817	DNP Executive Practicum II	2

NURS 818	DNP Executive Practicum III	3
NURS 819	DNP Executive Practicum IV	3
NURS 890	DNP Nursing Capstone	3

Doctor of Nursing Practice Nursing Practice with a Concentration in Post-Masters Neonatal Clinical Nurse Specialist (DNP)

Doctor of Nursing Practice

The Doctor of Nursing Practice program is designed for nurses that are seeking a terminal degree in nursing practice. DNP-prepared nurses are equipped to serve as clinical experts, change agents, and advocates in addressing healthcare in our nation. Specific areas of focus include: advanced practice skills, healthcare policy, organizational and systems leadership, interprofessional collaboration, evidence-based research, healthcare technology, informatics, and patient advocacy. The DNP program at ODU is fully accredited by the Commission on Collegiate Nursing Education (CCNE).

ODU offers seven concentrations in the DNP program. The number of credits required for the Doctor of Nursing degree varies by concentration and reflects specific courses and practicum requirements necessary for the specialty area of professional nursing practice. NURS 800 and NURS 809, incorporated into the MSN core curriculum, are required prerequisites for the DNP.

Refer to the School of Nursing (SON) website for more information: www.odu.edu/nursing.

Post Master's Neonatal Clinical Nurse Specialist DNP

Janice Hawkins, DNP Nurse Executive Program Director

Pam Bishop, Neonatal CNS Program Director

The Post Masters Neonatal CNS Doctor of Nursing Practice (DNP) concentration has been developed to address a growing demand from advanced practice nurses. The program of study prepares students as expert clinicians in the application of evidence-based knowledge within the realms of nursing interventions, teaching, and research. This Post-Masters Clinical Nurse Specialist DNP program is targeted to licensed, registered nurses with an MSN.

The program requires course content in theory, research, education, and Neonatal CNS professional and clinical cores. The curriculum is designed to prepare nurses as Neonatal Clinical Nurse Specialists. Graduates of this program are eligible to sit for the American Association of Critical Care Nurses (AACN) Acute Care Neonatal (ACCNS-N) Exam. The Neonatal Clinical Nurse Specialist DNP is offered in an online/hybrid format.

Additional requirements include physical exams, CPR certification, immunization requirements, computer competencies and technical standards, background checks, and urine drug screening.

To graduate from Old Dominion University's DNP Program, a student must have successfully completed all required course work, including prerequisite courses of NURS 800 and NURS 809, an evidence-based research project, and all clinical practicum.

Admission Requirements

Admission Requirements for the Neonatal CNS DNP

In addition to meeting University requirements, applicants must meet the admission criteria below.

1. Current, unencumbered license as a registered nurse (RN).
2. Master's degree in nursing or a related field from a regionally accredited college or university with a minimum of 3.0 grade point
3. Baccalaureate degree in nursing or related field from a regionally accredited college or university with a minimum of a 3.0 grade point average.
4. Three letters of recommendation, with at least one from a former faculty member and at least two from former employers.
5. A 500-700 word essay that should speak specifically to the concentration area to which you are applying.
6. Current Resume
7. Prior successful completion (grade of B or better) of the following courses in a previous APRN MSN program, preferred within 5 years of admission:
 - a. Advanced Pathophysiology
 - b. Advanced Physical Assessment
 - c. Advanced Pharmacology

Application Deadline

Priority Deadline: June 1

NURS 738	Clinical Nurse Specialist I: Introduction to Practice	2
NURS 739	Clinical Nurse Specialist Practicum I: Role Socialization	4
NURS 751	Developmental Neonatal Physiology	2
NURS 756	Clinical Nurse Specialist II: Transition to Practice	3
NURS 757	Clinical Nurse Specialist Practicum II: Role Transition	5
NURS 772	Foundations of Advanced Neonatal Care	3
NURS 773	Pharmacology for Advanced Neonatal Care	3
NURS 774	Advanced Neonatal Care: High Risk Management I	3
NURS 775	Advanced Neonatal Care: High Risk Management II	3
NURS 805	Application of Practice-Based Research Methods	2
NURS 806	Proposal Development and Database Management	4
NURS 807	Informatics and Healthcare Technology	3
NURS 810	Leadership in Complex Systems and Organizations	3
NURS 812	Evidence-Based Management for Quality Healthcare	3
NURS 814	Competitive Resource Design and Utilization	3
NURS 816	DNP Executive Practicum I	2
NURS 817	DNP Executive Practicum II	2
NURS 818	DNP Executive Practicum III	3
NURS 819	DNP Executive Practicum IV	3
NURS 890	DNP Nursing Capstone	3

Doctor of Nursing Practice Nursing Practice with a Concentration in Post-Masters Pediatric Clinical Nurse Specialist (DNP)

Doctor of Nursing Practice

The Doctor of Nursing Practice program is designed for nurses that are seeking a terminal degree in nursing practice. DNP-prepared nurses

are equipped to serve as clinical experts, change agents, and advocates in addressing healthcare in our nation. Specific areas of focus include: advanced practice skills, healthcare policy, organizational and systems leadership, interprofessional collaboration, evidence-based research, healthcare technology, informatics, and patient advocacy. The DNP program at ODU is fully accredited by the Commission on Collegiate Nursing Education (CCNE).

ODU offers seven concentrations in the DNP program. The number of credits required for the Doctor of Nursing degree varies by concentration and reflects specific courses and practicum requirements necessary for the specialty area of professional nursing practice. NURS 800 and NURS 809, incorporated into the MSN core curriculum, are required prerequisites for the DNP.

Refer to the School of Nursing (SON) website for more information: www.odu.edu/nursing.

Post Master's Pediatric Clinical Nurse Specialist DNP

Janice Hawkins, DNP Nurse Executive Program Director

Pam Bishop, Pediatric CNS Program Director

The Post Masters Adult Gerontology CNS Doctor of Nursing Practice (DNP) concentration has been developed to address a growing demand from advanced practice nurses. The program of study prepares students as expert clinicians in the application of evidence-based knowledge within the realms of nursing interventions, teaching, and research. This Post-Masters Clinical Nurse Specialist DNP program is targeted to licensed, registered nurses with an MSN.

The program requires course content in theory, research, and Pediatric CNS professional and clinical cores. The curriculum is designed to prepare nurses as Pediatric Clinical Nurse Specialists. Graduates of this program are eligible to sit for the American Association of Critical Care Nurses (AACN) Acute Care Pediatric (ACCNS-P) Exam. The Post Master's Pediatric CNS DNP is offered in an online/hybrid format.

Additional requirements include physical exams, CPR certification, immunization requirements, computer competencies and technical standards, background checks and urine drug screening.

To graduate from Old Dominion University's DNP Program, a student must have successfully completed all required course work, including prerequisite courses of NURS 800 and NURS 809, an evidence-based research project, and all clinical practicum.

Admission Requirements

Admission Requirements for the Pediatric CNS DNP

In addition to meeting University requirements, applicants must meet the admission criteria below.

1. Current, unencumbered license as a registered nurse (RN).
2. Master's degree in nursing or a related field from a regionally accredited college or university with a minimum of 3.0 grade point
3. Baccalaureate degree in nursing or related field from a regionally accredited college or university with a minimum of a 3.0 grade point average.
4. Three letters of recommendation, with at least one from a former faculty member and at least two from former employers.
5. A 500-700 word essay that should speak specifically to the concentration area to which you are applying.
6. Current Resume
7. Prior successful completion (grade of B or better) of the following courses in a previous APRN MSN program, preferred within 5 years of admission:

- a. Advanced Pathophysiology
- b. Advanced Physical Assessment
- c. Advanced Pharmacology

Application Deadline

Priority Deadline: June 1

NURS 705	Primary Care Approaches for Children	3
NURS 738	Clinical Nurse Specialist I: Introduction to Practice	2
NURS 739	Clinical Nurse Specialist Practicum I: Role Socialization	4
NURS 756	Clinical Nurse Specialist II: Transition to Practice	3
NURS 757	Clinical Nurse Specialist Practicum II: Role Transition	5
NURS 782	The Growth and Development of Children in the 21st Century	3
NURS 783	Management of Acute Pediatric Conditions I	3
NURS 786	Management of Acute/Critical Pediatric Conditions II	3
NURS 805	Application of Practice-Based Research Methods	2
NURS 806	Proposal Development and Database Management	4
NURS 807	Informatics and Healthcare Technology	3
NURS 810	Leadership in Complex Systems and Organizations	3
NURS 812	Evidence-Based Management for Quality Healthcare	3
NURS 814	Competitive Resource Design and Utilization	3
NURS 816	DNP Executive Practicum I	2
NURS 817	DNP Executive Practicum II	2
NURS 818	DNP Executive Practicum III	3
NURS 819	DNP Executive Practicum IV	3
NURS 890	DNP Nursing Capstone	3

Doctor of Nursing Practice Nursing Practice with a Concentration in Post-Masters Psychiatric Mental Health Nurse Practitioner (DNP)

Doctor of Nursing Practice

The Doctor of Nursing Practice program is designed for nurses that are seeking a terminal degree in nursing practice. DNP-prepared nurses are equipped to serve as clinical experts, change agents, and advocates in addressing healthcare in our nation. Specific areas of focus include: advanced practice skills, healthcare policy, organizational and systems leadership, interprofessional collaboration, evidence-based research, healthcare technology, informatics, and patient advocacy. The DNP program at ODU is fully accredited by the Commission on Collegiate Nursing Education (CCNE).

ODU offers three concentrations in the DNP programs: 1) Post-Master's Advanced Practice (build on traditional master's programs for nurse practitioners, clinical nurse specialists, nurse midwives, and nurse anesthesia), 2) Post-Master's Nurse Executive, Post-Masters Psychiatric Mental Health Nurse Practitioner (for APRNs seeking to add a PMHNP and DNP) and 3) Post-Baccalaureate Nurse Anesthesia (CRNA). In order to graduate from Old Dominion University's Post-Master's APN and NE DNP programs, a student must successfully complete all 37 post-masters credit hours of required course work, including an evidence-based

DNP project, and all clinical practica. It will take a full-time student four semesters (spring, summer, fall and spring) to complete the program. A part-time student will complete the DNP program in seven semesters (spring, summer, fall, spring, summer, fall, and spring). All of the master's programs in nursing at ODU include six credits that also meet requirements for the DNP program allowing students to complete the DNP in three additional semesters. See specific differing credit requirements and curriculum plans for Post Masters Psych Mental Health DNP and Post Baccalaureate Nurse Anesthesia programs.

See detailed information on each concentration in the following sections. Refer to the School of Nursing (SON) website for program specific curriculum plans www.odu.edu/nursing.

Post Master's Psychiatric Mental Health Nurse Practitioner

Kelli Garber, DNP Advanced Practice Program Director

Katia Hall, PMHNP Program Director

The Psychiatric Mental Health Nurse Practitioner Post Masters Doctor of Nursing Practice (DNP) program has been developed to address a growing demand from advanced practice nurses for programming that enables them to obtain a DNP and an additional national certification as a nurse practitioner in the area of psychiatric mental health. This Post Masters Psychiatric Mental Health DNP program is targeted to licensed, registered nurses with an APRN MSN who wish to gain new skills and knowledge for board certification to provide psychiatric care services as a psychiatric mental health nurse practitioner. The Psychiatric Mental Health Doctor of Nursing Practice (DNP) degree will provide additional education for advanced practice nurses in:

- Advanced diagnostics and practice skills in psychiatric mental health;
- Care of the underserved and increasingly diverse population; and
- Incorporation of emerging care technologies.

To graduate from Old Dominion University's DNP Program, a student must have successfully completed all required course work, including prerequisite courses of NURS 800 and NURS 809, an evidence-based research project and all clinical practicum. The DNP Post Master's Psychiatric Mental Health Nurse Practitioner concentration is offered in an online/hybrid format.

Admission Requirements

Admission Requirements for the DNP Program

In addition to meeting University requirements, applicants must meet the admission criteria below..

1. Current, unencumbered license as a registered nurse (RN).
2. Master's degree in nursing or a related field from a regionally accredited college or university with a minimum of 3.0 grade point
3. Baccalaureate degree in nursing or related field from a regionally accredited college or university with a minimum of a 3.0 grade point average.
4. Three letters of recommendation, with at least one from a former faculty member and at least two from former employers.
5. A 500-700 word essay that should speak specifically to the concentration area to which you are applying.
6. Current Resume

Application Deadline

September 1

Psychiatric Mental Health Nurse Practitioner

1. Completed application for review and admission to the Psychiatric Mental Health Nurse Practitioner track and DNP program.
2. Prior successful completion (grade of B or better) of the following courses in a previous APRN MSN program, preferred within 5 years of admission:

- a. Advanced Pathophysiology
- b. Advanced Physical Assessment
- c. Advanced Pharmacology

Curriculum Requirements

Psychiatric Mental Health Concentration

NURS 723	Psychotherapeutic Approaches & Treatment Modalities	3
NURS 725	Psychopharmacology and Neurobiology	3
NURS 726	Managing Psychiatric Disorders Across the Lifespan	3
NURS 727	Psychiatric Mental Health Nurse Practitioner Practicum I	4
NURS 728	Psychiatric Mental Health Nurse Practitioner Practicum II	5
NURS 800	Integrative Concepts for Advanced Nursing Practice Roles	3
NURS 801	Roles and Responsibilities for Transforming Practice	3
NURS 802	The Business of Advanced Nursing Practice	3
NURS 803	Leadership and Interprofessional Practice in Healthcare	3
NURS 805	Application of Practice-Based Research Methods	2
NURS 806	Proposal Development and Database Management	4
NURS 807	Informatics and Healthcare Technology	3
NURS 809	Advocacy for Healthcare Public Policy for Advanced Practice	3
NURS 865	DNP Clinical Practicum I	2
NURS 866	DNP Clinical Practicum II	2
NURS 867	DNP Clinical Practicum III	3
NURS 868	DNP Clinical Practicum IV	3
NURS 890	DNP Nursing Capstone	3
Total Credit Hours		55

Certificate

Neonatal Physician Assistant Certificate

Certificate Programs

Certificate programs offered by the School of Nursing are post-graduate, non-degree offerings. These highly focused programs are designed to provide nurses or others with knowledge and skills to complement their advanced practice roles.

Neonatal Physician Assistant

Alyssa Weiss, Advisor

This program is designed to educate licensed physician assistants with sponsored physician support for a role in neonatal care. The program of study will provide didactic instruction to complement the physician assistant's on-the-job clinical training, as well as offer a unique opportunity for interprofessional education with neonatal nurse practitioner students. *The Neonatal Physician Assistant Certificate is offered in an online/hybrid format.*

Admission Requirements for Certificate Programs

1. School of Nursing Supplemental Application (available at www.odu.edu/nursing)

2. A 500-700 word essay that addresses the applicant's goals and reasons for seeking the certificate.
3. Transcripts
4. One letter of recommendation
5. Resume
6. Non-degree application

In addition to the certificate admission requirements listed above, PA applicants must submit a physician sponsor letter, Physician Assistant transcripts, active Physician Assistant license, and documentation of Physician Assistant certification.

Curriculum Requirements

NURS 773	Pharmacology for Advanced Neonatal Care	3
NURS 774	Advanced Neonatal Care: High Risk Management I	3
NURS 751	Developmental Neonatal Physiology	2
HLSC 771	Foundations of Advanced Neonatal Care	3
HLSC 775	Advanced Neonatal Care: High Risk Management II	3
Total Credit Hours		14

Certificate Nurse Educator Certificate

Certificate Programs

Certificate programs offered by the School of Nursing are post-graduate, non-degree offerings. These highly focused programs are designed to provide nurses or others with knowledge and skills to complement their advanced practice roles.

Nurse Educator Certificate Program

Karen Karlowicz, Advisor

The Nurse Educator Certificate program offers valuable knowledge and practical experience related to teaching in entry-level or graduate nursing education programs. Courses provide an overview of nursing curriculum design, program evaluation, student assessment, instructional methodologies, and professional/ethical/legal issues in nursing/health professions education. Completion of a teaching practicum is required.

This certificate program is targeted to nurses with at least one graduate degree in nursing who may be seeking faculty positions in entry-level or graduate nursing education programs. Admission is also open to students currently enrolled in a graduate nursing program as well as currently enrolled or graduates of other Health Sciences graduate degree programs. The expected time to complete the certificate is three semesters. It is recommended that students begin the course sequence in fall semester. The *Nurse Educator Certificate* is offered in an online/hybrid format.

Admission Requirements for Certificate Programs

1. School of Nursing Supplemental Application (available at www.odu.edu/nursing)
2. Current, unencumbered license as a registered nurse (RN).
3. A 500-700 word essay that addresses the applicant's goals and reasons for seeking the certificate.
4. Transcripts
5. One letter of recommendation
6. Resume
7. Non degree application

Curriculum Requirements

NURS 676	Professional, Ethical and Legal Concepts of Nursing Education	3
NURS 720	Instructional Delivery Methods & Learner Assessment	3
NURS 730	Nursing Curricular Design and Program Evaluation	3
NURS 734	Educator Internship: Classroom Instruction	3
Total Credit Hours		12

Certificate Post-Professional - Adult Gerontology, Clinical Nurse Specialist Certificate

Pamela Bishop, Advisor Certificate programs offered by the School of Nursing are post-graduate, non-degree offerings. These highly focused programs are designed to provide nurses or others with knowledge and skills to complement their advanced practice roles. This post-professional certificate enables nurses with a previously earned MSN to complete only those courses and practicums required for eligibility to take the Adult Gerontology Clinical Nurse Specialist certification exam. This program is offered in an online/hybrid format.

Please note: Admissions as of Fall 2025 is on hold for program review.

Admission Requirements Successful completion (grade of B or better) of the following courses: Advanced Pathophysiology Advanced Physical Assessment Advanced Pharmacology Completed application for admission to the certificate program. Current, unencumbered license as a registered nurse (RN). The application submission deadlines for the certificate program are the same as those for the MSN program.

Curriculum Degree Requirements The 16-credit hour post-master's certificate curriculum includes those courses required by the American Nurses Credentialing Center and the American Association of Critical Care Nurses, both of which administer certification exams for the Adult Gerontology Clinical Nurse Specialist.

NURS 530	Principles of Practice: Contemporary Issues in Nursing Care of the Older Adult	2
NURS 738	Clinical Nurse Specialist I: Introduction to Practice	2
NURS 739	Clinical Nurse Specialist Practicum I: Role Socialization	4
NURS 756	Clinical Nurse Specialist II: Transition to Practice	3
NURS 757	Clinical Nurse Specialist Practicum II: Role Transition	5
Total Credit Hours		16

Certificate Post-Professional - Family Nurse Practitioner Certificate Post-Professional - Family Nurse Practitioner (Graduate Certificate)

Lisa Cordero, Advisor

The Post-Professional Certificate for Family Nurse Practitioner has been developed to address a growing demand from nurses for programming that enables them to obtain national certification as an advanced practice nurse (nurse practitioner) in the area of family care. The program will educate students in the concepts associated with illnesses and conditions

across the lifespan. Students will develop knowledge in the diagnosis and management of illnesses. Students will learn to provide advanced nursing care to patients from childhood to older adulthood. Upon completing the program, application of key concepts related to diagnosis, treatment, and ongoing management of patients in primary care settings, with a focus on healthy promotion and disease prevention using best practices and evidence-based care to achieve the best possible patient outcomes will be understood.

This certificate program is targeted to licensed, registered nurses with an APRN MSN who wish to gain new skills and knowledge for board certification to provide primary care services as a family nurse practitioner. The expected time to complete the program is 1.5 years. There is a limited number of seats for the Post-Professional Certificate in Family Nurse Practitioner. *The Post Professional FNP Certificate track is offered in an online/hybrid format.*

Please note: Admissions as of Fall 2025 is on hold for program review.

Admission Requirements

- Successful completion (grade of A- or better) of the following courses in a previous APRN MSN program within the last 5 years:
 - Advanced Pathophysiology
 - Advanced Physical Assessment
 - Advanced Pharmacology
- Completed application for admission to the certificate program.
- Current, unencumbered license as a registered nurse (RN).
- The application submission deadlines for the certificate program are the same as those for the MSN program.

Curriculum Requirements

NURS 705	Primary Care Approaches for Children	3
NURS 719	Family and Community Primary Care Assessment	1
NURS 760	Advanced Family Nursing I Practicum	3
NURS 762	Advanced Family Nursing I: Management of Acute Illnesses	3
NURS 764	Advanced Family Nursing II Practicum	4
NURS 765	Advanced Family Nursing II: Management of Chronic Illnesses	3
NURS 766	Primary Care Approaches for Women	3
NURS 767	Advanced Family Nursing III Practicum	3-4
Total Credit Hours		23-24

Certificate

Post-Professional - Psychiatric Mental Health Nurse Practitioner Certificate

Katia Hall, Advisor

The Post-Professional Certificate in Psychiatric Mental Health Nurse Practitioner has been developed to address a growing demand from nurses for programming that enables them to obtain national certification as an advanced practice nurse (nurse practitioner) in psychiatric mental health. This certificate program is targeted to licensed, registered nurses with an APRN MSN who wish to gain new skills and knowledge for board certification to provide psychiatric care services as a psychiatric mental health nurse practitioner. The expected time to complete the program is 3 semesters or 12 months. There is a limited number of seats for the Post-Professional Certificate in Psychiatric Mental Health Nurse Practitioner. *The Post Professional PMHNP Certificate track is offered in an online/hybrid format.*

Please note: Admissions as of Fall 2025 is on hold for program review.

Admission Requirements

- Successful completion (grade of B or better) of the following courses in a previous APRN MSN program, preferred within 5 years of admission:
 - Advanced Pathophysiology
 - Advanced Physical Assessment
 - Advanced Pharmacology
- Completed application for admission to the certificate program.

Curriculum

Degree Requirements

The 18-credit hour post-APRN master's certificate curriculum includes those courses required by the American Nurses Credentialing Center which administers certification exams for the Psychiatric Mental Health Nurse Practitioner specialty.

NURS 723	Psychotherapeutic Approaches & Treatment Modalities	3
NURS 725	Psychopharmacology and Neurobiology	3
NURS 726	Managing Psychiatric Disorders Across the Lifespan	3
NURS 727	Psychiatric Mental Health Nurse Practitioner Practicum I	4
NURS 728	Psychiatric Mental Health Nurse Practitioner Practicum II	5
Total Credit Hours		18

Joint School of Public Health

Li-Wu Chen, PhD, MHSA, Founding Dean

Brian C. Martin, PhD, MBA, Associate Dean for Academic Affairs

Felicia Mebane, PhD, MSPH, Associate Dean for Community Engagement and Outreach (NSU)

Qi (Harry) Zhang, PhD, MA, PhD Health Services Research Program Director

TBD, MPH Program Director (ODU)

Stephen Nkansah-Amankra, PhD, MPH, MA, MPH Program Director (NSU)

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School Mission

The Joint School of Public Health (JSPH) is a collaborative partnership between Old Dominion University and Norfolk State University to offer experiential learning and research opportunities across multiple campuses. The first of its kind in Virginia, students learn through hands-on experience, classroom learning, and community engagement to prepare for the public health jobs of the future.

The school's mission is to improve the health and well-being of populations, in the Commonwealth of Virginia and beyond, through transformative education, research, scholarship, service, practice experiences and community partnerships.

Program Application and Acceptance

The JSPH has developed graduate programs that prepare individuals for practice, teaching, or research to meet the public health needs of the region, the state, and the nation. These programs include the Doctor of Philosophy (PhD) in Health Services Research degree, the Master of Public Health (MPH) degree, and several graduate certificate programs.

Students entering graduate programs in the JSPH should meet the minimum university admission requirements (see <https://www.odu.edu/admission/graduate> (<https://www.odu.edu/admission/graduate/>)). Application information, qualifications, deadlines, and advisors are listed in the specific program sections of this catalog and on the program web sites.

Note: Students enrolled in the MPH concentration provided at Norfolk State University (NSU) should rely on the NSU Graduate Catalog starting with the 2024 - 2025 academic year: <https://www.nsu.edu/catalog> (<https://www.nsu.edu/catalog/>).

Departments

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- Department of Health Behavior, Policy, and Management (p. 344)

Doctor of Philosophy Programs

- Health Services Research (PhD) (p. 344)

Master of Healthcare Administration Program

- Healthcare Administration (MHA) (p. 346)

Master of Public Health Programs

- Public Health with a Concentration in Applied Data Science (MPH) (p. 336)
- Public Health with a Concentration in Behavioral Health and Health Promotion (MPH) (p. 337)
- Public Health with a Concentration in Epidemiology (MPH) (p. 338)
- Public Health with a Concentration in Epidemiology of Infectious Disease (MPH) (p. 339)
- Public Health with a Concentration in Global Environmental Health (MPH) (p. 340)

- Public Health with a Concentration in Health Management and Policy (MPH) (p. 341)

Certificate Programs

- Applied Data Science Certificate (p. 343)
- Core Public Health Certificate (p. 342)
- Epidemiology Certificate (p. 343)
- Global Health Certificate (p. 342)
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Joint School of Public Health

Dean's Office Programs

Master of Public Health Programs

- Public Health with a Concentration in Applied Data Science (MPH) (p. 336)
- Public Health with a Concentration in Behavioral Health and Health Promotion (MPH) (p. 337)
- Public Health with a Concentration in Epidemiology (MPH) (p. 338)
- Public Health with a Concentration in Epidemiology of Infectious Disease (MPH) (p. 339)
- Public Health with a Concentration in Global Environmental Health (MPH) (p. 340)
- Public Health with a Concentration in Health Management and Policy (MPH) (p. 341)

Certificate Programs

- Core Public Health Certificate (p. 342)
- Global Health Certificate (p. 342)

Master of Public Health

Public Health with a Concentration in Applied Data Science (MPH)

For information about the MPH Program:

mph@odu.edu (<https://www.odu.edu/academics/programs/masters/public-health/>)

Website: <https://www.odu.edu/academics/programs/masters/public-health>

Students can complete this program in a traditional (classroom) format or online.

The Master's of Public Health (MPH) is designed to prepare students for entry and/or advancement in public health careers. The program provides students with an understanding of the public health sciences and with knowledge and skills that can be utilized in healthcare management, population-based research, and the community practice of public health. The MPH is designed for students with a bachelor's degree from all academic disciplines within and outside of the health disciplines. The graduates of the program will be ready to serve as invaluable professionals and leaders in the realm of public health.

The 43-credit Applied Data Science curriculum provides students with hands-on skills of applying data science principles to process, visualize and analyze data in order to extract meaningful information to address important questions in public health and the health sciences. Students in this track will also learn to use popular software packages such as R, SAS, SQL and Tableau. Data scientists are in high demand in several fields. Data science professionals with added contextual expertise of public health will find career opportunities at state or federal departments of public health, universities, pharmaceutical industries, and business entities.

Admission

The Master of Public Health program evaluates applicants using a holistic review process. All components of an application are reviewed prior to making an admission decision. Consideration may be given for appropriate work experience in a health-related field.

All applications are made through the Schools of Public Health Application Service (SOPHAS), the centralized application service for schools and programs of public health.

Application Checklist:

1. Completion of Bachelor's Degree from an accredited US institution or Foreign institution with a **GPA of 2.8 or higher**.
2. Two (2) letters of recommendation from academic sources or employment supervisor. Additional letters of recommendation are encouraged, if available.
3. Unofficial transcripts from all degree-granting programs listing the dates of program completion or attendance.
4. A personal essay of approximately 500 words explaining your public health career goals, reasons for interest in the Public Health program, specialty concentration selected with reasons for this selection, and any relevant work experience
5. TOEFL (minimum 79 IBT or 550 paper)/IELTS (minimum 7.0) is required for International Applicants.

There are no pre-requisite courses or specific undergraduate degrees required to be eligible to apply. Previous coursework in statistics and research methods is encouraged but not required. Applicants will be formally notified of admission decisions within two weeks of receipt of a completed application. Applicants need to confirm their spot in the program within 2 weeks of receiving a decision. Admitted students will be assigned a faculty advisor in their concentration area.

Curriculum Requirements

Recommended Prerequisites

Faculty recommend that students have taken some college-level math courses such as college algebra or calculus. Faculty also recommend that students have taken at least one college-level statistics course.

Full-Time Course Sequence

Year 1

Fall Term 10

MPHO 600	Introduction to Public Health Practice
MPHO 620	Health Management and Systems Thinking
MPHO 701	Introduction to Healthcare Analytics
MPHO 703	Programming Tools and Techniques in Data Management

Spring Term 9

MPHO 608	Environment and Public Health
MPHO 614	Principles of Epidemiology
MPHO 779	Intro to Research Methods

Summer Term 6

MPHO 605	Introduction to Biostatistics for Public Health
MPHO 704	Predictive Data Analysis

Year 2

Fall Term 9

MPHO 611	Social and Behavioral Sciences for Public Health
MPHO 705	Data Mining and Machine Learning
MPHO 706	Categorical Data Analysis

Spring Term 9

MPHO 627	Data Visualization
MPHO 669	Applied Practice Experience

Additional Requirements

Sequence of Course Offerings

A full-time student should be able to finish the program in five (5) academic terms. The study plan is designed to both accommodate typical student program time-to-completion needs and ensure a successful path through the coursework to program completion. Most courses are offered once per academic year in a specific semester for both online and on-campus students. Please review the course sequence carefully. Students interested in attending the program in a part-time capacity should contact their academic advisor for an individualized plan.

Graduation Requirements

Requirements for graduation include a minimum 43 graduate credit hours, with a minimum cumulative grade point average of 3.00 overall and in the concentration.

Financial Assistance

Financial aid is available to graduate students at Old Dominion University. In addition to the financial aid offered by the University, graduate students may be eligible for aid and student loans administered by other agencies. For information please contact the Office of Student Financial Aid.

For additional information on the MPH curriculum or admission requirements, or if you're interested in taking courses as a non-degree seeking student, please contact the Graduate Program Director (mph@odu.edu).

Master of Public Health Public Health with a Concentration in Behavioral Health and Health Promotion (MPH)

For information about the MPH Program:

mph@odu.edu (<https://www.odu.edu/academics/programs/masters/public-health/>)

Website: <https://www.odu.edu/academics/programs/masters/public-health>

Students can complete this program in a traditional (classroom) format or online.

The Master's of Public Health (MPH) is designed to prepare students for entry and/or advancement in public health careers. The program provides students with an understanding of the public health sciences and with knowledge and skills that can be utilized in healthcare management, population-based research, and the community practice of public health. The MPH is designed for students with a bachelor's degree from all academic disciplines within and outside of the health disciplines. The graduates of the program will be ready to serve as invaluable professionals and leaders in the realm of public health.

Graduates of the MPH with a concentration in Health Behavior and Health Promotion are prepared to be health behavior and health promotion leaders, directors, managers, health educators, community health planners, program managers, and program evaluators in public and private sectors including health departments, not-for-profit organizations, and foundations. Their work is aimed at preventing disease and injury and promoting healthy behaviors through education, communication, research, and publication.

Admission

The Master of Public Health program evaluates applicants using a holistic review process. All components of an application are reviewed prior to making an admission decision. Consideration may be given for appropriate work experience in a health-related field.

All applications are made through the Schools of Public Health Application Service (SOPHAS), the centralized application service for schools and programs of public health.

Application Checklist:

1. Completion of Bachelor's Degree from an accredited US institution or Foreign institution with a **GPA of 2.8 or higher**.
2. Two (2) letters of recommendation from academic sources or employment supervisor. Additional letters of recommendation are encouraged, if available.
3. Unofficial transcripts from all degree-granting programs listing the dates of program completion or attendance.
4. A personal essay of approximately 500 words explaining your public health career goals, reasons for interest in the Public Health program, specialty concentration selected with reasons for this selection, and any relevant work experience
5. TOEFL (minimum 79 IBT or 550 paper)/IELTS (minimum 7.0) is required for International Applicants.

There are no pre-requisite courses or specific undergraduate degrees required to be eligible to apply. Previous coursework in statistics and research methods is encouraged but not required. Applicants will be formally notified of admission decisions within two weeks of receipt of a completed application. Applicants need to confirm their spot in the program within 2 weeks of receiving a decision. Admitted students will be assigned a faculty advisor in their concentration area.

Curriculum Requirements

The Master of Public Health (MPH) is a 43-credit program. All courses include the standardized competencies required for accreditation of MPH programs by the Council on Education for Public Health (CePH).

Fall 1 (10 credit hours)

MPHO 600	Introduction to Public Health Practice	1
MPHO 605	Introduction to Biostatistics for Public Health	3
MPHO 611	Social and Behavioral Sciences for Public Health	3
MPHO 614	Principles of Epidemiology	3

Spring 1 (9 credit hours)

MPHO 608	Environment and Public Health	3
MPHO 616	Research Methods in Public Health	3
MPHO 620	Health Management and Systems Thinking	3

Summer 1 (6 credit hours)

MPHO 651	Health Promotion Theory and Practice	3
MPHO 661	Program Planning and Evaluation	3

Fall 2 (9 credit hours)

MPHO 630	Health Communication and Social Marketing for Public Health	3
MPHO 640	Health Disparities and Social Justice	3
Elective		3

Spring 2 (9 credit hours)

MPHO 669	Applied Practice Experience	3
Elective		3
Elective		3

* Electives are approved by student advisor.

Additional Requirements

Sequence of Course Offerings

A full-time student should be able to finish the program in five (5) academic terms. The study plan is designed to both accommodate typical student program time-to-completion needs and ensure a successful path through the coursework to program completion. Most courses are offered once per academic year in a specific semester for both online and on-campus students. Please review the course sequence carefully. Students interested in attending the program in a part-time capacity should contact their academic advisor for an individualized plan.

Graduation Requirements

Requirements for graduation include a minimum 43 graduate credit hours, with a minimum cumulative grade point average of 3.00 overall and in the concentration.

Financial Assistance

Financial aid is available to graduate students at Old Dominion University. In addition to the financial aid offered by the University, graduate students may be eligible for aid and student loans administered by other agencies. For information please contact the Office of Student Financial Aid.

For additional information on the MPH curriculum or admission requirements, or if you're interested in taking courses as a non-degree seeking student, please contact the Graduate Program Director (mph@odu.edu).

Master of Public Health
Public Health with a Concentration
in Epidemiology (MPH)

For information about the MPH Program:
mph@odu.edu (<https://www.odu.edu/academics/programs/masters/public-health/>)
Website: <https://www.odu.edu/academics/programs/masters/public-health>

Students can complete this program in a traditional (classroom) format or online.

The Master's of Public Health (MPH) is designed to prepare students for entry and/or advancement in public health careers. The program provides students with an understanding of the public health sciences and with knowledge and skills that can be utilized in healthcare management, population-based research, and the community practice of public health. The MPH is designed for students with a bachelor's degree from all academic disciplines within and outside of the health disciplines. The graduates of the program will be ready to serve as invaluable professionals and leaders in the realm of public health.

Epidemiologists are public health professionals that focus on the causes, patterns and control of diseases and injury in populations. Epidemiology is a fundamental science of public health and is essential to the reduction of risk and the occurrence of negative health outcomes. The epidemiology curriculum provides rigorous training in the knowledge and skills for analyzing community health problems, with emphasis on how to measure and describe the health of populations.

Admission

The Master of Public Health program evaluates applicants using a holistic review process. All components of an application are reviewed prior to making an admission decision. Consideration may be given for appropriate work experience in a health-related field.

All applications are made through the Schools of Public Health Application Service (SOPHAS), the centralized application service for schools and programs of public health.

Application Checklist:

1. Completion of Bachelor's Degree from an accredited US institution or Foreign institution with a **GPA of 2.8 or higher**.

- Two (2) letters of recommendation from academic sources or employment supervisor. Additional letters of recommendation are encouraged, if available.
- Unofficial transcripts from all degree-granting programs listing the dates of program completion or attendance.
- A personal essay of approximately 500 words explaining your public health career goals, reasons for interest in the Public Health program, specialty concentration selected with reasons for this selection, and any relevant work experience
- TOEFL (minimum 79 IBT or 550 paper)/IELTS (minimum 7.0) is required for International Applicants.

There are no pre-requisite courses or specific undergraduate degrees required to be eligible to apply. Previous coursework in statistics and research methods is encouraged but not required. Applicants will be formally notified of admission decisions within two weeks of receipt of a completed application. Applicants need to confirm their spot in the program within 2 weeks of receiving a decision. Admitted students will be assigned a faculty advisor in their concentration area.

Curriculum Requirements

Recommended Prerequisites

Our faculty strongly recommend that students applying to the epidemiology track have a minimum of two college-level math courses at the level of algebra or above. A statistics course is acceptable for one of the math courses. It is also recommended that students have at least two college-level biology courses.

Full-Time Course Sequence

Year 1

<i>Fall Term</i>	<i>10</i>

MPHO 600	Introduction to Public Health Practice
MPHO 605	Introduction to Biostatistics for Public Health
MPHO 611	Social and Behavioral Sciences for Public Health
MPHO 620	Health Management and Systems Thinking

<i>Spring Term</i>	<i>9</i>

MPHO 614	Principles of Epidemiology
MPHO 779	Intro to Research Methods
Elective	

<i>Summer Term</i>	<i>6</i>

MPHO 631	Statistical Software for Public Health
MPHO 711	Epidemiology Methods I

Year 2

<i>Fall Term</i>	<i>9</i>

MPHO 702	Biostatistics II
MPHO 718	Epidemiologic Methods II
Elective	

<i>Spring Term</i>	<i>9</i>

MPHO 608	Environment and Public Health
MPHO 669	Applied Practice Experience
Elective	

Total Credit Hours	43

Elective Options

Please see your faculty advisor for additional options and for information on when courses are offered.

MPHO 626	Effective Information Technology for Healthcare Organizations	3
MPHO 627	Data Visualization	3
MPHO 634	Health Law and Ethics	3
MPHO 690	Leadership	3

MPHO 706	Categorical Data Analysis	3
MPHO 707	Survival Analysis	3
MPHO 715	Current Issues in Epidemiology	3
MPHO 727	Organizational Management	3
MPHO 736	Conflict Analysis and Negotiations	3
MPHO 737	Infectious and Chronic Disease Epidemiology	3
MPHO 772	International Health Exchange Program	3

Additional Requirements

Sequence of Course Offerings

A full-time student should be able to finish the program in five (5) academic terms. The study plan is designed to both accommodate typical student program time-to-completion needs and ensure a successful path through the coursework to program completion. Most courses are offered once per academic year in a specific semester for both online and on-campus students. Please review the course sequence carefully. Students interested in attending the program in a part-time capacity should contact their academic advisor for an individualized plan.

Graduation Requirements

Requirements for graduation include a minimum 43 graduate credit hours, with a minimum cumulative grade point average of 3.00 overall and in the concentration.

Financial Assistance

Financial aid is available to graduate students at Old Dominion University. In addition to the financial aid offered by the University, graduate students may be eligible for aid and student loans administered by other agencies. For information please contact the Office of Student Financial Aid.

For additional information on the MPH curriculum or admission requirements, or if you're interested in taking courses as a non-degree seeking student, please contact the Graduate Program Director (mph@odu.edu).

Master of Public Health Public Health with a Concentration in Epidemiology of Infectious Disease (MPH)

For information about the MPH Program:

mph@odu.edu (<https://www.odu.edu/academics/programs/masters/public-health/>)

Website: <https://www.odu.edu/academics/programs/masters/public-health>

Students can complete this program in a traditional (classroom) format or online.

The Master's of Public Health (MPH) is designed to prepare students for entry and/or advancement in public health careers. The program provides students with an understanding of the public health sciences and with knowledge and skills that can be utilized in healthcare management, population-based research, and the community practice of public health. The MPH is designed for students with a bachelor's degree from all academic disciplines within and outside of the health disciplines. The graduates of the program will be ready to serve as invaluable professionals and leaders in the realm of public health.

Graduates of the MPH with a concentration in Epidemiology of Infectious Diseases will be prepared to work as public health professionals who focus on the causes, patterns and control of diseases and injury in populations around the world. Epidemiology is a fundamental public health science and is essential to the surveillance of and responses to infectious disease and other outbreaks.

Admission

The Master of Public Health program evaluates applicants using a holistic review process. All components of an application are reviewed prior to making an admission decision. Consideration may be given for appropriate work experience in a health-related field.

All applications are made through the Schools of Public Health Application Service (SOPHAS), the centralized application service for schools and programs of public health.

Application Checklist:

- 1. Completion of Bachelor's Degree from an accredited US institution or Foreign institution with a **GPA of 2.8 or higher**.
- 2. Two (2) letters of recommendation from academic sources or employment supervisor. Additional letters of recommendation are encouraged, if available.
- 3. Unofficial transcripts from all degree-granting programs listing the dates of program completion or attendance.
- 4. A personal essay of approximately 500 words explaining your public health career goals, reasons for interest in the Public Health program, specialty concentration selected with reasons for this selection, and any relevant work experience
- 5. TOEFL (minimum 79 IBT or 550 paper)/IELTS (minimum 7.0) is required for International Applicants.

There are no pre-requisite courses or specific undergraduate degrees required to be eligible to apply. Previous coursework in statistics and research methods is encouraged but not required. Applicants will be formally notified of admission decisions within two weeks of receipt of a completed application. Applicants need to confirm their spot in the program within 2 weeks of receiving a decision. Admitted students will be assigned a faculty advisor in their concentration area.

Curriculum Requirements

The Master of Public Health (MPH) is a 43-credit program. All courses include the standardized competencies required for accreditation of MPH programs by the Council on Education for Public Health (CePH).

Fall 1 (10 credit hours)

MPHO 600	Introduction to Public Health Practice	1
MPHO 605	Introduction to Biostatistics for Public Health	3
MPHO 611	Social and Behavioral Sciences for Public Health	3
MPHO 614	Principles of Epidemiology	3

Spring 1 (9 credit hours)

MPHO 608	Environment and Public Health	3
MPHO 616	Research Methods in Public Health	3
MPHO 620	Health Management and Systems Thinking	3

Summer 1 (6 credit hours)

MPHO 716	Application of Epidemiological Methods	3
Elective		3

Fall 2 (9 credit hours)

MPHO 717	Epidemiology of Infectious Diseases	3
MPHO 776	Global Health	3
Elective		3

Spring 2 (9 credit hours)

MPHO 689	Integrative Learning Experience	3
MPHO 712	Applied Biostatistics	3
Elective		3

*

Electives are approved by the student advisor.

Additional Requirements

Sequence of Course Offerings

A full-time student should be able to finish the program in five (5) academic terms. The study plan is designed to both accommodate typical student program time-to-completion needs and ensure a successful path through the coursework to program completion. Most courses are offered once per academic year in a specific semester for both online and on-campus students. Please review the course sequence carefully. Students interested in attending the program in a part-time capacity should contact their academic advisor for an individualized plan.

Graduation Requirements

Requirements for graduation include a minimum 43 graduate credit hours, with a minimum cumulative grade point average of 3.00 overall and in the concentration.

Financial Assistance

Financial aid is available to graduate students at Old Dominion University. In addition to the financial aid offered by the University, graduate students may be eligible for aid and student loans administered by other agencies. For information please contact the Office of Student Financial Aid.

For additional information on the MPH curriculum or admission requirements, or if you're interested in taking courses as a non-degree seeking student, please contact the Graduate Program Director (mph@odu.edu).

Master of Public Health Public Health with a Concentration in Global Environmental Health (MPH)

For information about the MPH Program:
mph@odu.edu (<https://www.odu.edu/academics/programs/masters/public-health/>)

Website: <https://www.odu.edu/academics/programs/masters/public-health/>
(<https://www.odu.edu/academics/programs/masters/public-health/>)

Students can complete this program in a traditional (classroom) format or online.

The Master's of Public Health (MPH) is designed to prepare students for entry and/or advancement in public health careers. The program provides students with an understanding of the public health sciences and with knowledge and skills that can be utilized in healthcare management, population-based research, and the community practice of public health. The MPH is designed for students with a bachelor's degree from all academic disciplines within and outside of the health disciplines. The graduates of the program will be ready to serve as invaluable professionals and leaders in the realm of public health.

Graduates of the MPH with a concentration in Global Environmental Health will be prepared to work for local, state, and federal agencies, the uniformed services, not-for-profit organizations, international organizations, and the private sector in such roles as environmental health officer, public health emergency response coordinator, global environmental health analyst, food safety officer, environmentalist/sanitarian, environmental disaster specialist, health inspector, bioterrorism preparedness coordinator, environmental health consultant, and consumer safety officer.

Admission

The Master of Public Health program evaluates applicants using a holistic review process. All components of an application are reviewed prior to

making an admission decision. Consideration may be given for appropriate work experience in a health-related field.

All applications are made through the Schools of Public Health Application Service (SOPHAS), the centralized application service for schools and programs of public health.

Application Checklist:

1. Completion of Bachelor's Degree from an accredited US institution or Foreign institution with a **GPA of 2.8 or higher**.
2. Two (2) letters of recommendation from academic sources or employment supervisor. Additional letters of recommendation are encouraged, if available.
3. Unofficial transcripts from all degree-granting programs listing the dates of program completion or attendance.
4. A personal essay of approximately 500 words explaining your public health career goals, reasons for interest in the Public Health program, specialty concentration selected with reasons for this selection, and any relevant work experience
5. TOEFL (minimum 79 IBT or 550 paper)/IELTS (minimum 7.0) is required for International Applicants.

There are no pre-requisite courses or specific undergraduate degrees required to be eligible to apply. Previous coursework in statistics and research methods is encouraged but not required. Applicants will be formally notified of admission decisions within two weeks of receipt of a completed application. Applicants need to confirm their spot in the program within 2 weeks of receiving a decision. Admitted students will be assigned a faculty advisor in their concentration area.

Curriculum Requirements

The Master of Public Health (MPH) is a 43-credit program. All courses include the standardized competencies required for accreditation of MPH programs by the Council on Education for Public Health (CePH).

Fall 1 (10 credit hours)

MPHO 600	Introduction to Public Health Practice	1
MPHO 605	Introduction to Biostatistics for Public Health	3
MPHO 611	Social and Behavioral Sciences for Public Health	3
MPHO 614	Principles of Epidemiology	3

Spring 1 (9 credit hours)

MPHO 608	Environment and Public Health	3
MPHO 616	Research Methods in Public Health	3
MPHO 620	Health Management and Systems Thinking	3

Summer 1 (6 credit hours)

MPHO 622	Environmental Health Law, Justice and Governance	3
MPHO 778	Global Environmental Health	3

Fall 2 (9 credit hours)

MPHO 632	Environmental and Occupational Health Risk Assessment	3
MPHO 784	Creating Sustainable Environmental Futures	3
Elective		3

Spring 2 (9 credit hours)

MPHO 669	Applied Practice Experience	3
Elective		3
Elective		3

* Electives are approved by student advisor.

Additional Requirements

Sequence of Course Offerings

A full-time student should be able to finish the program in five (5) academic terms. The study plan is designed to both accommodate typical student program time-to-completion needs and ensure a successful path through the coursework to program completion. Most courses are offered once per academic year in a specific semester for both online and on-campus students. Please review the course sequence carefully. Students interested in attending the program in a part-time capacity should contact their academic advisor for an individualized plan.

Graduation Requirements

Requirements for graduation include a minimum 43 graduate credit hours, with a minimum cumulative grade point average of 3.00 overall and in the concentration.

Financial Assistance

Financial aid is available to graduate students at Old Dominion University. In addition to the financial aid offered by the University, graduate students may be eligible for aid and student loans administered by other agencies. For information please contact the Office of Student Financial Aid.

For additional information on the MPH curriculum or admission requirements, or if you're interested in taking courses as a non-degree seeking student, please contact the Graduate Program Director (mph@odu.edu).

Master of Public Health Public Health with a Concentration in Health Management and Policy (MPH)

For information about the MPH Program:

mph@odu.edu (<https://www.odu.edu/academics/programs/masters/public-health/>)

Website: <https://www.odu.edu/academics/programs/masters/public-health>

Students can complete this program in a traditional (classroom) format or online.

The Master's of Public Health (MPH) is designed to prepare students for entry and/or advancement in public health careers. The program provides students with an understanding of the public health sciences and with knowledge and skills that can be utilized in healthcare management, population-based research, and the community practice of public health. The MPH is designed for students with a bachelor's degree from all academic disciplines within and outside of the health disciplines. The graduates of the program will be ready to serve as invaluable professionals and leaders in the realm of public health.

Students in the Health Management and Policy track work to address the complex issues presented by today's dynamic healthcare sector. Students prepare to face the cost, access and quality challenges of the healthcare system, incorporating concepts and competencies from areas such as management, policy analysis and finance.

Admission

The Master of Public Health program evaluates applicants using a holistic review process. All components of an application are reviewed prior to making an admission decision. Consideration may be given for appropriate work experience in a health-related field.

All applications are made through the Schools of Public Health Application Service (SOPHAS), the centralized application service for schools and programs of public health.

Application Checklist:

1. Completion of Bachelor's Degree from an accredited US institution or Foreign institution with a **GPA of 2.8 or higher**.
2. Two (2) letters of recommendation from academic sources or employment supervisor. Additional letters of recommendation are encouraged, if available.
3. Unofficial transcripts from all degree-granting programs listing the dates of program completion or attendance.
4. A personal essay of approximately 500 words explaining your public health career goals, reasons for interest in the Public Health program, specialty concentration selected with reasons for this selection, and any relevant work experience
5. TOEFL (minimum 79 IBT or 550 paper)/IELTS (minimum 7.0) is required for International Applicants.

There are no pre-requisite courses or specific undergraduate degrees required to be eligible to apply. Previous coursework in statistics and research methods is encouraged but not required. Applicants will be formally notified of admission decisions within two weeks of receipt of a completed application. Applicants need to confirm their spot in the program within 2 weeks of receiving a decision. Admitted students will be assigned a faculty advisor in their concentration area.

Curriculum Requirements

Recommended Prerequisites

There are no prerequisite courses for the Health Management and Policy Track. However, introductory courses in accounting and finance, macroeconomics and business finance may provide useful preparation for the courses included in the track.

Full-Time Course Sequence

Year 1

<i>Fall Term</i>		<i>10</i>
MPHO 600	Introduction to Public Health Practice	
MPHO 605	Introduction to Biostatistics for Public Health	
MPHO 611	Social and Behavioral Sciences for Public Health	
MPHO 620	Health Management and Systems Thinking	
<i>Spring Term</i>		<i>9</i>
MPHO 614	Principles of Epidemiology	
MPHO 779	Intro to Research Methods	
Elective		
<i>Summer Term</i>		<i>6</i>
MPHO 721	Healthcare Strategy	
MPHO 733	Financing Healthcare	

Year 2

<i>Fall Term</i>		<i>9</i>
MPHO 723	Policy and Politics of Health	
MPHO 727	Organizational Management	
Elective		
<i>Spring Term</i>		<i>9</i>
MPHO 608	Environment and Public Health	
MPHO 669	Applied Practice Experience	
MPHO 736	Conflict Analysis and Negotiations	
Total Credit Hours		43

Elective Options

Please see your faculty advisor for additional options and for information on when courses are offered.

MPHO 626	Effective Information Technology for Healthcare Organizations	3
MPHO 634	Health Law and Ethics	3

MPHO 690	Leadership	3
MPHO 772	International Health Exchange Program	3

Additional Requirements

Sequence of Course Offerings

A full-time student should be able to finish the program in five (5) academic terms. The study plan is designed to both accommodate typical student program time-to-completion needs and ensure a successful path through the coursework to program completion. Most courses are offered once per academic year in a specific semester for both online and on-campus students. Please review the course sequence carefully. Students interested in attending the program in a part-time capacity should contact their academic advisor for an individualized plan.

Graduation Requirements

Requirements for graduation include a minimum 43 graduate credit hours, with a minimum cumulative grade point average of 3.00 overall and in the concentration.

Financial Assistance

Financial aid is available to graduate students at Old Dominion University. In addition to the financial aid offered by the University, graduate students may be eligible for aid and student loans administered by other agencies. For information please contact the Office of Student Financial Aid.

For additional information on the MPH curriculum or admission requirements, or if you're interested in taking courses as a non-degree seeking student, please contact the Graduate Program Director (mph@odu.edu).

Certificate

Core Public Health Certificate

The Graduate Core Public Health Certificate is an 18-credit hour program designed to give students a strong foundation of knowledge in the five core areas of public health:

- Biostatistics
- Epidemiology
- Environmental health
- Health services administration
- Social and behavioral sciences

The fundamental knowledge and skills learned in these core courses will equip students to analyze and respond to emerging public health issues at the institutional, community, and societal levels.

Curriculum Requirements

MPHO 605	Introduction to Biostatistics for Public Health	3
MPHO 608	Environment and Public Health	3
MPHO 611	Social and Behavioral Sciences for Public Health	3
MPHO 614	Principles of Epidemiology	3
MPHO 620	Health Management and Systems Thinking	3
MPHO 779	Intro to Research Methods	3
Total Credit Hours		18

Certificate

Global Health Certificate

<https://www.odu.edu/hs/centers/globalhealth> (<https://www.odu.edu/hs/centers/globalhealth/>)

Michele Kekeh, PhD, Program Director
Email Address: mkekeh@odu.edu
3011 Health Sciences Bldg.

Global Health aims to show us the big picture. Mistakenly, people assume that the target of “Global Health” involves mainly tackling problems in the developing world. Diseases and health problems do not recognize borders. All countries can learn from the experiences of other countries. Neglecting to address health problems in a global scale may affect people’s health, well-being and national security around the world including in developed countries such as the United States.

This competency-based certificate program aims to provide comprehensive training on Global Health. Additionally, this certification program embraces a transdisciplinary focus. The Global Health Certificate is designed as an online program for professionals who are practicing or who plan to practice in a worldwide setting. Graduates of the Global Health Certificate can expect to find employment in a variety of fields including health-related governmental/non-governmental organizations, university research programs, international healthcare consultancies, and multinational corporations (Education Advisory Board, 2013). The certificate requires three core courses (3 credit hours each), two electives (2 credit hours each) and a cumulative experience (2 credit hours) for a total fifteen (15) credits. A maximum of 6 credit hours from graduate level courses may be transferred into the certificate program. Admission to the certificate program requires a bachelor’s degree (or the equivalent).

Curriculum Requirements

Required Core Courses		9
HLSC 746	Epidemiology	
HLSC 776	Global Health	
HLSC 702	Health Management	
Electives		
Select two of the following:		4
HLSC 778	Global Environmental Health	
HLSC 780	Monitoring & Evaluating Global Health Programs	
HLSC 782	One Health, One Medicine	
HLSC 784	Creating Sustainable Environmental Futures	
HLSC 785	Issues and Opportunities in Global Health Research	
Cumulative Experience		
Select one of the following:		2
HLSC 798	Supervised Research	
HLSC 768	Practicum in Global Health	
HLSC 705	Interprofessional Study Abroad on Global Health	
NOTE: A maximum of 6 credit hours from graduate level courses may be transferred.		
Total Credit Hours		15

Department of Epidemiology, Biostatistics, & Environmental Health

Department website: <https://www.odu.edu/epidemiology-biostatistics-environmental-health> (<https://www.odu.edu/epidemiology-biostatistics-environmental-health/>)

Jim Blando, PhD
Associate Professor
Chair
Jblando@odu.edu (jblando@odu.edu)

The Department of Epidemiology, Biostatistics, and Environmental Health plays a central role in advancing public health. Our environmental health faculty apply physics and chemistry to measure and assess environmental risks and their potential impact on humans and ecosystems. The epidemiology faculty study disease patterns in populations, while our biostatistics faculty use advanced mathematical methods to analyze data and

draw insights critical to public health. Together, these disciplines address key global challenges such as climate change, pandemics, pollution, food insecurity, clean water, and sustainability.

Certificate Programs

- Applied Data Science Certificate (p. 343)
- Epidemiology Certificate (p. 343)
- Occupational Safety Certificate (p. 343)

Certificate
Applied Data Science Certificate

Advances in technology, the availability of large amounts of data and the rapid growth of electronic health data and analysis tools have led to an ever-increasing need for specific skills in data analytics. The Graduate Applied Data Science Certificate is a 15-credit hour program designed for working professionals looking to advance in the healthcare infomatics industry.

Curriculum Requirements

MPHO 605	Introduction to Biostatistics for Public Health	3
MPHO 627	Data Visualization	3
MPHO 701	Introduction to Healthcare Analytics	3
MPHO 703	Programming Tools and Techniques in Data Management	3
MPHO 704	Predictive Data Analysis	3
Total Credit Hours		15

Certificate
Epidemiology Certificate

Epidemiology is the study of the distribution and determinants of disease, illness and injury. The Graduate Epidemiology Certificate is a 15-credit hour program designed to provide the learner with an understanding of the concepts of epidemiology used in public health practice. The certificate is intended to provide the concepts, methods and tools needed for the assessment of health situations and trends of population groups.

Curriculum Requirements

MPHO 605	Introduction to Biostatistics for Public Health	3
MPHO 614	Principles of Epidemiology	3
MPHO 779	Intro to Research Methods	3
Electives - Select Two		6
MPHO 630	Health Communication and Social Marketing for Public Health	
MPHO 702	Biostatistics II	
MPHO 711	Epidemiology Methods I	
MPHO 715	Current Issues in Epidemiology	
MPHO 737	Infectious and Chronic Disease Epidemiology	
MPHO 772	International Health Exchange Program	
Total Credit Hours		15

Certificate
Occupational Safety Certificate

Jeff Moody, MSPH, Coordinator

The certificate program in occupational safety is designed to prepare students to meet safety standards and guidelines in such areas as business, education and industry with the goal of managing operations to minimize financial losses resulting from accidents, health claims, legal actions, and property damage. It is especially attractive to students in majors such as engineering, occupational and technical studies, and business who may reasonably anticipate assignment of safety as an additional duty, or to

individuals already employed in the occupational health and safety field. Course taken for the Certificate may also be used to qualify for safety positions, enhance the qualifications of Certified Safety Professional (CSP) and Certified Industrial Hygienist (CIH) candidates, and provide maintenance points for professionals holding the CSP or CIH certifications.

Courses in the certificate program may be taken through degree or nondegree programs, and may be applied to degree requirements at the graduate level in environmental health. For completion of the graduate certificate program students must have a minimum cumulative grade point average of 3.00 in all courses taken toward the certificate. After successful completion of the program, a Certificate in Occupational Safety will be awarded. A total of 15-16 semester hours is required, comprised of three core courses and six to seven hours of electives. All courses, with the exception of the lab course, are provided online, either as televised or web-based courses. There are no prerequisites.

Curriculum Requirements

Core Courses		9
ENVH 506	Principles of Occupational Safety and Health	6 - 7
ENVH 525	Occupational Safety and Health Program Management	
ENVH 507	Occupational Safety Standards, Laws and Regulations	
Select two of the following:		
ENVH 501	Occupational Health	
ENVH 526	Physical Hazards and Their Control	15-16
ENVH 540	Principles of Ergonomics	
ENVH 541	Industrial Hygiene	
ENVH 542	Industrial Hygiene Sampling Methods	
ENVH 546	Physical Hazards Laboratory	
Total Credit Hours		

Department of Health Behavior, Policy, and Management

Department website: <https://www.odu.edu/health-behavior-policy-management> (<https://www.odu.edu/health-behavior-policy-management/>)

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The Department of Health Behavior, Policy, and Management is dedicated to shaping future leaders in health behavior, policy, management, and research. We tackle critical population and organizational challenges through a blend of innovative education, cutting-edge research, and practical application. Our health behavior experts are committed to advancing public health by addressing the root causes of health issues. Meanwhile, our health policy and management specialists focus on creating evidence-based solutions to systemic challenges, preparing the next generation of healthcare administrators, policymakers, and researchers to ensure accessible, high-quality care for all.

The Department of Health Behavior, Policy, and Management houses the PhD in Health Services Research.

Doctor of Philosophy Programs

- Health Services Research (PhD) (p. 344)

Master of Healthcare Administration Program

- Healthcare Administration (MHA) (p. 346)

Certificate Program

- Health Management Certificate (p. 348)

Doctor of Philosophy Health Services Research (PhD)

757-683-4259

<http://www.odu.edu/academics/programs/doctoral/health-services-research>
(<http://www.odu.edu/academics/programs/doctoral/health-services-research/>)

Dr. Qi (Harry) Zhang, Graduate Program Director (qzhang@odu.edu)

The primary mission of the Ph.D. in health services research is to develop leaders and problem solvers whose professional services will improve the health of the population not only in Eastern Virginia but also statewide, nationally, and internationally. Health services researchers examine health care quality and effectiveness, primary and managed care, new technologies, and other critical health services and related public health research practice topics. Health services researchers pursue careers in many settings, including academia, industry, professional organizations, research centers, health policy groups, clinical settings, and in federal, state, local, and international agencies.

The goals of the program are to enable students to conduct and interpret health services research, to formulate and analyze public health policy, to lead programs and organizations that address the health care needs of populations and to work directly with community members to empower them to be a part of the policy formulation process. In accomplishing these goals students in the program will develop the critical skills necessary to integrate knowledge and competencies applicable to public health and health services questions and problems. Students will be able to design viable programs, manage resources, and measure the effectiveness of service delivery public health interventions to populations. Students will be awarded the Ph.D. in health services research after the completion of all university and program requirements for graduate degrees.

In addition to demonstrated ability in the health services research competencies, students are expected to select one of two tracks: Applied Health Research or Health Policy and Management Research.

Applied Health Research track will provide students with skills needed to address complex health questions across disciplinary boundaries, advance health-related research and programs, prevent disease and injury, and provide innovative approaches or solve practice-related problems in state and federal agencies, private/non-profit research and evaluation agencies, academia, and health systems.

Health Policy and Management Research track will provide students with the skills and systems thinking approaches to formulate and implement health policies, evaluate the effectiveness of policies within a health care organization, and improve the management of health delivery performance in state and federal agencies, private/non-profit research and evaluation agencies, academia, and health systems.

Requirements for Admission

Students are admitted to the Ph.D. program during the fall term only. Applications for admission are reviewed by the Ph.D. in Health Services Research Program admissions committee. To qualify for admission, an applicant must meet the general University admission requirements at the graduate level as well as specific program requirements, including:

1. A completed master's degree from a program that is accredited by a specialized accrediting agency; degrees such as M.D., J.D., and D.D.S. are also acceptable;
2. A minimum acceptable grade point average of 3.50 (on a 4.0 scale) overall for the master's degree;
3. Graduate Record Exam (GRE) not required but strongly recommended;

- For those whose native language is not English a TOEFL score of at least 550 (79 for internet-based test);
- Official transcripts from all institutions of higher education attended;
- A current curriculum vitae or resume;
- Three letters of reference from sources capable of commenting on the applicant's readiness and commitment for doctoral studies. At least two, and preferably all letters should be from academic sources; other letters must be from professional supervisors;
- A 1500 word essay discussing the applicant's academic and professional goals. This essay should discuss how the Ph.D. in Health Services Research program will contribute towards meeting these goals; and
- A personal interview to discuss applicant's research focus and fit with the program faculty's expertise.

Prerequisite courses are necessary for students who do not have graduate preparation in basic statistics, research design, and basic computer literacy. Prerequisite courses in health delivery systems and community health may be required for students without academic preparation or experience in these areas.

All applications are made through the Schools of Public Health Application Service (SOPHAS), the centralized application service for schools and programs of public health.

Curriculum Requirements

The coursework consists of 12 credits of health services core courses, 18 credits of research core courses, 12 credits of track-specific courses and 2-3 credits of electives. Track options include: Health Administration and Policy (HAP) or Applied Health Research (AHR). A 1-credit colloquium is required each semester along with coursework (4 course series). Additionally, students complete 12 dissertation credits. Up to 9 credit hours of coursework may be at the 600 level. Up to 12 hours of graduate credit may be transferred from another university and applied towards the Ph.D. degree. Transfer of credit is approved at the discretion of the advisory committee and the graduate program director.

Health Services Research

The Health Services Research Core

HSR 776	Global Health	3
HSR 801	Introduction to Health Services	3
HSR 809	Multidisciplinary Approaches to Health Services Research	3
HSR 814	Theory in the Health Sciences	3
Research Core		
HSR 810	Research Design and Application	3
HSR 811	Quantitative Research Methods in Health Care	3
HSR 812	Qualitative Research Methods	3
HSR 813	Health Outcomes Research	3
HSR 846	Epidemiology	3
HSR 873	Planning Proposals and Developing Grants in Health Research	3

Electives* 2-3

HSR 706	Leadership in Complex Systems and Organizations
HSR 778	Global Environmental Health
HSR 804	Methods of Program Evaluation
HSR 805	Interprofessional Study Abroad on Global Health

Track - Select One 10-15

Applied Health Research Track

HSR 785	Issues and Opportunities in Global Health Research
HSR 815	Decision Analysis in Health Care
HSR 898	Supervised Research

MPHO 712	Applied Biostatistics	
<i>Health Policy and Management Research Track</i>		
HSR 802	Health Management	
HSR 864	Health Economics	
HSR 872	Policy and Politics of Health	
HSR 898	Supervised Research	
Colloquium		
HSR 889	Colloquium I	1
HSR 890	Colloquium II	1
HSR 891	Colloquium III	1
HSR 892	Colloquium IV	1
Dissertation		
Complete dissertation requirements		12

* Other track courses can be used as an elective. Additional electives with approval of Program Director.

Additional Requirements

Degree Requirements

- Satisfactory completion of at least 60 semester hours of graduate level coursework, including all required courses as listed below. (Students who receive two or more grades of C+ or one grade of F may not continue in the program).
- Two semesters of full-time residency. These do not have to be consecutive.
- A health services research supervised research experience.
- Acceptable performance on written and oral candidacy examinations in the major field of study at the end of the program coursework. Students may re-take the candidacy exams only once.
- Successful defense of a dissertation proposal.
- Completion of a traditional or three-article dissertation representing the candidate's ability to conduct scholarly, original research. The quality of the research must be suitable for publication in an academic, peer-reviewed journal.
- Successful oral defense of the dissertation.
- Submission of the approved final copy of the dissertation.

Time frames for completion of degree requirement are as follows:

- The entire process (from admission to dissertation defense) must be completed within eight years. Exceptions to this time limit require the approval of the graduate program director, college dean and the dean of the graduate school.
- Academic credit which is more than eight years old at the time of graduation must be re-validated by an examination before the work can be applied to a doctoral degree.
- The dissertation must be completed within five years after the candidacy exams are passed.
- Dissertations should be defended at least six weeks prior to the end of the semester in which the student expects to graduate.

Each student is required to have an identified research mentor who also serves as their advisory faculty member who will meet with the student upon entry into the program. The faculty member, with the graduate program director, approves the student's planned coursework (plan of study) and conducts the written and oral candidacy exams at the end of the coursework. Students must maintain a 3.0 grade point average.

Candidacy Exams (Written and Oral)

The candidacy examination is normally taken during the spring or fall semester of registration in the last formal graduate credits. Through the candidacy examination, the student's advisory and examination committee in conjunction with the candidacy exam subcommittee and the graduate program director shall ensure that the student has demonstrated a mastery of the subject matter in all fields of the program, has an adequate knowledge

of relevant literature, and has the ability to identify, utilize, and apply research skills and techniques. To be eligible to take the examination, the student must meet the program requirements, must have completed or be in the semester of completing all coursework and the internship, must be recommended by his/her advisory and examination committee, and must achieve at least a 3.0 GPA on all coursework taken within the program. Students need to apply to take the candidacy exam to the graduate program director by the specified deadline each semester. The application form must be submitted by February 10 to take the exam in the spring semester, April 10 to take the exam in the summer, and by September 10 to take the exam in the fall semester.

All parts of the examination are graded pass/fail. Students may retake the exam only once. Parts of the written exam that are not passed on the first attempt need to be re-taken when the exam is offered again. The oral exam can be re-taken in the same semester.

Dissertation (12 credits)

The candidate's program of study culminates in a dissertation representing an original research project which makes a real and significant contribution to health services knowledge and practice. The dissertation provides a demonstration of the student's ability to conduct independent scholarly research in health services research. The dissertation phase begins only after all other degree requirements (coursework, candidacy exams), have been completed. Towards this end, the candidate must form a dissertation committee, write and successfully defend a dissertation proposal, independently conduct the research necessary to complete the dissertation, write the dissertation, successfully defend the dissertation at an oral defense, make any necessary changes based on the committee's recommendation and submit a final approved copy to the dean's office. Additionally, all Ph.D. students are strongly encouraged to prepare as first author at least one journal article based upon their dissertation research prior to graduation.

Dissertation Committee

After the candidacy exams are successfully passed, the dissertation committee is formed by the student in conjunction with, and approval by, the student's faculty advisor and the graduate program director. A dissertation committee must have at least three members, one of whom is from outside the department of the major field of study. The members of the dissertation committee must all hold doctorates and be graduate certified unless an exception first has been approved by the graduate program director, college dean, and appropriate VP. The committee's purpose is to supervise the entire process from proposal writing and defense through the oral defense of the dissertation. The faculty mentor supervises and approves the choosing of a topic, the choosing of a theoretical framework, the development of the research methods, the actual conduct of the research and the writing of the results. For either dissertation (traditional or three article) the dissertation committee may not be officially formed until: (1) all coursework is completed; and (2) the candidacy examination has been successfully completed.

Dissertation Proposal

The dissertation proposal topic selected shall represent a major research project/area which focuses on an issue directly related to health services research and may be multidisciplinary in approach. The traditional dissertation proposal consists of the first three chapters of the dissertation in their entirety, while the Three Article Dissertation consists of Chapters 1 and 2 and any subsequent "article" written as part of the three article dissertation.

The dissertation proposal provides a detailed explanation of the research being proposed, and should address the significance of the study, provide a substantive literature review or systematic review, and describe, in detail, the methods that will be used to collect data. The proposal will be defended in a public forum to which are invited all faculty, staff and students in the college. The final draft of the dissertation proposal must be available for public viewing two weeks before the defense date. No formal work should begin on the dissertation until a majority of dissertation committee members and graduate program director approve the dissertation proposal in writing.

Dissertation proposals can be defended prior to IRB approval/exemption. However, no data collection or interaction with study participants can ever

begin until the dissertation chair and the student have obtained IRB approval or exemption. Approval of the dissertation proposal is NOT a pro forma activity and the student is cautioned never to regard it as such.

Dissertation and Final Oral Defense

The completion of a dissertation is the cornerstone of the Ph.D. program. Through the dissertation, candidates demonstrate that they are prepared to join the company of scholars and to be leaders in health services research. The candidate should work closely with his/her dissertation committee throughout this process. Dissertations must be carefully prepared, publicly available for viewing, defended in a public forum and approved by the dissertation committee, the graduate program director, and the college dean.

The dissertation committee plays a vital role in the completion of the dissertation. Candidates are expected to be in regular communication with the committee chair and members regarding the progress of the study, research results and manuscript drafts. While preparing a dissertation, candidates must be continuously enrolled for a minimum of one credit hour per semester. University resources may not be used unless a candidate is officially enrolled. Advice or assistance from committee members should not be expected unless the candidate is officially enrolled.

Dissertations must be carefully prepared according to ODU guidelines using the most current version of the Guide for the Preparation of Theses and Dissertations (obtained from The Graduate School). The APA style manual should be used to cover specific questions of style. However, the requirements of the Guide for the Preparation of Theses and Dissertations take precedence over all the guidelines contained in the APA manual. All proposed dissertation research which involves human subjects must be reviewed and approved by the college or University's Human Subjects Committee. The process and approval must be documented in the text of the dissertation. Once the dissertation is successfully defended and in its final form, the student will upload the document to ProQuest.

Once the dissertation committee approves that the dissertation is ready, the student works with the dissertation committee to set a defense date and to ensure that the defense date is made public. The student should provide sufficient copies of the dissertation for public viewing at least two weeks before the defense date. The defense itself needs to be publicized two weeks in advance as well. While the defense is publicized and open to the public in general, care should be taken to ensure that all college faculty and administrators and all departmental students receive invitations to the defense. The entire dissertation committee must attend the final oral dissertation defense. After the dissertation defense, the dissertation committee meets in a closed-door meeting to discuss the dissertation defense and to vote on its approval or disapproval. If the dissertation is not approved, it can be defended only once more (no sooner than three months after the initial defense). The final dissertation must be approved through a signature process that includes the dissertation chair, all members of the dissertation committee, the graduate program director and the dean of the College of Health Sciences. Note that a dissertation may be approved orally at the final defense, but the committee may require some changes before the final copy is approved. Final approval of the written document is the responsibility of the associate dean of the college. The Doctor of Philosophy in Health Services Research will be awarded upon the oral defense of the dissertation, the submission of the final approved copy of the dissertation and the completion of all other program requirements for graduation.

Master of Healthcare Administration Healthcare Administration (MHA)

The Healthcare Administration (M.H.A.) program allows you to earn your degree by taking courses in a hybrid format. Develop knowledge and competencies through in-person interactions and online learning.

Mission

The mission of the Healthcare Administration master's program is to educate and train the next generation of healthcare managers and leaders through excellence in competency-based education, faculty and student

scholarship, and service-learning focused primarily on Hampton Roads and the surrounding regions.

Admissions

Applications open Aug. 26 for consideration for admission to the Fall 2025 term, and applications are reviewed until the class is filled.

Priority consideration will be given to applications received by March 1. International applicants who will require an F-1 Student Visa to study in the United States must submit their application by April 15.

All applications are made through the Health Administration, Management & Policy Centralized Application Service (HAMPCAS), a centralized application service for graduate programs in health administration, healthcare management, and health policy.

Review process

For applications received by March 1 the following review process will be used:

- Applications reviewed and offers for applicant interviews by March 8
- Applicant interviews scheduled by March 19
- Interviews conducted by April 9
- Admission offers made by April 16
- Admission offers accepted by applicants by April 30
- Decision to close admissions or continue reviewing applications by April 30

For U.S. Students

- No GRE or GMAT required.
- Completion of all undergraduate degree requirements from an accredited institution prior to matriculating in the Health Administration (M.H.A.) program, with a minimum cumulative grade point average (GPA) of 3.0 on a 4.0 scale.
 - In the case where an applicant's cumulative GPA is below the minimum 3.0, reviewers may consider a replacement GPA computed from the most recent 40 semester credit hours of U.S. or Canadian coursework.
- Three (3) letters of reference from academic or workplace affiliations that reflect on an applicant's behavior, character, and leadership ability.
- Personal essay describing how the Health Administration (M.H.A.) degree will enhance your professional goals.
- Current CV/resume documenting professional experience, educational achievements, and volunteer experience.
- Official transcripts from all colleges/universities attended. Ensure the degree conferral date is listed on the awarding institution's transcript.
- Transcripts must be sent to HAMPCAS only. HAMPCAS only accepts electronic transcripts from Parchment and National Student Clearinghouse. If your school does not offer either of these services, your transcript must be sent via mail. Please use the information below to send your transcripts.
 - Parchment (<https://www.parchment.com/order/>)
 - National Student Clearinghouse (<http://www.studentclearinghouse.org/>)
- Sending transcripts to HAMPCAS by mail. Download a transcript request form after you enter each institution in HAMPCAS and send the transcript request form to the institution registrar to send transcript by mail to the address below:
 - **HAMPCAS Transcript Processing Center**
O. Box 9122 Watertown, MA 02471
- Interview: Screened applicants will meet with the Healthcare Administration (M.H.A.) admissions committee to assess interpersonal and communication skills, maturity, and an understanding and commitment to Healthcare Administration (M.H.A.) career paths.

Applicants may have the opportunity to take a campus tour on the day of the interview.

For International Students

- No GRE or GMAT required.
- Completion of all undergraduate degree requirements from an accredited institution prior to matriculating in the Healthcare Administration (M.H.A.) program, with a minimum cumulative grade point average (GPA) of 3.0 on a 4.0 scale.
- International applicants, whose native language is not English, must take the Test of English as a Foreign Language (TOEFL) – Minimum scores: Paper-based test 550, Computer-based test 213, iBT exam 80 OR International English Language Testing System (IELTS) - Minimum scores: Total 6.5, Subscores: 6.
 - **TOEFL School Code is B589**
- Three (3) letters of reference from academic or workplace affiliations that reflect on an applicant's behavior, character, and leadership ability.
- Personal essay describing how the Healthcare Administration (M.H.A.) degree will enhance the applicant's professional goals.
- Current CV/resume documenting professional experience, educational achievements, and volunteer experience
- Official transcripts from all colleges/universities attended. Ensure the degree conferral date is listed on the awarding institution's transcript.
 - In cases where a non-U.S. grading system has been used, verification must be provided by one of the following services:
 - World Education Services
 - Educational Credential Evaluators
 - If the academic institution that you attended does not issue documents in English, the credentialing agency will require that you submit a word-for-word translation of your transcripts. You can contact University Language Services (<https://www.universitylanguage.com/>) to submit your transcripts for translation and instruct them to send the translated transcript to the credentialing agency you choose.
 - HAMPCAS will ONLY accept the evaluation report from the credentialing agency. Do not send your foreign transcript to HAMPCAS.
 - All foreign transcript evaluations from the credentialing agency must be sent directly to HAMPCAS at either of the following addresses:
 - **HAMPCAS Transcript Processing Center PO Box 9122**
Watertown, MA 02471
 - **HAMPCAS Transcript Processing Center 311 Arsenal Street STE 5600**
Watertown, MA 02472
- Interview: Screened applicants will meet with the Healthcare Administration (M.H.A.) program admissions committee to assess interpersonal and communication skills, maturity, and an understanding and commitment to Healthcare Administration (M.H.A.) career paths. Applicants may have the opportunity to take a campus tour on the day of the interview.
- International students must abide by all U.S. Immigration laws throughout their enrollment in the Healthcare Administration (M.H.A.) program. This includes, but is not limited to, qualifying and obtaining a proper visa prior to attendance. For further information, please contact Human Resources at 757-446-6043.

Waivers to admission standards will be considered on a case-by-case basis to students who can demonstrate exceptional qualifications.

Curriculum Requirements

The 42/43-credit Healthcare Administration (M.H.A.) curriculum is designed to cover all Commission on Accreditation of Healthcare Management Education (CAHME) core competencies and to provide

all students with a deep and broad understanding and appreciation of the healthcare system and healthcare management consistent with the program's mission (https://www.evms.edu/education/masters_programs/healthcare_administration/mission/).

All courses are delivered in a hybrid format consisting of in-person sessions and online assignments. The Healthcare Administration (M.H.A.) degree can be completed in five semesters for full-time students but can be completed on a part-time basis. Part-time students will have a maximum of six years to complete degree requirements from the date they start their first course.

The Healthcare Administration (M.H.A.) curriculum will consist of two tracks to meet the experience needs for incoming students. Students enrolled in Track I (43 credit hours) will be students who have little to no experience in healthcare settings. Track I students will be required to take an administrative introduction course, which will consist of gaining health care administration exposure and experience at a local healthcare organization. Students enrolled in Track II will have healthcare experience and do not need this initial exposure for the healthcare environment. Throughout the program, students will work closely with their academic advisor to ensure proper course sequencing and competency development, leading to successful graduation.

Course Sequence – Track I (43 credit hours)

Year 1 - Fall Semester		9
HADM 600	Introduction to Health Care Systems	
HADM 601	Policy and Politics of Health	
HADM 602	Organizational Management	
Year 1 - Spring Semester		9
HADM 605	Health Law and Ethics	
HADM 606	Health Economics	
HADM 607	Effective Information Technology for Healthcare Organizations	
Year 1 - Summer Semester		7
HADM 610	Financing Healthcare	
HADM 611	Operations Management and Performance Improvement	
HADM 612	Administrative Introduction	
Year 2 - Fall Semester		9
HADM 700	Leadership	
HADM 701	Supply Chain Management	
HADM 702	Healthcare Marketing	
Year 2 - Spring Semester		9
HADM 705	Conflict Analysis & Negotiations	
HADM 706	Healthcare Strategy	
HADM 715	Administrative Residency	
Total Credit Hours		43

Course Sequence – Track II (42 credit hours)

Year 1 - Fall Semester		9
HADM 600	Introduction to Health Care Systems	
HADM 601	Policy and Politics of Health	
HADM 602	Organizational Management	
Year 1 - Spring Semester		9
HADM 605	Health Law and Ethics	
HADM 606	Health Economics	
HADM 607	Effective Information Technology for Healthcare Organizations	

Year 1 - Summer Semester		6
HADM 610	Financing Healthcare	
HADM 611	Operations Management and Performance Improvement	
Year 2 - Fall Semester		9
HADM 700	Leadership	
HADM 701	Supply Chain Management	
HADM 702	Healthcare Marketing	
Year 2 - Spring Semester		9
HADM 705	Conflict Analysis & Negotiations	
HADM 706	Healthcare Strategy	
HADM 715	Administrative Residency	
Total Credit Hours		42

Certificate Health Management Certificate

Healthcare management is a multidisciplinary field of inquiry and practice that is concerned with the organization, financing, delivery and quality of health services for individuals and populations. The Graduate Healthcare Management Certificate is a 15-credit hour program designed to provide the learner with leadership and strategic management tools specifically for the healthcare environment.

Curriculum Requirements

Required		
MPHO 620	Health Management and Systems Thinking	3
MPHO 733	Financing Healthcare	3
Select three of the following:		9
MPHO 690	Leadership	
MPHO 721	Healthcare Strategy	
MPHO 723	Policy and Politics of Health	
MPHO 727	Organizational Management	
MPHO 736	Conflict Analysis and Negotiations	
Total Credit Hours		15

College of Sciences

<http://www.odu.edu/sci>

143 Oceanography & Physics Building
Norfolk, VA 23529
757-683-3274

Gail Dodge, Dean

Lesley Greene, Associate Dean for Graduate Studies

Wayne Hynes, Associate Dean for Faculty Affairs

H. Rodger Harvey, Associate Dean for Research

Joshua Wallach, Associate Dean for Undergraduate Affairs

Ph.D.

- Chemistry
- Clinical Psychology
- Computational and Applied Mathematics
- Computer Science
- Ecological Sciences
- Oceanography
- Physics
- Psychology

Master's

- Biology
- Chemistry
- Computational and Applied Mathematics
- Computer Science
- Ocean and Earth Sciences
- Physics
- Psychology

Overview

The College of Sciences is committed to providing graduate programs of the highest quality. Our degree programs are designed to prepare students for careers in the sciences and to lay broad foundations for specialized training in these fields of knowledge. We offer a strong academic environment where students can grow and discover. Students learn in the classroom, in the laboratory, in the field, and around the world.

The college is comprised of the Departments of Biological Sciences, Chemistry and Biochemistry, Computer Science, Mathematics and Statistics, Ocean and Earth Sciences, Physics, and Psychology. The Departments of Biological Sciences, Chemistry and Biochemistry, Mathematics and Statistics, Ocean and Earth Sciences, and Physics cooperate with the Darden College of Education and Professional Studies to provide the necessary courses for a Master's of Science in Education in each of the respective fields.

Programs

The College of Sciences has developed graduate programs in the basic and applied sciences that meet the needs of the region, the state, the nation, and the world. These programs address a variety of challenges, ranging from basic research to the quest for solutions to contemporary problems in science. The importance of these challenges is reflected by the more than \$15 million in research and training grant expenditures generated by the college. The college provides the nation with much-needed graduate programs in broad fields of concentration leading to both master's and doctoral degrees. Related program emphases within the major areas of study are designed to meet the professional needs of the students and communities served.

The college's faculty of 200 highly skilled professional educators is devoted to guiding students toward an assimilation of the most current scientific theories, research, and practices.

College Financial Aid

The College of Sciences has established competitive teaching and research assistantship stipends that are distributed by each department. In addition, each department has fellowship and tuition exemption funds available for competitive distribution.

Dominion Graduate Scholars

Programs in the College of Sciences offer a number of very competitive awards for graduate students newly admitted into Ph.D. programs. Some of these are Dominion Graduate Scholar research assistantships that carry a minimum stipend of \$22,000 for a the academic year and full tuition. These Dominion Scholars must be enrolled in at least nine hours of graduate courses each semester, and three graduate credits during the summer to meet institutional eligibility requirements.

All admission materials are considered as a part of the evaluation process. Students apply to specific graduate programs and may inquire about the Dominion Graduate Scholar research assistantship. After a student has been appointed to a Dominion Scholar research assistantship, the graduate program director will submit a copy of their letter-of-offer, letter-of-acceptance and the awardee's credential summary.

Minimum criteria for eligibility are as follows:

1. GRE scores: 310 combined verbal and quantitative, and at least a 4.0 on the analytical writing section.
2. GRE scores (older version): 1200 combined verbal and quantitative, or 1300 in any two of verbal, quantitative, or analytical.
3. Undergraduate GPA of 3.20 overall and 3.50 in the major, out of 4.00 maximum.
4. Evidence of research aptitude by undergraduate thesis/research, publications, M.S. thesis and/or letters of reference.
5. Information concerning the Dominion Graduate Scholar Program may be obtained from the graduate program director for the program of interest.
6. Written acknowledgment from a faculty member agreeing to serve as the student's major advisor, if the student is accepted.

Departments

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- Department of Chemistry and Biochemistry (p. 355)
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- Department of Psychology (p. 377)

Programs

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Department of Biological Sciences

110 Mills Godwin Building
Norfolk, Virginia 23529-0266
(757) 683-3595
<https://www.odu.edu/biosci>

Holly Gaff, Chair

Ian Bartol and David Gauthier, Associate Chairs

Daniel Barshis, Ecological Sciences Ph.D. Graduate Program Director

Piotr Kraj, Biology Master's Graduate Program Director

The Department of Biological Sciences provides a broad selection of course offerings. The degree program in biology allows for the selection of elective subjects most suited to the individual's vocational interests. In addition, the Department of Biological Sciences partners with the Graduate School to offer an interdisciplinary Ph.D. in Biomedical Sciences.

Programs

Doctor of Philosophy Program

- Ecological Sciences (PhD) (p. 354)

Master of Science Programs

- Biology (MS) (p. 350)
- Biology with a Concentration in Microbiology and Immunology (MS) (p. 351)
- Biology with a Concentration in One Health (MS) (p. 353)

Doctor of Philosophy - Biomedical Sciences

Barbara Hargrave, Graduate Program Director

In this interdisciplinary program all students are required to master a broad knowledge of the basic biomedical sciences. Refer to the Graduate School

(<http://catalog.odu.edu/graduate/graduateschool/>) page of this catalog for details.

Master of Science Biology (MS)

Piotr Kraj, Graduate Program Director

The Department of Biological Sciences provides a broad selection of course offerings. The degree program in biology allows for the selection of elective subjects most suited to the individual's vocational interests.

The curriculum for the Master of Science program is developed around one's interests such as:

- botany,
- ecology,
- immunology,
- infectious diseases,
- marine biology,
- microbiology,
- physiology,
- biomechanics,
- environmental pollution,
- marine benthic ecology,
- systematic biology, and
- zoology.

In addition, there are specially designed concentration areas in:

- Microbiology and Immunology
- One Health

Facilities and Equipment in the Department of Biological Sciences include:

- microscopy: electron, fluorescence and confocal,
- animal care facilities: terrestrial and aquatic,
- spectroscopy,
- cell culture,
- DNA sequencing: Sanger and Next-Generation,
- GIS (Geographic Information System),
- digital imaging,
- a greenhouse,
- herbarium,
- zoological museum, and
- field science wet laboratories.

In addition, excellent opportunities exist for research and instruction off-campus at field research sites including:

- Blackwater Ecological Preserve,
- Virginia Coast Reserve-Long Term Ecological Research Site,
- Virginia Institute of Marine Sciences Eastern Shore Marine Laboratory, and
- other regional agencies and facilities.

Admission Information

Students who wish to enter this program should apply to the Master of Science in biology program and indicate their proposed field of study in the Statement of Interest, a required component of the application. Applications for admission can be obtained via the Internet at <http://www.odu.edu/admission/graduate> (<http://www.odu.edu/admission/graduate/>) or from:

Office of Graduate Admissions
Old Dominion University
Norfolk, VA 23529-0050
(757) 683-3685

Requirements for regular admission to the master’s program in biology are:

- 1. a bachelor’s degree in biology or a related field from an accredited college or university;
- 2. a grade point average of at least 3.00 on a 4.00 scale;
- 3. two letters of recommendation;
- 4. an essay describing the area of biology of interest for graduate study, professional goals and motivation for graduate study in biology; and
- 5. written acknowledgment from a Department of Biological Sciences faculty member agreeing to serve as the student’s major advisor, if the student is accepted.

The Test of English as a Foreign Language (TOEFL) is required of all applicants whose native language is not English: minimum scores are 550 for the paper-based test, 213 for the computer-based or 79 on internet-based test.

Deadlines for application to the program are:

- February 1 for summer admission, early fall admission and consideration for a graduate teaching assistantship;
- June 1 for fall semester admission; and
- October 1 for spring semester admission.

Curriculum Requirements

Two degree options are available — thesis and non-thesis. A minimum of 32 semester hours of graduate credit is required; three-fifths of these credits must be at the 600-level or above and 20 credits must be Biology department coursework. Students must pass a course with a grade of C (2.0) or better for the course to count towards the 32 degree required hours.. Research (BIOL 698) is required of all students. All students must deliver a scientific presentation in an appropriate public forum; for thesis students, the presentation should be at a scientific meeting. Coursework will include 5 core courses; the remaining credits are selected according to the interest of the student, with the guidance and approval of the student’s faculty advisory committee. A substantial research project and a defense of the written thesis (BIOL 699) are required of students selecting the thesis option. Thesis students will complete a thesis defense (final oral exam) covering the research and appropriate coursework. Non-thesis students will complete a comprehensive written and/or oral examination on the program of study.

Biology Core

Many pertinent graduate courses are offered for the Master of Science in Biology programs that can be applied toward the degree requirements. A program of study is developed by the student with approval of advisory committee and the Graduate Program Director.

A set of five core courses is required:

RCR Course		
BIOL 747/847	Responsible and Ethical Conduct of Research	3
Statistics Course *		
BIOL 757/857	Statistics in Biology	4
Fundamentals Course		
Select one of the following:		3
BIOL 523	Cellular and Molecular Biology	
BIOL 524	Comparative Animal Physiology	
BIOL 759	Foundations and Principles in Ecology	
Data Analysis Course		
Select one of the following:		3
BIOL 701	Practical Computing for Biology	
BIOL 772	Modeling and Simulation in the Life Sciences	
BIOL 732	GIS in the Life Sciences	
Research Course **		
BIOL 698	Research in Biology	3
Total Credit Hours		16

- * BIOL 757/BIOL 857 is the recommended statistics course for this program. However, depending upon your area of research/concentration, another course may be approved by your graduate program director.
- ** No more than three credits of BIOL 698 can be applied to the total number of credits required.

Biology Courses

Elective Coursework *	
Select 16 credits of electives	16
Total Credit Hours	16

- * Remaining credits are elective, based on student interests, with guidance and approval of the student's faculty advisory committee. Students choosing the thesis option will need to take BIOL 699. Additional core courses, beyond the five required, can be used as elective credits.

Master of Science Biology with a Concentration in Microbiology and Immunology (MS)

Piotr Kraj, Graduate Program Director

The Department of Biological Sciences provides a broad selection of course offerings. The degree program in biology allows for the selection of elective subjects most suited to the individual’s vocational interests.

The curriculum for the Master of Science program is developed around one’s interests such as:

- botany,
- ecology,
- immunology,
- infectious diseases,
- marine biology,
- microbiology,
- physiology,
- biomechanics,
- environmental pollution,
- marine benthic ecology,
- systematic biology, and
- zoology.

In addition, there are specially designed concentration areas in:

- Microbiology and Immunology
- One Health

Facilities and Equipment in the Department of Biological Sciences include:

- microscopy: electron, fluorescence and confocal,
- animal care facilities: terrestrial and aquatic,
- spectroscopy,
- cell culture,
- DNA sequencing: Sanger and Next-Generation,
- GIS (Geographic Information System),
- digital imaging,
- a greenhouse,
- herbarium,

- zoological museum, and
- field science wet laboratories.

In addition, excellent opportunities exist for research and instruction off-campus at field research sites including:

- Blackwater Ecological Preserve,
- Virginia Coast Reserve-Long Term Ecological Research Site,
- Virginia Institute of Marine Sciences Eastern Shore Marine Laboratory, and
- other regional agencies and facilities.

The Microbiology and Immunology concentration is designed to enable the student to learn basic skills related to Microbiology and Immunology with the flexibility to develop a curriculum in their area of interest such as infectious diseases or immunology.

Admission Information

Students who wish to enter this program should apply to the Master of Science in biology program and indicate their proposed field of study in the Statement of Interest, a required component of the application. Applications for admission can be obtained via the Internet at <http://www.odu.edu/admission/graduate> (<http://www.odu.edu/admission/graduate/>) or from:

Office of Graduate Admissions
Old Dominion University
Norfolk, VA 23529-0050
(757) 683-3685

Requirements for regular admission to the master's program in biology are:

1. a bachelor's degree in biology or a related field from an accredited college or university;
2. a grade point average of at least 3.00 on a 4.00 scale;
3. two letters of recommendation;
4. an essay describing the area of biology of interest for graduate study, professional goals and motivation for graduate study in biology; and
5. written acknowledgment from a Department of Biological Sciences faculty member agreeing to serve as the student's major advisor, if the student is accepted.

The Test of English as a Foreign Language (TOEFL) is required of all applicants whose native language is not English: minimum scores are 550 for the paper-based test, 213 for the computer-based or 79 on internet-based test.

Deadlines for application to the program are:

- February 1 for summer admission, early fall admission and consideration for a graduate teaching assistantship;
- June 1 for fall semester admission; and
- October 1 for spring semester admission.

Curriculum Requirements

Two degree options are available — thesis and non-thesis. A minimum of 32 semester hours of graduate credit is required; three-fifths of these credits must be at the 600-level or above and 20 credits must be Biology department coursework. Students must pass a course with a grade of C (2.0) or better for the course to count towards the 32 degree required hours.. Research (BIOL 698) is required of all students. All students must deliver a scientific presentation in an appropriate public forum; for thesis students, the presentation should be at a scientific meeting. Coursework will include 5 core courses; the remaining credits are selected according to the interest of the student, with the guidance and approval of the student's faculty advisory committee. A substantial research project and a defense of the written thesis (BIOL 699) are required of students selecting the thesis option. Thesis students will complete a thesis defense (final oral exam) covering the research and appropriate coursework. Non-thesis students will complete a comprehensive written and/or oral examination on the program of study.

Biology Core

Many pertinent graduate courses are offered for the Master of Science in Biology programs that can be applied toward the degree requirements. A program of study is developed by the student with approval of advisory committee and the Graduate Program Director.

A set of five core courses is required:

RCR Course		
BIOL 747/847	Responsible and Ethical Conduct of Research	3
Statistics Course *		
BIOL 757/857	Statistics in Biology	4
Fundamentals Course		
Select one of the following:		3
BIOL 523	Cellular and Molecular Biology	
BIOL 524	Comparative Animal Physiology	
BIOL 759	Foundations and Principles in Ecology	
Data Analysis Course		
Select one of the following:		3
BIOL 701	Practical Computing for Biology	
BIOL 772	Modeling and Simulation in the Life Sciences	
BIOL 732	GIS in the Life Sciences	
Research Course **		
BIOL 698	Research in Biology	3
Total Credit Hours		16

* BIOL 757/BIOL 857 is the recommended statistics course for this program. However, depending upon your area of research/concentration, another course may be approved by your graduate program director.

** No more than three credits of BIOL 698 can be applied to the total number of credits required.

Microbiology and Immunology Concentration

All students in the MS in Biology – Microbiology and Immunology concentration will complete at least 31 credits, consisting of the set of five core courses and at least an additional 12 credits selected from the following:

RCR Course		
BIOL 747	Responsible and Ethical Conduct of Research	3
Statistics Course		
BIOL 757	Statistics in Biology	4
Fundamentals Course		
BIOL 523	Cellular and Molecular Biology	3
Data Analysis Course		
Select one of the following:		3
BIOL 701	Practical Computing for Biology	
BIOL 772	Modeling and Simulation in the Life Sciences	
BIOL 732	GIS in the Life Sciences	
Research Course *		
BIOL 698	Research in Biology	3
Microbiology & Immunology Concentration Courses		
Select four of the following:		12
BIOL 503	Medical Microbiology	
BIOL 516	Clinical Immunology	
BIOL 525	Cancer Biology	
BIOL 530	Microbial Pathogenesis	
BIOL 536	Infectious Disease Epidemiology	
BIOL 537	One Health: People, Animals and the Environment	

BIOL 540	Methods in Immunological Research
BIOL 557	General Virology
BIOL 562	Microbial Genetics
BIOL 563	Cell Signaling in Host Pathogen Interactions
BIOL 565	Biotechnology
BIOL 570	Diseases that Changed our World
BIOL 582	Human and Veterinary Parasitology
BIOL 640	Microbial Toxins
BIOL 702	Biomedical Sciences Journal Club
BIOL 705	Advanced Microbiology
BIOL 730	Emerging Infectious Diseases
BIOL 740	Vaccinology
BIOL 745	Advanced Immunology
BIOL 748	Functional Genomics and Proteomics in Animal Models
BIOL 771	Vector-Borne Diseases

Elective Courses **

Select 4 credits of electives 4

Total Credit Hours 32

* No more than three credits of BIOL 698 can be applied to the total number of credits required.

** Remaining credits are elective, based on student interests, with guidance and approval of the student's faculty advisory committee. Students choosing the thesis option will need to take BIOL 699. Additional core courses, beyond the five required, can be used as elective credits.

Master of Science Biology with a Concentration in One Health (MS)

Piotr Kraj, Graduate Program Director

The Department of Biological Sciences provides a broad selection of course offerings. The degree program in biology allows for the selection of elective subjects most suited to the individual's vocational interests.

The curriculum for the Master of Science program is developed around one's interests such as:

- botany,
- ecology,
- immunology,
- infectious diseases,
- marine biology,
- microbiology,
- physiology,
- biomechanics,
- environmental pollution,
- marine benthic ecology,
- systematic biology, and
- zoology.

In addition, there are specially designed concentration areas in:

- Microbiology and Immunology
- One Health

Facilities and Equipment in the Department of Biological Sciences include:

- microscopy: electron, fluorescence and confocal,
- animal care facilities: terrestrial and aquatic,
- spectroscopy,

- cell culture,
- DNA sequencing: Sanger and Next-Generation,
- GIS (Geographic Information System),
- digital imaging,
- a greenhouse,
- herbarium,
- zoological museum, and
- field science wet laboratories.

In addition, excellent opportunities exist for research and instruction off-campus at field research sites including:

- Blackwater Ecological Preserve,
- Virginia Coast Reserve-Long Term Ecological Research Site,
- Virginia Institute of Marine Sciences Eastern Shore Marine Laboratory, and
- other regional agencies and facilities.

The One Health concentration is for students in the MS program that have a specific interest in aspects of the interdisciplinary One Health paradigm, a strategy for expanding interdisciplinary collaborations and communications in aspects of health for humans, animals and the environment. The concentration will introduce students to the concepts of One Health and their application. Students will be admitted to the concentration after selection of their guidance committee and approval of their program of study.

Admission Information

Students who wish to enter this program should apply to the Master of Science in biology program and indicate their proposed field of study in the Statement of Interest, a required component of the application. Applications for admission can be obtained via the Internet at <http://www.odu.edu/admission/graduate> (http://www.odu.edu/admission/graduate/) or from:

Office of Graduate Admissions
Old Dominion University
Norfolk, VA 23529-0050
(757) 683-3685

Requirements for regular admission to the master's program in biology are:

1. a bachelor's degree in biology or a related field from an accredited college or university;
2. a grade point average of at least 3.00 on a 4.00 scale;
3. two letters of recommendation;
4. an essay describing the area of biology of interest for graduate study, professional goals and motivation for graduate study in biology; and
5. written acknowledgment from a Department of Biological Sciences faculty member agreeing to serve as the student's major advisor, if the student is accepted.

The Test of English as a Foreign Language (TOEFL) is required of all applicants whose native language is not English: minimum scores are 550 for the paper-based test, 213 for the computer-based or 79 on internet-based test.

Deadlines for application to the program are:

- February 1 for summer admission, early fall admission and consideration for a graduate teaching assistantship;
- June 1 for fall semester admission; and
- October 1 for spring semester admission.

Curriculum Requirements

Two degree options are available — thesis and non-thesis. A minimum of 32 semester hours of graduate credit is required; three-fifths of these credits must be at the 600-level or above and 20 credits must be Biology department coursework. Students must pass a course with a grade of C (2.0) or better for the course to count towards the 32 degree required hours.. Research (BIOL 698) is required of all students. All students must deliver a scientific presentation in an appropriate public forum; for thesis students,

the presentation should be at a scientific meeting. Coursework will include 5 core courses; the remaining credits are selected according to the interest of the student, with the guidance and approval of the student's faculty advisory committee. A substantial research project and a defense of the written thesis (BIOL 699) are required of students selecting the thesis option. Thesis students will complete a thesis defense (final oral exam) covering the research and appropriate coursework. Non-thesis students will complete a comprehensive written and/or oral examination on the program of study.

One Health Concentration

All students in the MS in Biology – One Health concentration will complete at least 32 credits, consisting of the set of five core courses, two required courses, and an additional 6 credits of coursework chosen from the concentration courses listed below.

RCR Course

BIOL 747	Responsible and Ethical Conduct of Research	3

Statistics Course

BIOL 757	Statistics in Biology	4

Fundamentals Course

BIOL 523	Cellular and Molecular Biology	3

Data Analysis Course

Select one of the following:		3

BIOL 701	Practical Computing for Biology	
BIOL 772	Modeling and Simulation in the Life Sciences	
BIOL 732	GIS in the Life Sciences	

Research Course *

BIOL 698	Research in Biology	3

Concentration Courses - Required

BIOL 536	Infectious Disease Epidemiology	3
BIOL 537	One Health: People, Animals and the Environment	3

Concentration Electives

Select two of the following:		6

BIOL 540	Methods in Immunological Research	
BIOL 557	General Virology	
BIOL 570	Diseases that Changed our World	
BIOL 730	Emerging Infectious Diseases	
BIOL 740	Vaccinology	
BIOL 771	Vector-Borne Diseases	
ECON 535	Health Economics: A Global Perspective	
ENVH 520	Communicable Diseases	
ENVH 523	Vector-Borne Diseases and Their Control	
HLSC 776	Global Health	

Elective Courses **

Select four credits of electives		4

Total Credit Hours		32

* No more than three credits of BIOL 698 can be applied to the total number of credits required.

** Remaining credits are elective, based on student interests, with guidance and approval of the student's faculty advisory committee. Students choosing the thesis option will need to take BIOL 699. Additional core courses, beyond the five required, can be used as elective credits.

Doctor of Philosophy Ecological Sciences (PhD)

Daniel Barshis, Graduate Program Director

The primary goal of the doctoral program in ecological sciences is to provide advanced training in ecological, evolutionary, and integrative biology.

The program has notable strengths in a broad range of biological sub-disciplines, including:

- ecosystem studies,
- experimental ecology,
- community ecology,
- behavioral ecology,
- marine biology,
- molecular genetics/genomics,
- conservation biology,
- systematics,
- modeling,
- evolutionary biology,
- biomechanics,
- parasitology, and
- functional morphology.

Program faculty conduct studies in a variety of terrestrial, freshwater, and marine environments on several continents, and their research focuses on a broad spectrum of taxa, including, but not limited to:

- vascular plants,
- polychaetes,
- mollusks,
- crustaceans,
- corals,
- insects,
- arachnids,
- birds,
- fishes, and
- amphibians.

Many faculty combine active field research with parallel laboratory studies. Quantitative approaches are encouraged and the opportunity exists to obtain a master's degree in statistics while pursuing a doctorate in ecological sciences. The program is enhanced by excellent on-campus resources that include a scanning electron microscopy lab, genetic sequencing facilities, herbarium, aquatics laboratory, water tunnel and flow quantification facility, GIS facilities, greenhouse, and digital imaging facilities. Field research sites have been established in:

- the Virginia Coastal Reserve,
- Blackwater Ecologic Preserve,
- Great Dismal Swamp,
- Atlantic Ocean,
- Chesapeake Bay, and
- other areas.

Admission

Application forms for admission to the Ph.D. program in ecological sciences are available from the Office of Admissions and online (<http://www.odu.edu/admission/graduate> (<http://www.odu.edu/admission/graduate/>)). The following should be sent to the Admissions Office:

1. the completed application form;
2. official transcripts from all universities attended (including institutions from which a degree has not yet been/was not awarded);
3. test of English as a Foreign Language (TOEFL) score (from students whose native language is not English);
4. three letters of recommendation, including one from the applicant's undergraduate or graduate major advisor (if applicable);

5. a statement of professional goals that includes specific research interests; and,
6. a current CV.

The deadline for application to the program is **February 1** for the subsequent fall semester. Students may be admitted during the spring and summer semesters as well, provided they obtain permission from the Graduate Program Director. If an applicant is interested in requesting financial aid, an application for institutional graduate financial assistance should be completed during the application process (see Office of Admissions web page for form).

To qualify for admission, a student needs:

1. a satisfactory academic average (overall GPA score of at least 3.0 on a 4.0 scale, and overall GPA in the sciences of at least 3.0);
2. a TOEFL score of at least 550 (paper-based test), 213 (computer-based test), or 79 (internet-based test) for applicants whose native language is not English;
3. satisfactory letters of recommendation; and
4. a statement of professional goals as stated above.

A master's degree is desirable but not required. The applicant is expected to have a background in the sciences, with an appropriate undergraduate degree and substantial course work in biology, chemistry or geology.

Applicants are strongly advised to contact the ODU faculty member closest to their area of interest prior to submitting an application to determine whether that faculty member is accepting new graduate students. No student, regardless of qualifications, is admitted to the Ecological Sciences Program without the approval of a specific faculty advisor. Potential applicants therefore should initiate a dialogue, preferably by email, with an appropriate member of the program faculty. Applicants should consult the list of faculty in the Department of Biological Sciences, which includes a brief description of their research interests. Applicants may also find it desirable to visit the campus for an interview with a potential advisor and the Graduate Program Director.

It is important for potential applicants to realize that many considerations enter into the decision to accept a student into the program. In addition to the strength of an applicant's credentials (transcripts, personal statement, and letters of recommendation), the availability of space in the appropriate faculty advisor's lab and availability of adequate financial aid may influence the decision. Of these, space in an appropriate advisor's lab is the most important consideration after an applicant's academic qualifications. For this reason, applicants are strongly encouraged to contact a potential advisor directly.

Curriculum Requirements

Many pertinent graduate courses are offered for the Ecological Sciences PhD program that can be applied toward the degree requirements. A program of study is developed by the student with approval of advisory committee and the Graduate Program Director.

A set of six core courses is required:

RCR Course

BIOL 847	Responsible and Ethical Conduct of Research	3

Statistics Course *

BIOL 857	Statistics in Biology	4

Fundamentals Course

Select one of the following:		3

BIOL 804	Animal Ecophysiology	
BIOL 810	Advanced Cell Biology	
BIOL 849	Biogeography	
BIOL 859	Foundations and Principles in Ecology	

Data Analysis Course

Select one of the following:		3

BIOL 801	Practical Computing for Biology	

BIOL 872	Modeling and Simulation in Life Sciences	
BIOL 803	Advanced Genomics Data Analysis	
BIOL 832	GIS in the Life Sciences	
Research Course ***		12-18
BIOL 898	Research in Biology	
Dissertation Course		3
BIOL 899	Dissertation	
Elective Coursework **, ****		21-45
Total Credit Hours		49-79

- * BIOL 857 is the recommended statistics course for this program. However, depending upon your area of research/concentration, another course may be approved by your graduate program director.
- ** Remaining credits are elective, based on student interests, with guidance and approval of the student's faculty advisory committee. Additional core courses, beyond the five required, can be used as elective credits.
- *** 18 (12 if MS holding)
- **** 45 (21 if MS holding)

Additional Requirements

Program Requirements

Program requirements are designed to provide a firm foundation in conceptual elements of ecological, evolutionary, and integrative biology, while moving students expeditiously toward their own research. In general, students must complete:

- 48 hours beyond the master's degree, or
- in the absence of a master's, 78 hours beyond the bachelor's degree.

The student's program of study should be broad and balanced. Coursework varies with each student, depending on background and goals. Enrollment in a weekly ecology seminar is required, on average, one semester each year. Professional experience (environmental management or teaching) is encouraged. A five-member advisory committee of faculty is selected to guide the student through his or her course of study and to provide initial approval of the dissertation research. This committee also administers the comprehensive written and oral candidacy examinations, which are taken after all required coursework is completed and the research skill requirement (proficiency in one foreign language, computer programming, or a quantitative skill approved by the advisory committee) is satisfied. The written exam must be passed before the oral exam may be taken. Once the candidacy exams are completed and a dissertation committee approves a written dissertation prospectus, the student advances to candidacy. At least three of the members of the original advisory committee, including the committee chair (student's major advisor), will compose the dissertation committee. This committee approves a written dissertation prospectus and will supervise the research. At this time, the student's attention turns almost exclusively to their own research. However, students continue to participate in seminar courses on a variety of topics, and an average of one seminar course per year of residency on campus is required. At the conclusion of their research, the student submits a dissertation to the committee and presents a public defense of this work.

Department of Chemistry and Biochemistry

Web Site: <http://www.odu.edu/chemistry> (<http://www.odu.edu/chemistry/>)

1000H New Chemistry Building
Norfolk, VA 23529-0126
(757) 683-4078

Craig A. Bayse, Chair
Bala Ramjee, Graduate Program Director

Overview

The Department of Chemistry and Biochemistry strives to provide a high quality of education in Chemistry and Biochemistry for both graduate and undergraduate students and to engage in scholarly research at the forefront in both the fields of chemistry and biochemistry. The department's variety of research programs provide students with a broad based education which prepares graduates for successful careers and a lifetime of learning. In addition to offering the Master of Science program and Doctor of Philosophy program in Chemistry, the Department of Chemistry and Biochemistry also partners with the Graduate School to offer an interdisciplinary Ph.D. program in Biomedical Sciences.

Programs

The Department of Chemistry and Biochemistry offers programs leading to a linked 5-year BSMS program, master of science with either a thesis or a non-thesis option, and doctor of philosophy in Chemistry and Biochemistry.

Programs

Doctor of Philosophy Program

- Chemistry (PhD) (p. 357)

Master of Science Program

- Chemistry (MS) (p. 356)

Doctor of Philosophy - Biomedical Sciences

Dr. Barbara Hargrave, Graduate Program Director

In this interdisciplinary program all students are required to master a broad knowledge of the basic biomedical sciences. Refer to the Graduate School (<http://catalog.odu.edu/graduate/graduateschool/>) page of this catalog for details.

Master of Science Chemistry (MS)

The Department of Chemistry and Biochemistry offers a program of study leading to the degree of master of science. This program offers a sound academic background of coursework and research to prepare the student for further graduate study or employment in fields requiring an advanced degree. Areas of specialization within the program include: analytical chemistry, biochemistry, environmental chemistry, inorganic chemistry, materials chemistry, organic chemistry, and physical chemistry.

Admission

An application (<http://www.odu.edu/admission> (<http://www.odu.edu/admission/>)), transcripts, two letters of recommendation from former college instructors, a resume, a writing sample, and an essay about career goals are required for consideration of admission to the program. The submission of Graduate Record Examination (GRE) scores is optional for domestic students, but strongly recommended for international applicants. All international applicants must satisfy ODU's English proficiency requirements for admission. International students can demonstrate English proficiency by providing an Internet Based TOEFL (iBT) or IELTS score. Admission to regular status requires a grade point average of 3.00 in the major and 2.80 overall (on a 4.00 scale). General university admission requirements also apply. In addition, a Bachelor of Science degree (or equivalent) with a major in chemistry (or another science) is expected, although applications from majors in all science disciplines are welcome. Undergraduate courses in organic chemistry, inorganic chemistry, analytical chemistry (quantitative and instrumental analysis), physical chemistry, and calculus are required for regular admission. Deficiencies in any of these areas will be identified and must be rectified by taking undergraduate coursework.

To be considered for a teaching assistantship, students must demonstrate both written and oral fluency in the English language. All domestic and international students who are not native English speakers are required

to take the SPEAK test. Students who have a score of 26 or better on the Speaking portion of the iBT TOEFL or a score of 8 on the IELTS are eligible to request a waiver for the SPEAK test requirement.

Curriculum Requirements

Core Courses

There are six core areas. These are:

- analytical chemistry
- biochemistry
- environmental chemistry
- inorganic chemistry
- organic chemistry
- physical chemistry

Students enrolled in either the research/thesis or non-thesis option must take one course from each of three different core areas.

Options

Candidates for the master's degree have two options in their program: the Research/Thesis option and the Non-Thesis option.

Thesis option

Courses	24
Research and Thesis	6
CHEM 790	Master's Seminar
	1
Total Credit Hours	31

Non-thesis option*

Courses	27
Independent study	3
CHEM 790	Master's Seminar (**)
	1
Total Credit Hours	31

* Ph.D students seeking a non-thesis master's degree after the successful completion of candidacy can use six credits of CHEM 898 toward this 27 credit requirement and additionally substitute CHEM 898 for CHEM 698.

** Ph.D. students seeking a non-thesis master's degree after successful completion of their candidacy can substitute CHEM 890 for CHEM 790.

Up to 15 hours may be taken in related courses given by other departments pending approval from the Graduate Studies Committee of the Department of Chemistry and Biochemistry. At least 60 percent of the credit hours must be from 600-level courses or higher.

Students who earn a grade of less than a B- in any two graduate courses will not be allowed to continue in the M.S. program.

Additional Requirements

Writing Proficiency Policy

The departmental graduate committee will request a writing sample from each new student. The graduate committee will refer students in need of remedial assistance to the Writing Center.

Seminar

All students are required to register for seminar (CHEM 790, one credit, pass/fail) and attend departmental seminars for one semester.

Research and Thesis

During their first semester (and not later than the end of their first academic year), students electing the Research/Thesis Option are required to interview the chemistry graduate faculty, choose a graduate faculty research advisor, and select a research committee in consultation with their advisor and the

Graduate Program Director. Upon completion of their research, students must write a formal thesis describing their research, present their work in a public seminar, and pass an oral examination by their research committee.

Non-Thesis Option

Not later than the end of their first academic year, students electing the Non-Thesis Option are required to interview the chemistry graduate faculty and choose an independent study advisor. Non-thesis students and their independent study advisor will then agree upon an independent study project. Upon completion of their independent study project, non-thesis students must write a formal Independent Study Report acceptable to their independent study advisor and the Graduate Studies Committee and pass an oral exam on their project.

Doctor of Philosophy Chemistry (PhD)

The Ph.D. program in Chemistry prepares students in the application of chemical principles to address many of society's technical, environmental, and biomedical problems. Students will be able to provide leadership in industrial, governmental and educational institutions in directing research and/or development to solve these problems. The Ph.D. degree is granted to students who have:

1. mastered advanced knowledge of definite sub-fields of chemistry
2. become familiar with research in these specific fields and developed perceptions of opportunities for further scientific advances
3. demonstrated the capacity to perform original, independent, and scholarly scientific investigation in their specific field and interpret their results.

All students admitted to the program must read and understand the regulations and policies described here and elsewhere throughout this catalog relevant to Old Dominion University's requirements for Ph.D. degrees. The essential credit requirements for the Ph.D. are:

A minimum of 78 credit hours beyond the Bachelor's degree, and
48 credit hours beyond the Master's degree.

Admission

Students with either a bachelor's or a master's degree may apply directly to the Ph.D. program. An application (<http://www.odu.edu/admission> (<http://www.odu.edu/admission/>)), undergraduate and graduate transcripts, two letters of recommendation from former college instructors, a resume, a writing sample, and an essay about career goals are required for consideration of admission to the program. The submission of Graduate Record Examination (GRE) scores is optional for domestic students, but strongly recommended for international applicants. All international applicants must satisfy ODU's English proficiency requirements for admission. Admission to regular status requires a grade point average of 3.00 in the major and 3.00 overall (based on a 4.00 scale). General university admission requirements apply. In addition, a Bachelor of Science degree (or equivalent) with a major in chemistry (or another science) is expected, although applications from majors in all science disciplines are welcome. Undergraduate courses in inorganic chemistry, organic chemistry, analytical chemistry (quantitative and instrumental analysis), physical chemistry, and calculus are required for regular admission. Deficiencies in any of these areas will be identified and must be rectified by taking undergraduate coursework in these areas.

To be considered for a teaching assistantship, students must demonstrate both written and oral fluency in the English language. All domestic and international students who are not native English speakers are required to take the SPEAK test. Students who have a score of 26 or better on the Speaking portion of the iBT TOEFL or a score of 8 on the IELTS are eligible to request a waiver for the SPEAK test requirement.

Curriculum Requirements

The broad requirements for granting the Ph.D. are as follows:

- satisfactory performance in core and elective courses,
- successful completion of both written and oral portions of the Candidacy Examination,
- completion of the dissertation prospectus,
- presentation of two graded seminars,
- and completion of a satisfactory dissertation and defense of the dissertation.

A minimum of 78 semester hours is required for students entering the Ph.D. program with a bachelor's degree in the following manner:

- Doctoral Research or Dissertation (1- 9 credits every semester)
- Graduate Orientation course (3 credits)
- Two semesters of Ph.D. seminar (2 x 2 credits each)
- Three core courses (3 x 3 credits each)
- Three elective courses (3 x 3 credits each) and
- Seminar course (1 credit per semester) until students achieve ABD status

A maximum of 12 semester hours may be transferred from non-degree status at Old Dominion University or from another University and applied towards the Ph.D. course requirements at the discretion of the graduate program director.

A minimum of 48 semester hours is required for students entering the Ph.D. program with a master's degree. All the requirements listed above for those entering the Ph.D. Program with a bachelor's degree are also applicable to those entering with a master's degree. However, courses taken as part of master's degree from ODU can be used to satisfy some of the above Ph.D. requirements.

Students who earn a grade of less than a B- in any two graduate courses will not be allowed to continue in the Ph.D. program.

Core Courses

Students must choose one course from three different core areas. The core areas are:

- analytical chemistry
- biochemistry
- environmental chemistry
- inorganic chemistry
- organic chemistry
- physical chemistry

Classes from each area are listed on the following pages.

Elective Courses

Students are required to take nine credit hours of elective courses. The courses are to be chosen upon consultation with their advisor and/or their guidance committee.

Additional Requirements

Writing Proficiency Policy

The departmental graduate committee will request a writing sample from each new student. If the graduate committee feels that remedial assistance in writing is needed, the student will be referred to the Writing Center.

Teaching

Students are required to spend at least one semester as a teaching assistant.

Seminar

All students are required to register for seminar CHEM 890 (one credit, graded pass/fail) and attend departmental seminars throughout their graduate career. Twice during their career, students will register for CHEM 891 (two credits) and present a seminar, which will receive a letter grade. In the

second year, students will give a background literature talk on their research. The second semester of CHEM 891 may not be taken in the same semester as graduation.

Advisor Selection

During their first semester (and not later than the end of their first semester), students are required to interview the chemistry graduate faculty (a signed sheet of at least three faculty members is required), choose a graduate faculty research advisor, and select a guidance committee in consultation with their advisor and the Graduate Program Director.

Candidacy Examination

A student enrolled in the Ph.D. program in chemistry becomes a candidate for the doctoral degree by passing the Ph.D. candidacy examination. This examination consists of a written portion and oral portion. The student is required to submit a written description of a novel research idea in the form of a grant proposal, and then present and defend the idea to his or her guidance committee.

Dissertation

The dissertation is the final and most important part of the work required for the Ph.D. degree. The dissertation must be based on original research and make a contribution to existing knowledge of sufficient interest to warrant publication in a refereed journal. The candidate normally works closely with the research advisor, who is chair of the dissertation committee.

Dissertation Defense

The final examination of the candidate consists of the oral defense of the dissertation. This public examination is conducted by the dissertation committee with the research advisor serving as chair.

Department of Computer Science

Web Site: <https://www.cs.odu.edu/>

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Ravi Mukkamala, Department Chair
Yaohang Li, Graduate Program Director - Admissions
Andrey Chernikov, Graduate Program Director – Master’s
Michele Weigle, Graduate Program Director – PhD

Programs

The Department of Computer Science offers programs leading to the Master of Science (MS) with a major in computer science, a linked five-year combined BSCS and MS with a major in computer science, and the Doctor of Philosophy (PhD) in computer science. The Department of Computer Science also offers a Master of Science in computer science with an information and communications technology (ICT) concentration (jointly with the Information Technology and Decision Sciences Department in the Strome College of Business). The department also offers two graduate certificates: Cybersecurity (12 credit hours) and Computer Science for Teachers (18 credit hours), which is targeted towards licensed high school teachers. In support of these degree programs, the department has excellent state-of-the-art computing facilities.

Computer science traces its foundation to mathematics, logic, and engineering. Studies in computer science encompass theory, experimental techniques, and engineering methodology. The computer science curriculum exposes students to aspects of each of these disciplines and fosters an appreciation and understanding of them. Students are exposed to the broad theoretical basis of computer science through lecture and laboratory experience. The Department of Computer Science has a unique curricular model that applies computer science education to the real world. In addition, the Department of Computer Science offers a set of courses to professionals who need supplementary experience. A graduate of the computer science program will have a broad fundamental knowledge of the field and in-depth knowledge in a particular subject area. To acquire breadth, graduate students in the department are required to take core courses which together

with the undergraduate core courses cover major aspects of computers and computation.

The department's MS degrees are available *both on-campus and online*. At the master's level, the department supports in-depth study in the following areas:

- data science and data analytics
- machine learning and artificial intelligence
- bioinformatics
- web science and digital libraries
- high performance computing
- cybersecurity
- computer networking
- software engineering
- computational foundations

At the PhD level, areas of specialization are limited only by the interests of the available faculty.

Programs

Doctor of Philosophy Program

- Computer Science (PhD) (p. 361)

Master of Science Programs

- Computer Science (MS) (p. 360)
- Computer Science with a Concentration in Information & Communications Technology (MS) (p. 361)

Certificate Program

- Computer Science for Teachers Certificate (p. 364)
- Cybersecurity Certificate (p. 364)

Linked Bachelor of Science in Computer Science and Master of Business Administration

This program allows students to earn a Bachelor of Science in Computer Science and a Master of Business Administration. After students have satisfactorily completed their undergraduate requirements, they must complete the remaining requirements in the MBA program. Additional information can be found in the section on BS/MBA Linked Program at the beginning of the College of Sciences section of this Catalog and the Strome College of Business section in the Graduate Catalog (<http://catalog.odu.edu/graduate/stromecollegeofbusiness/>).

Linked Bachelor of Science in Computer Science and Master of Science in Computer Science

This program allows for exceptionally successful students to earn both a BSCS and an MS in Computer Science by allowing up to 12 credits of graduate coursework to count toward both their bachelor's and master's degree in Computer Science. All options available under the MS degree are available under this program. Students must earn a minimum of 150 credit hours (120 discrete credit hours for the undergraduate degree and 30 discrete credit hours for the graduate degree).

Admission

To be admitted to the linked program, students must have completed at least 60 undergraduate credit hours with at least 24 credit hours from ODU. Students must have completed CS 361, CS 381, MATH 212 and all prerequisites for those courses. At the time of admission, they must have an overall GPA of 3.00 or better, and an overall GPA of 3.00 or better in CS and MATH courses.

Interested students who meet the admission requirements should apply to the graduate program director, after consulting with the undergraduate chief departmental advisor, as soon as possible upon completing the required courses and 60 credit hours. In consultation with the graduate program director, a student will:

1. Officially declare an undergraduate Computer Science major with the undergraduate chief departmental advisor.
2. Draft a schedule of graduate courses to be taken as an undergraduate to be presented to the undergraduate chief departmental advisor.
3. Apply, during their senior year, to the Office of Graduate Admissions for admission to the master's in computer science program.

Students who have completed at least six hours of graduate courses upon attaining senior standing (completion of 90 credit hours) and who have earned a GPA of 3.00 or better in those courses will not be required to take the Graduate Record Exam (GRE) for admission to the master's program. Otherwise, in keeping with normal admission requirements for the MS in computer science, students will take the GRE as an undergraduate and will subsequently be reevaluated for continuation into the master's program.

Once students have been awarded their bachelor's degree and fulfilled all regular admission requirements for the MS in computer science, they will be officially admitted into the MS program.

Program Requirements

Students in the program will fulfill all normal admission and curricular requirements for both a Bachelor of Science in Computer Science and an MS in computer science with the following exceptions:

1. Students in the program may count up to 12 hours of graduate courses, at the 500 or 600 level, excluding independent study, taken as an undergraduate toward both the bachelor's and master's degrees in computer science.
 - a. Students in the program may substitute computer science graduate courses for undergraduate courses according to the following schema. All students must complete an undergraduate writing intensive course in the major. Students may substitute 500- and 600-level courses for the upper-level CS electives in the undergraduate program so long as they have the prerequisites for those courses. 700- or 800-level courses may not be used.
 - b. Students will not receive credit for both the 400 and 500 level version of the same course.
 - c. Students in the program may make a written petition for other substitutions to the graduate program director, who will consider them in consultation with the chief departmental advisor and the instructor(s) of the courses involved.
 - d. To maximize the accelerated benefit one or more of the following required courses should be selected: CS 517, CS 518, CS 550, or CS 571.

NOTES:

1. In accordance with University policy, up to 21 hours of graduate courses taken as an undergraduate may be counted toward the bachelor's degree in computer science. However, only 12 hours of graduate courses taken as an undergraduate may also be counted toward the MS degree in computer science. This will limit students' scheduling flexibility subsequently.
2. Like students in the regular MS in computer science program, students in the linked BSCS/MS computer science degree may count no more than 12 hours at the 500-level toward their MS degree. Students are advised against taking all 12 of those 500-level credits as an undergraduate, since doing so will limit their scheduling flexibility subsequently.

Linked Bachelor of Science in Computer Science and Master of Science in Data Science and Analytics

This program allows for exceptionally successful students to earn both a BSCS and an MS in Data Science and Analytics by allowing up to 12 credits of graduate coursework to count toward both their bachelor's degree in Computer Science and master's degree in Data Science and Analytics. All options available under the MS degree are available under this program. Students must earn a minimum of 150 credit hours (120 discrete credit hours for the undergraduate degree and 30 discrete credit hours for the graduate degree).

Admission

To be admitted to the linked program, students must have completed at least 60 undergraduate credit hours with at least 24 credit hours from ODU. Students must have completed CS 361, CS 381, MATH 212 and all prerequisites for those courses. At the time of admission, they must have an overall GPA of 3.00 or better, and an overall GPA of 3.00 or better in CS and MATH courses.

Interested students who meet the admission requirements should apply to the graduate program director, after consulting with the undergraduate chief departmental advisor, as soon as possible upon completing the required courses and 60 credit hours. In consultation with the graduate program director, a student will:

1. Officially declare an undergraduate Computer Science major with the undergraduate chief departmental advisor.
2. Draft a schedule of graduate courses to be taken as an undergraduate to be presented to the undergraduate chief departmental advisor.
3. Apply, during their senior year, to the Office of Graduate Admissions for admission to the master's in Data Science and Analytics program.

Students who have completed at least six hours of graduate courses upon attaining senior standing (completion of 90 credit hours) and who have earned a GPA of 3.00 or better in those courses will not be required to take the Graduate Record Exam (GRE) for admission to the master's program. Otherwise, in keeping with normal admission requirements for the MS in Data Science and Analytics, students will take the GRE as an undergraduate and will subsequently be reevaluated for continuation into the master's program.

Once students have been awarded their bachelor's degree and fulfilled all regular admission requirements for the MS in data science and analytics, they will be officially admitted into the MS program.

Program Requirements

Students in the program will fulfill all normal admission and curricular requirements for both a Bachelor of Science in Computer Science and an MS in Data Science and Analytics with the following exceptions:

1. Students in the program may count up to 12 hours of graduate courses, at the 500 or 600 level, excluding independent study, taken as an undergraduate toward both the bachelor's and master's degrees.
 - a. Students in the program may substitute computer science graduate courses for undergraduate courses according to the following schema. All students must complete an undergraduate writing intensive course in the major. Students may substitute 500- and 600-level courses for the upper-level CS electives in the undergraduate program so long as they have the prerequisites for those courses. 700- or 800-level courses may not be used.
 - b. Students will not receive credit for both the 400 and 500 level version of the same course.
 - c. Students in the program may make a written petition for other substitutions to the graduate program director, who will consider them in consultation with the chief departmental advisor and the instructor(s) of the courses involved.

The graduate courses taken must be from the following:

CS 550	Database Concepts	3
Choose three from the following:*		9
CS 522	Introduction to Machine Learning	
CS 532	Web Science	
CS 569	Data Analytics for Cybersecurity	
CS 580	Introduction to Artificial Intelligence	
Total Credit Hours		12

* Substitutions of other computer science courses may be made with approval of the graduate program director.

NOTE:

1. In accordance with University policy, up to 21 hours of graduate courses taken as an undergraduate may be counted toward the bachelor's degree in computer science. However, only 12 hours of graduate courses taken as an undergraduate may also be counted toward the MS degree in Data Science and Analytics. This will limit students' scheduling flexibility subsequently.

Master of Science Computer Science (MS)

Yaohang Li, Graduate Program Director - Admissions
Andrey Chernikov, Graduate Program Director – Master's

This program is designed for students with a strong background in computer science. ODU's Department of Computer Science supports in-depth study at the graduate level in areas such as data science, machine learning, bioinformatics, web science and digital libraries, high performance computing, cyber security, data mining, networking, software engineering, and computational foundations.

The department's MS degrees are available *both on-campus and online*.

Admission

Entrance Requirements

Students entering the Master of Science program in computer science should meet the minimum university graduate admission requirements (<https://www.odu.edu/admission/graduate> (<https://www.odu.edu/admission/graduate/>)).

In addition, an applicant must have a strong background in computer science. Students who do not have a sufficient background in computer science may enter the graduate program as *provisional students* and make up for their deficiencies by taking appropriate courses.

Two letters of recommendation from faculty members of academic institutions are required in addition to all transcripts at the postsecondary level. For students whose native language is not English, either a TOEFL score of 550 (paper-based) and 79 (internet-based) or IELTS score of 6.5 is also required.

Curriculum Requirements

The departmental requirements for the Master of Science degree are described below. All requirements must be satisfied in addition to the University requirements outlined under the University Requirements for Graduate Degrees & Certificates section of this catalog.

All degree options require 31 credit hours, including 16 credits of core coursework.

Core Courses

CS 500	Foundations of Computing	3
or CS 600	Algorithms and Data Structures	
CS 522	Introduction to Machine Learning	3

or CS 580	Introduction to Artificial Intelligence	
CS 550	Database Concepts	3
or CS 650	Advanced Databases	
CS 620	Introduction to Data Science and Analytics	3
CS 665	Computer Architecture	3
CS 690	Colloquium	1
Total Credit Hours		16

Colloquium

In addition to taking CS 690 Colloquium, each student is required to attend at least 10 departmental colloquiums during their MS study.

Degree Options

Three options are available for candidates for Masters degrees:

- thesis option
- project option
- course option

Thesis Option

Core Coursework	16
must include CS 600 and CS 650	
CS Electives	9
CS 699 Thesis Research	6
Total Credit Hours	31

Students in the thesis option are required to take CS 600 and CS 650 as part of the core coursework requirement.

The candidate is required to write a thesis and make an oral presentation of the results.

Project Option

Core Coursework	16	
CS Electives	12	
CS 698	Master's Project	3
Total Credit Hours		31

The candidate is required to prepare a written report on the project and to present it orally.

Courses Option

Core Coursework	16
CS Electives	15
Total Credit Hours	31

The candidate is required to complete an exit examination that requires a comprehensive written report and an oral examination.

Course Restrictions

All credit hours must be in Computer Science (CS) unless recommended by the student's MS thesis or project advisor and approved by the GPD.

No more than 12 credit hours of 500-level courses may count towards the degree requirements.

No more than 3 credit hours of CS 697 Independent Study in Computer Science may count towards the degree requirements.

Since internship is not a degree requirement, the courses CS 667, CS 668, and CS 669 *do not* count towards MS course requirements.

Although 800-level courses are primarily meant for PhD students, these courses may count as 700-level courses for the purposes of MS credit requirements.

Master of Science Computer Science with a Concentration in Information & Communications Technology (MS)

Yaohang Li, Graduate Program Director - Admissions
Andrey Chernikov, Graduate Program Director – Master's

ICT (Information and Communications Technology) is the infrastructure and components that enable contemporary business computing. This MS program in Computer Science offers a unique combination of computer science technical knowledge and business IT skills that prepares graduate students for success in the business world of the 21st century. The program emphasizes cutting-edge ICT skills, which can provide a basis for job entry, career development and flexibility amid the rapid changes in Information Technology.

Admission

Entrance Requirements

Students entering the Master of Science program in computer science should meet the minimum university graduate admission requirements (<https://www.odu.edu/admission/graduate> (<https://www.odu.edu/admission/graduate/>)).

In addition, an applicant must have a strong background in computer science. Students who do not have a sufficient background in computer science may enter the graduate program as *provisional students* and make up for their deficiencies by taking appropriate courses.

Two letters of recommendation from faculty members of academic institutions are required in addition to all transcripts at the postsecondary level. For students whose native language is not English, either a TOEFL score of 550 (paper-based) and 79 (internet-based) or IELTS score of 6.5 is also required.

Curriculum Requirements

This concentration, offered jointly with the Department of Information Technology and Decision Sciences in the Strome College of Business, is appropriate for students with either a bachelor's degree in business administration with a major in information systems and a computer science minor or with a bachelor's degree in computer science with a business administration minor.

The departmental requirements for the Master of Science degree with concentration in Information and Communications Technology are described below. All requirements must be satisfied in addition to the University requirements outlined under the University Requirements for Graduate Degrees & Certificates section of this catalog.

This degree requires 31 credit hours, including 16 credits of core coursework. At the end of the program, the candidate is required to complete an exit examination that requires a comprehensive written report and an oral presentation.

Core Courses

CS 500	Foundations of Computing	3
or CS 600	Algorithms and Data Structures	
CS 550	Database Concepts	3
or CS 650	Advanced Databases	
CS 522	Introduction to Machine Learning	3
or CS 580	Introduction to Artificial Intelligence	
CS 620	Introduction to Data Science and Analytics	3
CS 665	Computer Architecture	3
CS 690	Colloquium	1
Total Credit Hours		16

Colloquium

In addition to taking CS 690 Colloquium, each student is required to attend at least 10 departmental colloquiums during their MS study.

Electives

For the remaining 15 credit hours, students must take 6 credit hours of electives from Computer Science and 9 credit hours from the following set of IT/BNAL electives.

CS Electives		6
IT/BNAL Electives		9
IT 651	Business Intelligence	
IT 652	Information and Communications Technology for Big Data	
BNAL 503	Data Visualization and Exploration	
BNAL 515	Advanced Business Analytics/Big Data Applications	
BNAL 721	Simulation Modeling for Business and Supply Chain Systems	
Total Credit Hours		15

Course Restrictions

No more than 12 credit hours of 500-level courses may count towards the degree requirements.

No more than 3 credit hours of CS 697 Independent Study in Computer Science may count towards the degree requirements.

Since internship is not a degree requirement, the courses CS 667, CS 668, and CS 669 *do not* count towards MS course requirements.

Although 800-level courses are primarily meant for PhD students, these courses may count as 700-level courses for the purposes of MS credit requirements.

Doctor of Philosophy Computer Science (PhD)

Yaohang Li, Graduate Program Director - Admissions
Michele Weigle, Graduate Program Director – PhD

In the ODU PhD program, research is led by our graduate faculty who have interests in artificial intelligence and data analytics, bioinformatics, computer networking, cybersecurity, parallel algorithms and computing, scientific and high-performance computing, stochastic modeling, and web science and digital libraries. The research groups are described on the Department of Computer Science Research webpage (<https://www.odu.edu/computer-science/research/>).

Admission

Students entering the PhD program in the Computer Science Department should meet the minimum university graduate admission requirements (<https://www.odu.edu/admission/graduate/>).

Students may be admitted directly to the PhD program with either a bachelor's or a master's degree. Prior to applying for admission, students are encouraged to visit the department's website and ensure that their research interests match with that of a faculty member.

Students are expected to show proficiency in Problem Solving and Programming, Introduction to Computer Architecture, Advanced Data Structures and Algorithms, Introduction to Theoretical Computer Science, and Operating Systems at an undergraduate level. Those entering the PhD program with deficiencies in these areas will have to make them up.

Applicants are required to take the GRE general test. Two letters of recommendation from faculty members of academic institutions are required in addition to all transcripts at the postsecondary level. For students whose

native language is not English, either a TOEFL score of 550 (paper-based) and 79 (internet-based) or IELTS score of 6.5 is also required.

Curriculum Requirements

A candidate for the doctoral degree in computer science must meet all of the following requirements in addition to the university requirements outlined under the Academic Information section in this Catalog:

- Complete a minimum of 78 credit hours beyond the bachelor's degree or 48 credit hours beyond the master's degree (credits include those for formal coursework, breadth requirements, and dissertation/research work). All credit hours must be in computer science unless recommended by the student's PhD dissertation advisor and approved by the GPD.
- Attend at least 10 departmental colloquium events *and* take the 1 credit hour CS 690 Colloquium.
- Develop a dissertation topic that is approved by the student's PhD dissertation advisor.
- Pass the candidacy examination. *After this step, and after formal courses are complete and the topic for the dissertation is approved by the advisor, the student is considered to be a PhD candidate.*
- Write and defend the dissertation prospectus (proposal).
- Complete 23 credit hours of CS 899 (Doctoral Dissertation).
- Successfully defend the dissertation.

The above must be completed within eight years after admission to the PhD program. Note that students with a degree in a discipline outside of computer science may be required to take prerequisite undergraduate courses that will not be counted towards the 78 credit hours requirement.

Course Requirements

All students must complete 48 credit hours as specified below:

CS 690	Colloquium	1
CS 800	Research Methods	3
CS courses that meet the breadth course requirements (see below)		12
CS Electives		9
CS 899 Doctoral Dissertation		23
Total Credit Hours		48

Additional Notes:

- CS 800 Research Methods must be taken during a student's first year in the PhD program (or within one year of completing required undergraduate prerequisites).
- CS Electives may include up to 9 credits of CS 898 Doctoral Research or up to 6 credits of graduate coursework outside of computer science, with the approval of the student's PhD dissertation advisor and the GPD.
- Since internship is not a degree requirement, the courses CS 667, CS 668, and CS 669 *do not* count towards PhD course requirements.

Students *without* a master's degree in computer science or related field must complete an *additional 30 credit hours* (for a *total of 78 credit hours* of graduate coursework) as specified below:

CS 522 or CS 580	Introduction to Machine Learning Introduction to Artificial Intelligence	3
CS 600	Algorithms and Data Structures	3
CS 620	Introduction to Data Science and Analytics	3
CS 650	Advanced Databases	3
CS 665	Computer Architecture	3
CS Electives		15
Total Credit Hours		30

Additional Notes:

- CS Electives may include up to 6 credits of CS 898 Doctoral Research.
- At least three-fifths of the minimum required hours for a doctoral degree must be completed at the 800 level. This means that students required to take 78 credit hours must have *at least 47 credit hours at the 800 level*. All students will complete at least 35 credit hours at the 800 level by satisfying the CS 800, CS 899, and breadth course requirements, so 12 additional credit hours of 800 level courses are required.

Breadth Course Requirements

Excellence in breadth is assessed through graduate coursework at ODU and is evaluated by multiple ODU CS faculty members. To demonstrate this, a student must earn a GPA of at least 3.5 in *four (4)* CS graduate courses at the 600 level or above that meet the following conditions:

1. At least *one course* in *three (3) different* research areas.
2. At least *three (3) courses* at the 800 level. (A student may take four 800-level courses, or three 800-level courses and one 600-level course.)
3. The four courses must be regular courses that also earn a letter grade (thus CS 697, CS 891, CS 896, CS 898, and CS 899 *do not* count towards this requirement). Most CS 895 Topics courses will count towards this requirement, and those eligible will be assigned to an appropriate research area.
4. Courses transferred from another university *do not* count towards this requirement.

See the Department of Computer Science webpage or contact the GPD for information on the course to research area mapping.

Additional Requirements

Advisor

Upon admission to the PhD program, a faculty advisor will be assigned to the student for general guidance. The student, however, is expected to find a dissertation advisor by the time he or she completes formal coursework. The guidelines for advising are outlined under Student Advising in the University Requirements for Graduate Degrees (<http://catalog.odu.edu/graduate/universityrequirementsforgraduatedegrees/>) section of the Graduate Catalog.

Candidacy Examination Process

Upon completing formal coursework (not counting CS 899 credits), before becoming heavily involved in dissertation work, and no later than three years after acceptance into the PhD program (preferably during the first 24 months after admission into the program), the student must pass the Candidacy Examination process. Students may satisfy this requirement by passing the Candidacy Examination or by completing an acceptable Research Event. Both options require a written and an oral component.

Option 1: Candidacy Examination

The topics and papers covered in the Candidacy Examination are set by the student's PhD advisor and other members of the appropriate research area committee. The student will be provided a set of 5-10 papers to review in their research area.

Written Component: The student will write a summary of the papers, highlighting their contributions to the research area, noting how they are related and how they are different. The student must also propose areas for potential future work. Ideally, this document could form the basis for the related work section of the student's dissertation proposal. The written summary should be 15-20 pages in the standard ODU dissertation format.

Oral Component: After the written component has been approved by the area committee, the student will give an oral presentation (about 20-30 minutes long) on the subject to the area committee. At the end of the presentation, the area committee may ask questions to further assess the student's understanding of the papers. At the end of the examination process, the committee will make a pass/fail decision and report this to the GPD.

The goal of this exam is to assess the student's understanding of the content of the papers and the student's ability to critically analyze and articulate

the important issues raised in the papers. The student should also be able to identify potential areas for future research that build off of these papers.

A *pass decision* means that the area committee believes that the student is prepared and qualified to undertake PhD-level research in computer science.

A *fail decision* means that the area committee believes the student is not ready to undertake PhD-level research in computer science. The area committee should provide recommendations to the student on how to improve their performance. A student who fails the Candidacy Examination may retake the exam once or may attempt the Research Event option once. Two failures will result in the student being dismissed from the PhD program. The student may request a different set of papers to be assigned for a retake.

Option 2: Research Event

Students who enter the PhD program with an acceptable MS thesis or are first author on a high-quality academic submission may be able to satisfy the Candidacy Examination process without taking the Candidacy Exam. Each research area committee determines its own set of conferences and journals in their research area that would be acceptable.

Written Component: The written component may be satisfied either through either an accepted publication or a high-quality, but rejected, submission to an approved conference or journal. For either option, the student must be the first author.

- Accepted: The research area committee may approve an accepted publication to count as the written component of the Candidacy Examination process.
- Rejected: The research area committee may approve a rejected, but high-quality, submission as the *baseline* for the written component of the Candidacy Examination process. In addition to the submitted paper, the student must construct a document that outlines how the student would address the reviewers' comments.

Oral Component: After the written component has been approved by the area committee, the student will give an oral presentation (about 20-30 minutes long) on the subject to the area committee. At the end of the presentation, the area committee may ask questions to further assess the student's understanding of the research and related work. At the end of the examination process, the committee will make a pass/fail decision and report this to the GPD.

A *pass decision* means that the area committee believes that the student is prepared and qualified to undertake PhD-level research in computer science.

A *fail decision* means that the area committee believes the student is not ready to undertake PhD-level research in computer science. The area committee should provide recommendations to the student on how to improve their performance. A student who fails the Research Event option may attempt the Research Event option once more or may take the Candidacy Exam once. Two failures will result in the student being dismissed from the PhD program.

To use the Research Event option, the student must provide the GPD and the chair of the appropriate research area committee a copy of the document proposed to satisfy the requirement. The document will be evaluated by the area committee to determine if it meets the stated criteria. The chair of the area committee will notify the student and the GPD of the outcome of the evaluation (acceptable or unacceptable). If the publication is deemed unacceptable, the student may submit another publication or take the Candidacy Examination. This does not count as an attempt.

If a student is not first author on a submitted paper to an approved conference/journal before they have completed formal coursework, they must take the Candidacy Examination within the next 6 months.

After passing the Candidacy Exam, completing formal coursework, and having an approved dissertation topic, the student must register for at least 1 credit hour each semester (including summer) until graduation.

Dissertation Committee

After the candidacy exam has been passed and dissertation topic approved, the Dissertation Committee is formed to supervise the dissertation research.

A Dissertation Committee is formed according to the following guidelines:

1. The faculty advisor selects *at least three members* of the Dissertation Committee in cooperation with the student and the Graduate Studies Committee.
2. The Dissertation Committee must consist of *at least two ODU faculty members*.
3. At least one member of the Dissertation Committee must be from outside the student's department/school at ODU or a non-ODU academic or professional with special knowledge of the dissertation subject area. No more than one-third of the committee's membership can be individuals external to the University.
4. Additional members may be appointed to the committee. Adjuncts (approved for graduate instruction) and non-university members may be added with approval of the GPD.
5. All committee members must be certified for graduate instruction. The current research interests of the computer science members of the committee should be related to the research goals of the student.
6. The Dissertation Committee must complete a PhD Dissertation Committee Form. This form is submitted to the GPD and to the Dean of the College of Sciences for approval.

Dissertation Prospectus

The oral examination of the written dissertation prospectus, or proposal, is designed to test the student's knowledge of background material related to the dissertation topic and to determine if the student has identified a significant problem, has a plan of attack, and is ready to proceed with the dissertation research.

At least one week before the scheduled oral examination time (and preferably two weeks before), the student must provide the examination committee with a written dissertation research proposal. The proposal should contain the following items (not necessarily in this order):

- a comprehensive literature review on the dissertation topic that should in particular discuss limitations of current approaches and open problems in the topic area
- a description of the research problem
- a discussion of how the problem relates to other work in the field
- a detailed research plan, including proposed tasks and a timeline for completion
- a list of expected contributions.

During the examination, the student will give a 45-minute presentation of the dissertation proposal to be followed by questions from the committee. The examination committee will be made up of at least three faculty members, all of whom must be graduate certified. These are typically the members of the student's dissertation committee. The exam is expected to last no more than 2 hours.

The presentation of the dissertation proposal is open to the public and will be publicized by the GPD at least one week in advance of the exam. Once the presentation has concluded and the audience has asked general questions, the audience will be excused. The examination by the committee will be held in private, but graduate faculty members are welcome to observe the exam.

Dissertation

A minimum of 23 credit hours of dissertation work (CS 899) is required. The work must represent an achievement in research and must be a significant contribution in the field. Students are required to publish (or have in the revision process) at least one paper in a refereed journal or refereed conference proceedings based on their dissertation work.

Dissertation Defense

The dissertation defense is an oral presentation of the dissertation results, open to the University community. The dissertation committee will examine the candidate after the presentation. The examination committee must be provided with the completed dissertation at least two weeks before the examination date.

Time Requirement

PhD students should normally be full-time. A full-time student can be expected to satisfy all the PhD requirements in three to five years when entering with an MS degree or four to six years with a bachelor's degree. No student (full-time or part-time) will be allowed to study for the PhD degree beyond eight years from the date of admission into the program.

Certificate Computer Science for Teachers Certificate

Michele Weigle, Computer Science for Teachers Certificate Program Coordinator

The purpose of this certificate is to educate students in foundational and advanced aspects of computing. Students will gain knowledge in algorithm design and analysis, relational databases, and advanced topics in computer science. Students will develop skills in analyzing algorithm complexity and designing SQL relational databases. Coursework will provide students with discipline specific content needed to teach college-level coursework in computer science. Graduates will be able to understand and discuss foundational computing topics and database architecture and modeling.

The primary target audience is licensed high school teachers in computer science or a related subject, who hold a master's degree in another field. Students enrolled in master's degree programs at Old Dominion University with a background in math or computer science will also be targeted.

Full-time and part-time students may enroll in the certificate program. Both non-degree seeking and degree seeking students may enroll. Degree seeking students may take courses in conjunction with their regular course load.

The courses in this certificate are available both in a traditional face-to-face format and fully online.

Admission

All students will be required to apply to the certificate program. The admission requirements will be based on enrollment status at the institution.

Degree-seeking students will:

- Gain advisor approval before applying to the program.
- Submit a completed online application.
- Be enrolled in a master's degree program at ODU.
- Have a background in undergraduate mathematics comparable to a minor in math, computer science, engineering, physics, or equivalent.
- Have a background in basic computer programming, preferably C++ or Java and exposure to at least one other programming language, and basic data structures.

Non-degree seeking students will:

- Submit a completed online application and application fee.
- Submit official transcripts of all undergraduate and graduate coursework from regionally accredited institutions.
- Have a master's degree from an accredited academic institution.
- Submit record of current teaching license.
- Have a background in undergraduate mathematics comparable to a minor in math, computer science, engineering, physics, or equivalent.

Students who have not earned a degree in the United States must also submit:

- Current scores on the Test of English as a Foreign Language (TOEFL), with a minimum score of 230 on the computer based TOEFL or 80 on the TOEFL iBT.
- A sample of scholarly writing.
- Three letters of recommendation, at least one of which evaluates proficiency in English.

Curriculum Requirements

The curriculum is designed to provide students with knowledge of foundational and advanced aspects of computing. Coursework will provide students with principles of computing including discrete mathematics, basic automata theory, and algorithm design and analysis. The core courses will train students to analyze computer algorithms and design relational databases. Students will be educated in SQL database procedures, entity-relationship modeling, database normalization, and database transaction concurrency.

The certificate requires a total of 18 credit hours.

Core Courses		
CS 500	Foundations of Computing	3
CS 550	Database Concepts	3
Select four of the following electives:		12
CS 517	Computational Methods and Software	
CS 522	Introduction to Machine Learning	
CS 532	Web Science	
CS 571	Operating Systems	
CS 580	Introduction to Artificial Intelligence	
CS 600	Algorithms and Data Structures	
CS 620	Introduction to Data Science and Analytics	
CS 624	Data Analytics and Big Data	
CS 625	Data Visualization	
CS 665	Computer Architecture	
CS 722	Machine Learning	
CS 732	Human Computer Interaction	
CS 733	Natural Language Processing	
CS 734	Introduction to Information Retrieval	
Total Credit Hours		18

Note that students who wish to apply these credits towards a Masters degree in computer science may count no more than four (4) 500-level courses towards the Masters degree requirements.

Certificate Cybersecurity Certificate

Shuai Hao, Cybersecurity Certificate Program Coordinator

This online certificate program, which may be completed in one year, is designed to train working professionals (in computer science and related fields) in cybersecurity. The courses offered under this program may be taken by current students or new students. A student must first apply to the certificate program and be admitted to the program to be eligible to receive the certificate.

A student admitted to this program may subsequently apply for the MS in Computer Science. If admitted, the courses taken during the certificate program may be considered towards the MS program.

Curriculum Requirements

Candidates for the program must at least have a 4-year bachelor's degree from an accredited academic institution. The program requires a student to take four courses (or 12 credits). Each course has a normal letter grade, and the student is expected to obtain a C or better in each course and maintain a 3.0 GPA overall. *The current offerings are listed below, but additional electives may be added in future.*

All students are required to take CS 562. Students can choose any three of the remaining courses listed below.

Required Course		
CS 562	Cybersecurity Fundamentals	3
Select three of the following:		9
CS 563	Cryptography for Cybersecurity	
CS 564	Networked Systems Security	
CS 565	Information Assurance for Cybersecurity	
CS 569	Data Analytics for Cybersecurity	
Total Credit Hours		12

Department of Mathematics and Statistics

2300 Engineering and Computational Sciences Building
Norfolk, VA 23529
757-683-3882
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Gordon Melrose, Chair
Ruhai Zhou, Graduate Program Director
N. Rao Chaganty, Statistics Program Director

Graduate Study in Computational and Applied Mathematics

The master's and doctoral programs in computational and applied mathematics offered by the Department of Mathematics and Statistics are designed to produce applied mathematicians and statisticians who can meet the growing demand for analytical and computational skills in traditional scientific and multi-disciplinary fields. Students in the program can choose to pursue an option in either applied mathematics, mathematics of data science, statistics, or biostatistics.

Applied mathematics is the application of mathematics to the solution of non-mathematical problems. Such problems may originate in math-oriented fields (physics, chemistry, and engineering) as well as in such areas such as geology, oceanography, meteorology, biology, ecology, environmental health, economics, actuarial science, business (operations and market research), banking, and medicine. Students will learn to use methods of applied mathematics, machine learning, data analysis, probability, statistics, biostatistics, numerical analysis, and scientific computing in seeking solutions to such problems. For work in computational and applied mathematics, training in an additional field of application is a necessity.

The desire and ability to use mathematics to bring together various disciplines is the unique characteristic of an applied mathematician. Not only has mathematical modeling and solving of societal and scientific problems increased the demand for applied mathematicians, but the flexibility and breadth of knowledge inherent in this discipline make it attractive for those who do not want to become irreversibly specialized.

Old Dominion University is one of the few American institutions offering a program expressly in applied mathematics. There are approximately 26 graduate program faculty members in the Department of Mathematics and Statistics, and current enrollment in the program is about 50 students. Areas of faculty research include analytical and numerical modeling in oceanography and meteorology, computational fluid dynamics and stability theory, elasticity and fracture mechanics, combustion theory, magnetohydrodynamics, mathematical biology, numerical analysis and approximation, optimization, applied probability, statistical inference, reliability, multivariate statistics, generalized linear models, estimating equations, biostatistics, nonparametric statistics, bioinformatics, machine learning, data science and high performance computing.

Facilities within the metropolitan area include the NASA/Langley Research Center, the Virginia Modeling, Analysis and Simulation Center (VMASC), and the Eastern Virginia Medical School.

Program Financial Aid. The Department of Mathematics and Statistics offer graduate assistantships with stipends awarded to students after a competitive review process. The level of award is determined on the basis of previous experience and performance as a graduate assistant and on the student's academic achievement and potential in applied mathematics or statistics. In addition, a number of teaching and research positions are available for financial support of graduate assistants during the summer months (June and July).

Writing Proficiency. All students in the graduate program are expected to demonstrate an acceptable level of writing ability. Students needing help to remedy their writing deficiencies will be referred to the Writing Center for diagnosis and assistance. All M.S. candidates will enroll in one of the MATH 632, STAT 632, and BDA 632 for a master's project.

Programs

Doctor of Philosophy Programs

- Computational and Applied Mathematics (PhD) (p. 369)
- Computational and Applied Mathematics with a Concentration in Mathematics of Data Science (PhD) (p. 370)

Master of Science Programs

- Computational and Applied Mathematics with a Concentration in Applied Mathematics (MS) (p. 365)
- Computational and Applied Mathematics with a Concentration in Biostatistics (MS) (p. 366)
- Computational and Applied Mathematics with a Concentration in Mathematics of Data Science (MS) (p. 367)
- Computational and Applied Mathematics with a Concentration in Statistics (MS) (p. 368)

Master of Science Computational and Applied Mathematics with a Concentration in Applied Mathematics (MS)

The M.S. candidate must complete a minimum of 33 normal credit hours of course work designed to fulfill an option in either applied mathematics, mathematics of data science, statistics or biostatistics. Each option includes 18 credit hours of Core Courses. With approval of the graduate program director, up to six of the 33 credits may be chosen from a field of application (e.g. oceanography, ecosystem analysis, computer science, economics, health sciences, operations research, physics and engineering mechanics) in which the student applies analytical and numerical techniques to another discipline. All programs of study must be approved by the graduate program director, and substitutions may be made only with their approval.

Concentrations

- **Applied Mathematics:** Students electing the concentration in Applied Mathematics will pursue course work in advanced mathematical analysis, differential equations, numerical methods, transform methods and data science. They will take electives in other methods of applied mathematics, or in an application area. A Master's Project will bring them in contact with the research frontier.
- **Statistics:** Students electing the concentration in Statistics will pursue course work in mathematical statistics, advanced regression analysis including responses surfaces, factorial designs, time series, advanced statistical computing. They will take electives in other areas of statistics and biostatistics. A Modeling Project involving statistical analysis of real-life data is required.
- **Biostatistics Concentration:** Students electing the concentration in Biostatistics will pursue course work in mathematical statistics, and biostatistical methods including survival analysis, clinical trials, categorical and longitudinal data analysis. They will take electives in

other areas of statistics and biostatistics. A Modeling Project involving statistical analysis of biomedical or health care data is required.

- **Mathematics of Data Science:** Students electing the concentration in Mathematics of Data Science will pursue course work in data science including mathematical statistics, regression and time series analysis, mathematical foundation of machine learning and genome data science. A Master's Project will bring them in contact to the real world applications.

Admission

An applicant to the master's program in computational and applied mathematics should have a bachelor's degree in mathematics, statistics, computer science, or an application area with a strong mathematics component (e.g., physics or engineering). Undergraduate mathematics preparation should include course work in linear algebra, advanced calculus, differential equations, probability, real analysis, and numerical methods. Undergraduate averages of 2.80 overall (4.00 scale) and 3.00 in the major and related mathematics courses are required.

A student who does not fully meet all requirements for admission as a regular graduate student may be allowed, with permission of the program director, to enroll as a provisional graduate student. Students lacking adequate preparation will be required to make up their deficiencies by taking appropriate undergraduate courses in addition to those specified for the master's program.

A formal application form, official transcripts, and two letters of recommendation should be forwarded to the Office of Admissions. It is recommended that applicants supply Graduate Record Examination aptitude scores.

The following material should be mailed directly to the director of the graduate program in computational and applied mathematics, Department of Mathematics and Statistics: a list of all mathematics courses taken and other courses closely allied to the applicant's primary interests in applied math or statistics along with the texts used (titles and authors), chapters studied or topics covered, and grades. This information should be enclosed with the financial aid application (if the applicant is submitting one).

Students may enroll in the program on either a full-time or part-time basis. Courses are offered on a regular basis during the late afternoon and early evening hours which allows part-time students to obtain master's degrees or post-master's graduate credit.

Curriculum Requirements

Computational and Applied Mathematics

Common Core Courses		
BDA 501	Programming Languages for Data Science	3
BDA 511	Introduction to Machine Learning	3
BDA 531	Modern Statistical Methods for Big Data Analytics	3
MATH 616	Computational Linear Algebra	3
STAT 625	Probability Theory for Data Science	3
MATH 632	Master's Project	3
or STAT 632	Master's Project	
or BDA 632	Computational Data Analytics Project	
Computational and Applied Mathematics Core Courses		18
Concentration Total		15
Total Credit Hours		33

Applied Mathematics Concentration

Select 15 hours of the following:		15
MATH 617	Measure and Integration	
MATH 618	Applied Functional Analysis	
MATH 622	Numerical Solutions to Differential Equations	

or MATH 721	Advanced Applied Numerical Methods I
MATH 637	Tensor Calculus and Differential Geometry
MATH 691	Engineering Analysis I
MATH 692	Engineering Analysis II
BDA 620	Large-Scale Optimization

Total Credit Hours **15**

Additional Requirements

Master's Project Requirement

The M.S. candidate will be assigned to a faculty advisor for a master's project. Each student will enroll in MATH 632, STAT 632 and BDA 632 to complete his/her project. The master's project is designed not only to broaden students' analytical competency but also to enhance students' writing and reporting skills on a technical subject.

Colloquium Requirement

In order to develop an appreciation for the breadth of contemporary research in applied mathematics and statistics, all M.S. candidates will attend at least 80% and succinctly summarize and evaluate in writing at least eight professional seminars given by research faculty or external seminar visitors. The Richard F. Barry Colloquium Series is run by the department throughout the academic year. The department also conducts seminars jointly with other departments.

Master of Science Computational and Applied Mathematics with a Concentration in Biostatistics (MS)

The M.S. candidate must complete a minimum of 33 normal credit hours of course work designed to fulfill an option in either applied mathematics, mathematics of data science, statistics or biostatistics. Each option includes 18 credit hours of Core Courses. With approval of the graduate program director, up to six of the 33 credits may be chosen from a field of application (e.g. oceanography, ecosystem analysis, computer science, economics, health sciences, operations research, physics and engineering mechanics) in which the student applies analytical and numerical techniques to another discipline. All programs of study must be approved by the graduate program director, and substitutions may be made only with their approval.

Concentrations

- **Applied Mathematics:** Students electing the concentration in Applied Mathematics will pursue course work in advanced mathematical analysis, differential equations, numerical methods, transform methods and data science. They will take electives in other methods of applied mathematics, or in an application area. A Master's Project will bring them in contact with the research frontier.
- **Statistics:** Students electing the concentration in Statistics will pursue course work in mathematical statistics, advanced regression analysis including responses surfaces, factorial designs, time series, advanced statistical computing. They will take electives in other areas of statistics and biostatistics. A Modeling Project involving statistical analysis of real-life data is required.
- **Biostatistics Concentration:** Students electing the concentration in Biostatistics will pursue course work in mathematical statistics, and biostatistical methods including survival analysis, clinical trials, categorical and longitudinal data analysis. They will take electives in other areas of statistics and biostatistics. A Modeling Project involving statistical analysis of biomedical or health care data is required.
- **Mathematics of Data Science:** Students electing the concentration in Mathematics of Data Science will pursue course work in data science including mathematical statistics, regression and time series analysis, mathematical foundation of machine learning and genome data

science. A Master's Project will bring them in contact to the real world applications.

Admission

An applicant to the master's program in computational and applied mathematics should have a bachelor's degree in mathematics, statistics, computer science, or an application area with a strong mathematics component (e.g., physics or engineering). Undergraduate mathematics preparation should include course work in linear algebra, advanced calculus, differential equations, probability, real analysis, and numerical methods. Undergraduate averages of 2.80 overall (4.00 scale) and 3.00 in the major and related mathematics courses are required.

A student who does not fully meet all requirements for admission as a regular graduate student may be allowed, with permission of the program director, to enroll as a provisional graduate student. Students lacking adequate preparation will be required to make up their deficiencies by taking appropriate undergraduate courses in addition to those specified for the master's program.

A formal application form, official transcripts, and two letters of recommendation should be forwarded to the Office of Admissions. It is recommended that applicants supply Graduate Record Examination aptitude scores.

The following material should be mailed directly to the director of the graduate program in computational and applied mathematics, Department of Mathematics and Statistics: a list of all mathematics courses taken and other courses closely allied to the applicant's primary interests in applied math or statistics along with the texts used (titles and authors), chapters studied or topics covered, and grades. This information should be enclosed with the financial aid application (if the applicant is submitting one).

Students may enroll in the program on either a full-time or part-time basis. Courses are offered on a regular basis during the late afternoon and early evening hours which allows part-time students to obtain master's degrees or post-master's graduate credit.

Curriculum Requirements

Computational and Applied Mathematics

Common Core Courses		
BDA 501	Programming Languages for Data Science	3
BDA 511	Introduction to Machine Learning	3
BDA 531	Modern Statistical Methods for Big Data Analytics	3
MATH 616	Computational Linear Algebra	3
STAT 625	Probability Theory for Data Science	3
MATH 632	Master's Project	3
or STAT 632	Master's Project	
or BDA 632	Computational Data Analytics Project	
Computational and Applied Mathematics Core Courses		18
Concentration Total		15
Total Credit Hours		33

Biostatistics Concentration

Select 15 hours of the following

STAT 626	Statistical Theory for Data Science
STAT 740	Advanced Clinical Trials
STAT 747	Advanced Analysis of Longitudinal Data
STAT 750	Advanced Categorical Data Analysis
BDA 640	Genomic Data Science
BDA 721	High-Dimensional Statistics
Total credit hours	15

Additional Requirements

Master's Project Requirement

The M.S. candidate will be assigned to a faculty advisor for a master's project. Each student will enroll in MATH 632, STAT 632 and BDA 632 to complete his/her project. The master's project is designed not only to broaden students' analytical competency but also to enhance students' writing and reporting skills on a technical subject.

Colloquium Requirement

In order to develop an appreciation for the breadth of contemporary research in applied mathematics and statistics, all M.S. candidates will attend at least 80% and succinctly summarize and evaluate in writing at least eight professional seminars given by research faculty or external seminar visitors. The Richard F. Barry Colloquium Series is run by the department throughout the academic year. The department also conducts seminars jointly with other departments.

Master of Science

Computational and Applied Mathematics with a Concentration in Mathematics of Data Science (MS)

The M.S. candidate must complete a minimum of 33 normal credit hours of course work designed to fulfill an option in either applied mathematics, mathematics of data science, statistics or biostatistics. Each option includes 18 credit hours of Core Courses. With approval of the graduate program director, up to six of the 33 credits may be chosen from a field of application (e.g. oceanography, ecosystem analysis, computer science, economics, health sciences, operations research, physics and engineering mechanics) in which the student applies analytical and numerical techniques to another discipline. All programs of study must be approved by the graduate program director, and substitutions may be made only with their approval.

Concentrations

- **Applied Mathematics:** Students electing the concentration in Applied Mathematics will pursue course work in advanced mathematical analysis, differential equations, numerical methods, transform methods and data science. They will take electives in other methods of applied mathematics, or in an application area. A Master's Project will bring them in contact with the research frontier.
- **Statistics:** Students electing the concentration in Statistics will pursue course work in mathematical statistics, advanced regression analysis including responses surfaces, factorial designs, time series, advanced statistical computing. They will take electives in other areas of statistics and biostatistics. A Modeling Project involving statistical analysis of real-life data is required.
- **Biostatistics Concentration:** Students electing the concentration in Biostatistics will pursue course work in mathematical statistics, and biostatistical methods including survival analysis, clinical trials, categorical and longitudinal data analysis. They will take electives in other areas of statistics and biostatistics. A Modeling Project involving statistical analysis of biomedical or health care data is required.
- **Mathematics of Data Science:** Students electing the concentration in Mathematics of Data Science will pursue course work in data science including mathematical statistics, regression and time series analysis, mathematical foundation of machine learning and genome data science. A Master's Project will bring them in contact to the real world applications.

Admission

An applicant to the master's program in computational and applied mathematics should have a bachelor's degree in mathematics, statistics, computer science, or an application area with a strong mathematics

component (e.g., physics or engineering). Undergraduate mathematics preparation should include course work in linear algebra, advanced calculus, differential equations, probability, real analysis, and numerical methods. Undergraduate averages of 2.80 overall (4.00 scale) and 3.00 in the major and related mathematics courses are required.

A student who does not fully meet all requirements for admission as a regular graduate student may be allowed, with permission of the program director, to enroll as a provisional graduate student. Students lacking adequate preparation will be required to make up their deficiencies by taking appropriate undergraduate courses in addition to those specified for the master's program.

A formal application form, official transcripts, and two letters of recommendation should be forwarded to the Office of Admissions. It is recommended that applicants supply Graduate Record Examination aptitude scores.

The following material should be mailed directly to the director of the graduate program in computational and applied mathematics, Department of Mathematics and Statistics: a list of all mathematics courses taken and other courses closely allied to the applicant's primary interests in applied math or statistics along with the texts used (titles and authors), chapters studied or topics covered, and grades. This information should be enclosed with the financial aid application (if the applicant is submitting one).

Students may enroll in the program on either a full-time or part-time basis. Courses are offered on a regular basis during the late afternoon and early evening hours which allows part-time students to obtain master's degrees or post-master's graduate credit.

Curriculum Requirements

Computational and Applied Mathematics

Common Core Courses		
BDA 501	Programming Languages for Data Science	3
BDA 511	Introduction to Machine Learning	3
BDA 531	Modern Statistical Methods for Big Data Analytics	3
MATH 616	Computational Linear Algebra	3
STAT 625	Probability Theory for Data Science	3
MATH 632	Master's Project	3
or STAT 632	Master's Project	
or BDA 632	Computational Data Analytics Project	
Computational and Applied Mathematics Core Courses		18
Concentration Total		15
Total Credit Hours		33

Mathematics of Data Science

Select 15 hours of the following

BDA 611	Mathematical Foundations of Machine Learning	
BDA 620	Large-Scale Optimization	
BDA 640	Genomic Data Science	
BDA 745	Transform Methods for Data Science	
STAT 626	Statistical Theory for Data Science	
STAT 637	Advanced Regression and Time Series	
or MATH 622	Numerical Solutions to Differential Equations	
or BDA 721	High-Dimensional Statistics	
Total credit hours		15

Additional Requirements

Master's Project Requirement

The M.S. candidate will be assigned to a faculty advisor for a master's project. Each student will enroll in MATH 632, STAT 632 and BDA 632 to complete his/her project. The master's project is designed not only to

broaden students' analytical competency but also to enhance students' writing and reporting skills on a technical subject.

Colloquium Requirement

In order to develop an appreciation for the breadth of contemporary research in applied mathematics and statistics, all M.S. candidates will attend at least 80% and succinctly summarize and evaluate in writing at least eight professional seminars given by research faculty or external seminar visitors. The Richard F. Barry Colloquium Series is run by the department throughout the academic year. The department also conducts seminars jointly with other departments.

Master of Science Computational and Applied Mathematics with a Concentration in Statistics (MS)

The M.S. candidate must complete a minimum of 33 normal credit hours of course work designed to fulfill an option in either applied mathematics, mathematics of data science, statistics or biostatistics. Each option includes 18 credit hours of Core Courses. With approval of the graduate program director, up to six of the 33 credits may be chosen from a field of application (e.g. oceanography, ecosystem analysis, computer science, economics, health sciences, operations research, physics and engineering mechanics) in which the student applies analytical and numerical techniques to another discipline. All programs of study must be approved by the graduate program director, and substitutions may be made only with his or her approval.

Concentrations

- **Applied Mathematics:** Students electing the concentration in Applied Mathematics will pursue course work in advanced mathematical analysis, differential equations, numerical methods, transform methods and data science. They will take electives in other methods of applied mathematics, or in an application area. A Master's Project will bring them in contact with the research frontier.
- **Statistics:** Students electing the concentration in Statistics will pursue course work in mathematical statistics, advanced regression analysis including responses surfaces, factorial designs, time series, advanced statistical computing. They will take electives in other areas of statistics and biostatistics. A Modeling Project involving statistical analysis of real-life data is required.
- **Biostatistics Concentration:** Students electing the concentration in Biostatistics will pursue course work in mathematical statistics, and biostatistical methods including survival analysis, clinical trials, categorical and longitudinal data analysis. They will take electives in other areas of statistics and biostatistics. A Modeling Project involving statistical analysis of biomedical or health care data is required.
- **Mathematics of Data Science:** Students electing the concentration in Mathematics of Data Science will pursue course work in data science including mathematical statistics, regression and time series analysis, mathematical foundation of machine learning and genome data science. A Master's Project will bring them in contact to the real world applications.

Admission

An applicant to the master's program in computational and applied mathematics should have a bachelor's degree in mathematics, statistics, computer science, or an application area with a strong mathematics component (e.g., physics or engineering). Undergraduate mathematics preparation should include course work in linear algebra, advanced calculus, differential equations, probability, real analysis, and numerical methods. Undergraduate averages of 2.80 overall (4.00 scale) and 3.00 in the major and related mathematics courses are required.

A student who does not fully meet all requirements for admission as a regular graduate student may be allowed, with permission of the program director, to enroll as a provisional graduate student. Students lacking

adequate preparation will be required to make up their deficiencies by taking appropriate undergraduate courses in addition to those specified for the master's program.

A formal application form, official transcripts, and two letters of recommendation should be forwarded to the Office of Admissions.

The following material should be mailed directly to the director of the graduate program in computational and applied mathematics, Department of Mathematics and Statistics: a list of all mathematics courses taken and other courses closely allied to the applicant's primary interests in applied math or statistics along with the texts used (titles and authors), chapters studied or topics covered, and grades. This information should be enclosed with the financial aid application (if the applicant is submitting one).

Students may enroll in the program on either a full-time or part-time basis. Courses are offered on a regular basis during the late afternoon and early evening hours which allows part-time students to obtain master's degrees or post-master's graduate credit.

Curriculum Requirements

Computational and Applied Mathematics

Common Core Courses

BDA 501	Programming Languages for Data Science	3
BDA 511	Introduction to Machine Learning	3
BDA 531	Modern Statistical Methods for Big Data Analytics	3
MATH 616	Computational Linear Algebra	3
STAT 625	Probability Theory for Data Science	3
MATH 632	Master's Project	3
or STAT 632	Master's Project	
or BDA 632	Computational Data Analytics Project	

Computational and Applied Mathematics Core Courses 18

Concentration Total 15

Total Credit Hours 33

Statistics

Concentration required: 9

STAT 626	Statistical Theory for Data Science
STAT 637	Advanced Regression and Time Series
STAT 638	Advanced Design and Analysis of Experiments

Select two of the following: 6

STAT 730	Multivariate Statistics
STAT 740	Advanced Clinical Trials
STAT 747	Advanced Analysis of Longitudinal Data
STAT 749	Advanced Nonparametric Statistics
STAT 750	Advanced Categorical Data Analysis
BDA 640	Genomic Data Science
BDA 721	High-Dimensional Statistics

Total Credit Hours 15

Additional Requirements

Master's Project Requirement

The M.S. candidate will be assigned to a faculty advisor for a master's project. Each student will enroll in MATH 632, STAT 632 and BDA 632 to complete his/her project. The master's project is designed not only to broaden students' analytical competency but also to enhance students' writing and reporting skills on a technical subject.

Colloquium Requirement

In order to develop an appreciation for the breadth of contemporary research in applied mathematics and statistics, all M.S. candidates will attend at least 80% and succinctly summarize and evaluate in writing at least eight

professional seminars given by research faculty or external seminar visitors. The Richard F. Barry Colloquium Series is run by the department throughout the academic year. The department also conducts seminars jointly with other departments.

Doctor of Philosophy Computational and Applied Mathematics (PhD)

A minimum of 78 credit hours beyond the bachelor's degree and 48 hours beyond the master's degree is required. Each student will be assigned an Advisory Committee, and together they will plan a complete program of course work designed to meet the student's objectives and to fulfill a concentration in mathematics of data science, or an option in applied mathematics, statistics, or biostatistics. The student is strongly encouraged to select courses in more than one of the concentration or option areas and in a field of application whenever such courses contribute appropriately to his or her program. Each program, however, must be directed and approved by the student's Advisory committee. A student receiving a grade of C+ or lower in any graduate course may be dismissed from the program. The concentration in Mathematics of Data Science and the three options offered under the PhD Program in Computational and Applied Mathematics are Applied Mathematics, Statistics, and Biostatistics:

- **Mathematics of Data Science Concentration:** Students electing the concentration in Mathematics of Data Science will pursue course work in the mathematical and statistical analysis of computational data science, including advanced machine learning, linear models, multivariate statistics, high dimensional statistics and applied functional data analytics. A PhD thesis project will bring them in contact with the research frontier.
- **Applied Mathematics Option:** Students electing the concentration in Applied Mathematics will pursue course work in advanced mathematical analysis, differential equations, numerical methods, transform methods, and data science. They will take electives in other methods of applied mathematics, or in an application area. A PhD thesis project will bring them in contact with the research frontier.
- **Statistics Option:** Students electing the concentration in Statistics will pursue course work in mathematical statistics, advanced regression analysis including responses surfaces, factorial designs, time series, advanced statistical computing. They will take electives in other areas of statistics and biostatistics. A PhD thesis project involving statistical analysis of real-life data is required.
- **Biostatistics Option:** Students electing the concentration in Biostatistics will pursue course work in mathematical statistics, and biostatistical methods including survival analysis, clinical trials, categorical and longitudinal data analysis. They will take electives in other areas of statistics and biostatistics. A PhD thesis project involving statistical analysis of biomedical or health care data is required.

Applicants who appear to be qualified for study at an advanced graduate level may be admitted to the doctoral program in computational and applied mathematics. These will be students with very strong backgrounds in mathematics, statistics, computer science, or application areas with a mathematics component (e.g. physics or engineering).

Students may be admitted directly to the Ph.D. program with either a bachelor's or a master's degree. A grade point average of 3.00 (4.00 scale) in the major and related mathematics courses is required.

Students are required to submit a formal application form, official transcripts, and three letters of recommendation to the Office of Admission.

Curriculum Requirements

Computational and Applied Mathematics Core

Common core courses

MATH 617	Measure and Integration	3
STAT 626	Statistical Theory for Data Science	3

MATH 898	Research	6
or STAT 898	Research	
Dissertation credits		18
MATH 899	Dissertation	
or STAT 899	Dissertation	
Total Credit Hours		30

Applied Mathematics Option:

Select 18 credits of the following:		18
MATH 605	Complex Variables I	
MATH 618	Applied Functional Analysis	
MATH 622	Numerical Solutions to Differential Equations	
MATH 637	Tensor Calculus and Differential Geometry	
MATH 638	Mathematical Theories of Continua	
MATH 693	Engineering Analysis III	
MATH 801 & MATH 802	Asymptotic and Perturbation Methods and Integral Equations	
MATH 821 & MATH 822	Advanced Applied Numerical Methods I and Advanced Applied Numerical Methods II	
MATH 803 or MATH 825	Advanced Applied Mathematics I Computational Fluid Dynamics	
BDA 845	Transform Methods for Data Science	
Total Credit Hours		18

Biostatistics Option:

Select 18 credits of the following		18
STAT 825	Linear Statistical Models	
STAT 827	Advanced Statistical Inference I	
STAT 828	Advanced Statistical Inference II	
STAT 830	Multivariate Statistics	
STAT 840	Advanced Clinical Trials	
STAT 849	Advanced Nonparametric Statistics	
BDA 640	Genomic Data Science	
BDA 821	High-Dimensional Statistics	
BDA 831	Applied Functional Data Analysis	
Total Credit Hours		18

Statistics Option:

Select 18 credits of the following:		18
STAT 630	Time Series Models	
STAT 640	Survival Analysis	
STAT 825	Linear Statistical Models	
STAT 827	Advanced Statistical Inference I	
STAT 828	Advanced Statistical Inference II	
STAT 830	Multivariate Statistics	
STAT 847	Advanced Analysis of Longitudinal Data	
STAT 849	Advanced Nonparametric Statistics	
STAT 850	Advanced Categorical Data Analysis	
BDA 821	High-Dimensional Statistics	
BDA 831	Applied Functional Data Analysis	
Total Credit Hours		18

Additional Requirements

Colloquium Requirement

In order to develop an appreciation for the breadth of contemporary research in applied mathematics and statistics, all Ph.D. candidates will attend at least 80% and succinctly summarize and evaluate in writing at least 16

professional seminars given by research faculty or external seminar visitors. The Richard F. Barry Colloquium Series is run by the department throughout the academic year. The department also conducts seminars jointly with other departments.

Foreign Language

A foreign language is not required.

Residency Requirement

An essential feature of doctoral study is the provision of total concentration on the field of study for significant periods of time. Students who wish to pursue a part of their doctoral study on a part-time basis may do so, but all doctoral students shall spend at least two academic years engaged in full-time graduate study.

Admission to Candidacy Examination

At the end of the core mathematics or statistics course work and prior to selecting a dissertation advisor, the student must pass an Admission to Candidacy Examination designed to test scholarly competence and knowledge and to give the examiners a basis for constructive recommendations on subsequent study. The written portion of this examination will be based upon an examination syllabus that will be provided to each student. The outcome of this examination will be reported to the vice provost for graduate studies and research as passed, failed, additional work to be completed, or to be re-examined. In the event of a re-examination, the outcome must be reported as passed or failed. This decision is final. The examination must be passed at least eight months prior to the granting of the degree.

Dissertation

A doctoral dissertation representing an achievement in research and a significant contribution to the field is required. Students must register for MATH 898 or MATH 899 each semester in which they are doing substantial work on their dissertations. A minimum of 24 hours of such research credit is required.

Defense of Dissertation

This examination will be oral and must be completed at least four weeks before the date on which the degree is to be conferred. The dissertation committee members must have the completed dissertation at least two weeks before the date of the oral examination. Under normal circumstances, it is expected that the student will have had a research paper accepted for publication prior to the dissertation defense.

Doctor of Philosophy Computational and Applied Mathematics with a Concentration in Mathematics of Data Science (PhD)

A minimum of 78 credit hours beyond the bachelor's degree and 48 hours beyond the master's degree is required. Each student will be assigned an Advisory Committee, and together they will plan a complete program of course work designed to meet the student's objectives and to fulfill a concentration in mathematics of data science, or an option in applied mathematics, statistics, or biostatistics. The student is strongly encouraged to select courses in more than one of the concentration or option areas and in a field of application whenever such courses contribute appropriately to his or her program. Each program, however, must be directed and approved by the student's Advisory committee. A student receiving a grade of C+ or lower in any graduate course may be dismissed from the program. The concentration in Mathematics of Data Science and the three options offered under the PhD Program in Computational and Applied Mathematics are Applied Mathematics, Statistics, and Biostatistics:

- Mathematics of Data Science Concentration: Students electing the concentration in Mathematics of Data Science will pursue course

work in the mathematical and statistical analysis of computational data science, including advanced machine learning, linear models, multivariate statistics, high dimensional statistics and applied functional data analytics. A PhD thesis project will bring them in contact with the research frontier.

- **Applied Mathematics Option:** Students electing the concentration in Applied Mathematics will pursue course work in advanced mathematical analysis, differential equations, numerical methods, transform methods, and data science. They will take electives in other methods of applied mathematics, or in an application area. A PhD thesis project will bring them in contact with the research frontier.
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- **Biostatistics Option:** Students electing the concentration in Biostatistics will pursue course work in mathematical statistics, and biostatistical methods including survival analysis, clinical trials, categorical and longitudinal data analysis. They will take electives in other areas of statistics and biostatistics. A PhD thesis project involving statistical analysis of biomedical or health care data is required.

Admission

Applicants who appear to be qualified for study at an advanced graduate level may be admitted to the doctoral program in computational and applied mathematics. These will be students with very strong backgrounds in mathematics, statistics, computer science, or application areas with a mathematics component (e.g. physics or engineering).

Students may be admitted directly to the Ph.D. program with either a bachelor's or a master's degree. A grade point average of 3.00 (4.00 scale) in the major and related mathematics courses is required.

Students are required to submit a formal application form, official transcripts, and three letters of recommendation to the Office of Admission.

Curriculum Requirements

Computational and Applied Mathematics Core

Common core courses		
MATH 617	Measure and Integration	3
STAT 626	Statistical Theory for Data Science	3
MATH 898	Research	6
or STAT 898	Research	
Dissertation credits		18
MATH 899	Dissertation	
or STAT 899	Dissertation	
Total Credit Hours		30

Mathematics of Data Science Concentration

Select 18 credits of the following:		18
BDA 611	Mathematical Foundations of Machine Learning	
BDA 620	Large-Scale Optimization	
BDA 640	Genomic Data Science	
BDA 821	High-Dimensional Statistics	
BDA 831	Applied Functional Data Analysis	
BDA 845	Transform Methods for Data Science	
MATH 618	Applied Functional Analysis	
STAT 825	Linear Statistical Models	
STAT 830	Multivariate Statistics	
Total Credit Hours		18

Additional Requirements

Colloquium Requirement

In order to develop an appreciation for the breadth of contemporary research in applied mathematics and statistics, all Ph.D. candidates will attend at least 80% and succinctly summarize and evaluate in writing at least 16 professional seminars given by research faculty or external seminar visitors. The Richard F. Barry Colloquium Series is run by the department throughout the academic year. The department also conducts seminars jointly with other departments.

Foreign Language

A foreign language is not required.

Residency Requirement

An essential feature of doctoral study is the provision of total concentration on the field of study for significant periods of time. Students who wish to pursue a part of their doctoral study on a part-time basis may do so, but all doctoral students shall spend at least two academic years engaged in full-time graduate study.

Admission to Candidacy Examination

At the end of the core mathematics or statistics course work and prior to selecting a dissertation advisor, the student must pass an Admission to Candidacy Examination designed to test scholarly competence and knowledge and to give the examiners a basis for constructive recommendations on subsequent study. The written portion of this examination will be based upon an examination syllabus that will be provided to each student. The outcome of this examination will be reported to the vice provost for graduate studies and research as passed, failed, additional work to be completed, or to be re-examined. In the event of a re-examination, the outcome must be reported as passed or failed. This decision is final. The examination must be passed at least eight months prior to the granting of the degree.

Dissertation

A doctoral dissertation representing an achievement in research and a significant contribution to the field is required. Students must register for MATH 898 or MATH 899 each semester in which they are doing substantial work on their dissertations. A minimum of 24 hours of such research credit is required.

Defense of Dissertation

This examination will be oral and must be completed at least four weeks before the date on which the degree is to be conferred. The dissertation committee members must have the completed dissertation at least two weeks before the date of the oral examination. Under normal circumstances, it is expected that the student will have had a research paper accepted for publication prior to the dissertation defense.

Department of Ocean & Earth Sciences

406 Oceanography and Physics Building
Norfolk, VA 23529
757-683-4285
www.odu.edu/oes

Kevin Yeager, Chair
Richard Zimmerman, Graduate Program Director

Our integrated curriculum uses active learning by promoting research and education. It is designed to give graduates the skill sets to prepare them for a range of careers in academia, and the public and private sectors. The graduate program in OES draws from the strength of our diverse faculty and their active research programs that span the globe. Graduate students have the opportunity to take part in research projects among a broad suite of field sites from the local waters of the Chesapeake Bay to the polar regions.

Programs

Doctor of Philosophy Program

- Oceanography (PhD) (p. 373)

Master of Science Program

- Ocean and Earth Sciences (MS) (p. 372)

Certificate Program

- Spatial Analysis of Coastal Environments Certificate (p. 374)

Master of Science Ocean and Earth Sciences (MS)

406 Oceanography and Physics Building
Norfolk, VA 23529
757-683-4285
www.odu.edu/oes

Kevin Yeager, Chair
Richard Zimmerman, Graduate Program Director

Mission

The Department of Ocean and Earth Sciences acquires and disseminates knowledge of the earth system, including the relationships among the biological, chemical, geological, and physical components of our planet. It is critical that we understand both natural and human-induced processes that change this system so we are prepared to meet present and future challenges to our society. With curiosity, creativity, scholarship, and respect as cornerstones of our philosophy, we strive to increase scientific knowledge and literacy through excellence in research, education, and service to the Commonwealth of Virginia and society in general.

General Description of Graduate Degrees

Two graduate programs are offered:

- Master of Science, Ocean and Earth Sciences
- Doctor of Philosophy, Oceanography

The Master of Science degree has both thesis and non-thesis options. The Ph.D. degree follows the traditional path of original research in the field of oceanography. For both degree paths, areas of emphasis are biological, chemical, geological, and physical oceanography, and the earth and geological sciences. Interdisciplinary studies are emphasized and an integral part of the student experience. The curricula are designed to prepare graduates for professional practice in their area of interest. Official transcripts, 3 letters of recommendation, TOEFL scores (international students), and a statement of goals and interest for graduate study should all be submitted to the Office of Admissions by January 1 for full consideration.

The department receives support from the Commonwealth and local philanthropic sources, as well as from private industry, and considerable support from federal agencies such as the National Science Foundation.

Establishment of the Virginia Graduate Marine Science consortium by the General Assembly in 1979 demonstrated the Commonwealth's determination to achieve excellence in marine science. The purpose of the consortium is to advance marine science instruction, research, training, and advisory services and to enhance Virginia's position in seeking funding to carry out these activities. Charter members of the consortium are Old Dominion University, the University of Virginia, Virginia Polytechnic Institute and State University, and the College of William and Mary. The Samuel L. and Fay M. Slover endowment to Old Dominion University in 1986 significantly accelerated the program of oceanographic studies. In 1991, a Center for Coastal Physical Oceanography (CCPO) was established at Old Dominion University by the Commonwealth of Virginia. The center is a Designated Center for Excellence.

The Department of Ocean and Earth Sciences is housed in two buildings. The Oceanography/Physical Sciences Building contains state-of-the-art

teaching laboratories, computer facilities, and research laboratories for geological sciences and biological, chemical and geological oceanography. The Center for Coastal Physical Oceanography is located in ODU's Innovation Research Park and contains most of the department's physical oceanography laboratories. The Department maintains a 55-foot research vessel, R/V Fay Slover, primarily for estuarine and coastal studies. In addition to R/V Slover, the Department has a number of small boats suitable for near-shore investigations.

Admission

Applicants who have obtained a bachelor's degree in a science (e.g., biology, chemistry, geology, physics), mathematics, or engineering, with a minimum 3.00 grade point average in their major and a 2.80 overall grade point average, are eligible for regular admission to the program. At least two semesters of calculus are also required. Ocean and earth sciences is an interdisciplinary endeavor and it is expected that applicants have science courses outside their major.

For students wishing to study geological/earth sciences, an undergraduate major in geology is required for regular admission. Students wishing to study physical oceanography should have majored in physics, mathematics, engineering, computer science, meteorology or a related physical sciences. Such applicants must have completed 36 hours in one of these fields and completed mathematics through partial differential equations.

An applicant who does not meet all requirements for admission as a regular graduate student may be admitted as a provisional graduate student. Students lacking adequate preparation for the program may make up deficiencies by taking appropriate undergraduate courses.

Curriculum Requirements

The student shall meet all university requirements for graduate degrees outlined in the Requirements for Graduate Degree section in this catalog, including at least 30 hours of graduate study. A maximum of 12 hours of credit may be transferred into a graduate degree program from non-degree status at Old Dominion University or from another accredited institution, except in the case of an approved inter-institutional program. All students are expected to demonstrate competency in oral communication and proficiency in writing.

Course Distribution

A minimum of 13 hours of basic course work in the four sub-disciplines of oceanography is required of all M.S. students. This core program consists of:

Required Core Courses

OEAS 604	Introduction to Physical Oceanography	3
OEAS 610	Advanced Chemical Oceanography	3
OEAS 620	Advanced Geological Sciences	3
OEAS 640	Advanced Biological Oceanography	4

Electives

Courses to be approved by the student's guidance committee.	17

Total Credit Hours	30

Students must achieve a grade of B or better in each of the four core courses. Students may repeat any individual core course only once; if a student fails to earn a grade of B or better on repeating a core course, then the student will be dismissed from the program.

The remaining 17 credits are chosen from a list of graduate courses approved by the student's guidance committee. At least 60 percent of all courses must be at the 600 level or above. For the non-thesis option, up to three hours of research may be used to meet course requirements. For the thesis option, up to six hours of research may be used to meet the course requirements.

Non-Thesis Option

A student in the non-thesis program must pass a written comprehensive examination testing breadth of knowledge in oceanography. The examination is given twice yearly, normally in October and March. The

examination grades are fail, pass, or pass with distinction. A student who has failed the examination may retake it only once.

Thesis Option

Before a student embarks on thesis research, a thesis advisory committee must be formed. Further information on university guidelines for forming this committee can be found in the Requirements for Graduate Degrees section of this catalog. The student must also submit a thesis proposal which outlines the research to be undertaken and identifies the resources required for completion of the research. Guidelines for the preparation of the thesis proposal are available from the graduate program director. Any student whose thesis research requires departmental funding must obtain prior approval from the department chair and graduate program director. No funds will be given without this approval. The thesis proposal requires the approval of the graduate program director and the student’s thesis advisory committee.

As part of the thesis requirement, the student is required to present a public defense of the research. The public defense and approval of the thesis by the student’s Thesis Committee satisfy the comprehensive examination requirement. Students in the thesis program should consult the graduate program director regarding the preparation of the M.S. thesis, scheduling a thesis defense, and the final submission of the thesis.

Additional Requirements

Ship Time Requirement and/or Field Work

MS graduate students must participate in field activities for a total of 5 days.

Request to Graduate

The student should complete an Application for Graduation form through the Registrar’s Office. The deadline for submitting this application is listed in the class schedule each semester and usually falls near the end of the semester preceding the one during which graduation is anticipated. It is the student’s responsibility to meet these deadlines and submit the necessary paperwork for graduation.

Removal of Incompletes

At least one month prior to graduation, all incomplete grades should be cleared. An Academic Record Change form is used for this purpose, and the instructor of the course and the department chair need to sign this form.

Doctor of Philosophy Oceanography (PhD)

Richard Zimmerman, Graduate Program Director

Our integrated curriculum uses active learning by promoting research and education. It is designed to give graduates the skill sets to prepare them for a range of careers in academia, and the public and private sectors. The graduate program in OES draws from the strength of our diverse faculty and their active research programs that span the globe. Graduate students have the opportunity to take part in research projects among a broad suite of field sites from the local waters of the Chesapeake Bay to the polar regions.

Admission

The doctoral degree in oceanography is granted to students who have:

1. mastered definite fields of knowledge, become familiar with research in these specific fields, and developed an informed understanding of opportunities for further advances;
2. demonstrated the capacity to do original, independent, scholarly work in their specific fields; and
3. shown the ability to integrate the field of specialization with the larger domains of knowledge and understanding.

All students are expected to demonstrate competency in oral communication and proficiency in writing.

All students in the oceanography Ph.D. program are responsible for reading and understanding the regulations and policies set forth throughout this catalog regarding requirements for the Ph.D. degree. The essential credit requirements for the Ph.D. are as follows: the student shall complete 48 credit hours beyond the master’s degree or 78 credit hours for students admitted to the program with a bachelor’s degree. Up to 24 credits can be granted for dissertation.

Curriculum Requirements

Students who do not have an M.S. degree in oceanography normally complete the following within the first year:

OEAS 604	Introduction to Physical Oceanography	3
OEAS 610	Advanced Chemical Oceanography	3
OEAS 620	Advanced Geological Sciences	3
OEAS 640	Advanced Biological Oceanography	4
Total Credit Hours		13

Additional Requirements

Waiving the requirement to take any of the core courses requires the approval of the GPD. Students must achieve a grade of B or better in each of these four core courses. Students may repeat any individual core course only once; if a student fails to earn a grade of B or better on repeating a core course, then the student will be dismissed from the program.

In consultation with the advisor and guidance committee, students will plan a complete program of course work designed to meet their objectives (see the section above). Depending on the entry status of the student, the following credit hours are also required:

- Those entering the Ph.D. program with an M.S. degree in oceanography must complete any needed core courses (see above), and a minimum of 48 credit hours of lecture courses and dissertation research.
- Those entering the Ph.D. program with a B.S. or M.S. degree in a discipline outside of oceanography shall complete 13 credit hours of the core courses listed above, and a minimum of 65 hours of additional lecture courses and dissertation research, for a total of 78 credit hours.

A maximum of 12 graduate credit hours may be transferred into a graduate degree program from non-degree status at Old Dominion University or from another accredited institution, except in the case of an approved interinstitutional program.

Major Advisor and Guidance Committee

A major advisor must be identified to the graduate program director (GPD), at least provisionally, prior to admission to the program. After receiving admission to the program and enrollment, students should consult with the GPD and their major advisor for guidance on initial course work. Before the completion of nine semester hours (i.e. before the end of the student’s first semester), the student will form a guidance committee in consultation with the major advisor. Please see the graduate program director and the Requirements for Graduate Degrees section of this catalog for further information on forming a guidance committee.

Plan of Study—Curriculum Plan

Sometime in the first year of study, the student shall prepare a plan of study with the aid and approval of the guidance committee. Students should see the graduate program director and refer to the Requirements for Graduate Degrees section of this catalog for further information on preparing a plan of study.

Diagnostic Examination

Although not required, the guidance committee has the option to administer a written and oral diagnostic examination during the first semester of residence (or before nine credit hours have been completed) for students entering the program with an M.S. degree in oceanography. For students matriculating with a bachelor’s degree or an M.S. degree in another field, the optional diagnostic examination should be administered no later than the third semester of residence (or before completion of 27 credit hours).

The diagnostic examination will be prepared by the student’s guidance committee in consultation with the graduate program director. The results of this examination are used as guidance for the curriculum plan. The guidance committee may also recommend to the graduate program director, based on the student’s performance in the four oceanography core courses, that the diagnostic examination be waived.

Computer Language Skills

To satisfy this requirement the student must either take a course in MATLAB programming (OEAS 595) or solve a substantial problem by writing an original computer program. The student’s advisor in consultation with the guidance committee develops the problem and a reasonable timetable for its completion. The problem must be solved independently with no help from others. The results will be evaluated by the advisor and guidance committee who will determine whether the student has solved the posed problem to their satisfaction. This computer language skills requirement should be completed before taking the candidacy exam.

Ship Time and/or Fieldwork Requirement

Each student is required to have at least ten days of shipboard experience, fieldwork, or a combination of the two.

Candidacy Exam

Near the completion of course work and before becoming heavily involved in dissertation work, the student shall pass a candidacy examination designed to test scholarly competence and knowledge of oceanography. The exam has written and oral portions prepared by the guidance committee. Additional details on the structure, form and content of the candidacy exam are available from the graduate program director and in the Requirements for Graduate Degrees section in this Catalog.

Formation of a Dissertation Committee

After the candidacy examination has been passed and the dissertation committee formed, the guidance committee’s responsibilities are completed. The dissertation committee is a new committee and is formed to supervise the student’s dissertation research. Students should see the graduate program director or refer to the Requirements for Graduate Degrees section in this Catalog for further information on the formation of a dissertation committee.

Changes to the dissertation committee must be made in advance of the oral dissertation defense. Such changes are made only with the approval of the GPD and college dean.

Advancement to Candidacy

Advancement to candidacy is a formal step that occurs after the student has:

- 1. completed formal coursework;
- 2. passed the Ph.D. written and oral components of the candidacy examination; and,
- 3. submitted a topic that is approved by the dissertation committee chair.

The student must be advanced to candidacy at least 12 months before the time the degree is expected to be received, but usually not before the completion of one-and-a-half years of graduate work.

Dissertation Preparation

General regulations and procedures governing the submission of a doctoral dissertation are given in the Guide for Preparation of Theses and Dissertations (obtained at https://www.odu.edu/content/dam/odu/offices/graduate-studies/thesis-dissertation/docs/thesis_dissertation_guide.pdf). Students should read this guide carefully before beginning to write their dissertation. Writing the dissertation as chapters that can be submitted for publication is encouraged.

Please note that the thesis and dissertation guide in place at the start of the semester will remain in force for the entire semester, and any changes made to the guide over the academic year (and the dates of these changes) will be listed on the cover page of the guide. Changes to the previous guide will also be noted on the cover page of the guide, or in a separate document that can be downloaded from the same site as the complete guide. For more

information on dissertation preparation and approval in the College of Sciences, contact your graduate program director.

Dissertation Defense

The format of a dissertation defense is determined by the dissertation committee with the approval of the GPD. The defense is chaired by the director of the dissertation committee. The chair will act as moderator, ruling on questions of procedure and protocol that may arise during the defense. Students should see the graduate program director or refer to the Requirements for Graduate Degrees section in this catalog for further information on the format of the dissertation defense.

Satisfactory performance on this examination (oral dissertation defense) and adherence to all regulations outlined above complete the requirements for the Ph.D. degree. All requirements for the doctoral degree must be completed within eight calendar years from the date of initial registration in the program.

Dissertation Acceptance and Submission

Once the dissertation committee has approved the dissertation, the student and major advisor must review the entire dissertation to ensure that it adheres to the format described in the Guide for Preparation of Theses and Dissertations before submitting the dissertation to the GPD for final review. Ten days should be allowed for GPD review. Once the GPD has approved the dissertation, the student submits the dissertation to the associate dean in the College of Sciences for approval. All approvals must be completed by the day before commencement. However, the associate dean generally requires that all dissertations be submitted prior to this deadline. Students should consult with the GPD for further details.

Request to Graduate

The student should obtain a copy of the form Application for Graduation from the Registrar’s Office and complete this application. The deadline for submitting this application is listed on the Registrar’s Office website at www.odu.edu/registrar (<http://www.odu.edu/registrar/>) and usually falls near the end of the semester preceding the one during which graduation is anticipated. It is the student’s responsibility to meet these deadlines and submit the necessary paperwork for graduation.

Removal of Incompletes

At least one month prior to graduation, all incomplete grades should be cleared. An Academic Record Change form is used for this purpose, and the instructor of the course and the department chair need to sign this form.

**Certificate
Spatial Analysis of Coastal
Environments Certificate**

The Certificate in Spatial Analysis of Coastal Environments provides an interdisciplinary program for students wishing to pursue careers in coastal management or research, remote sensing, or applications of geographic information systems (GIS). Rendered upon completion of the requirements, the certificate is an academic affidavit comprised of courses in geography, biology, and ocean and earth, and is administered by the Department of Ocean and Earth Sciences and the Department of Political Science and Geography. Students must take courses in the areas listed below and complete them with a cumulative GPA of 3.00 or higher and no grade below a C (2.00). The certificate is available to postgraduate professionals who meet the requirements. Students with comparable professional experience may be able to show competence in selected courses through examination.

Curriculum Requirements

Core Courses (Both courses are required)		
GEOG 502	Geographic Information Systems	3
GEOG 504	Digital Techniques for Remote Sensing	3
Interpretive Analysis Courses		
Select two of the following:		6

BIOL 504	Conservation Biology and Sustainable Development	
GEOG 520	Marine Geography	
GEOG 522	Coastal Geography	
GEOG 590	Applied Cartography/GIS	
GEOG 595	Topics in Geography	
OEAS 551	Data Collection and Analysis in Oceanography	
Capstone Seminar		
GEOG 519	Spatial Analysis of Coastal Environments	3
or OEAS 519	Spatial Analysis of Coastal Environments	
Total Credit Hours		15

Department of Physics

306 Oceanography & Physics Building (OCNPS)
Main Office: (757) 683-3468
<http://www.odu.edu/physics> (<http://www.odu.edu/physics/>)

Sebastian Kuhn, Chair
Balsa Terzic, Graduate Program Director

The Department of Physics offers programs of study leading to both the M.S. degree in physics and the Ph.D. degree in physics. Primary focus is placed on the Ph.D. program, and most students enrolled for graduate study are enrolled in that program. Students have the opportunity to perform research in state-of-the-art facilities under faculty direction. Graduates are prepared for research at the highest levels in academia, government laboratories, and corporate laboratories.

Programs

Doctor of Philosophy Program

- Physics (PhD) (p. 375)

Master of Science Program

- Physics (MS) (p. 375)

Master of Science Physics (MS)

Admission

Applicants for admission to graduate study must have an earned bachelor's degree in physics or a closely related discipline from an accredited institution or an equivalent degree from a foreign institution. The applicant is normally required to have a minimum cumulative grade point average of 3.0 on a 4.0 scale. The general portion of the Graduate Record Examination (GRE) is optional for application to either the master's or the doctoral program; applicants to the doctoral program are encouraged to take the GRE specialized physics test as well. The Test of English as a Second Language (TOEFL) is required of all nonnative speakers of English who have resided in the U.S. for less than ten years.

While no promise of financial support is given for M.S. students, occasionally they will be supported as teaching assistants. Old Dominion University requires that all graduate teaching assistants who do not speak English as a first language pass a test of spoken English.

Admission decisions are based on undergraduate achievement, GRE scores (if available), and personal reference letters. Graduate study may commence at the beginning of any academic term. Decisions regarding financial support for students entering in the fall term are normally made by April 15, so a student's completed application must be received by January 15. Anyone who applies after January 15 should communicate directly with the Department of Physics concerning the availability of support.

Curriculum Requirements

A student may select either the thesis or non-thesis option. For either option, each student's course of study must have the advance approval of the graduate program director.

Non-Thesis Option

Thirty graduate credits that must include the following courses:

PHYS 556	Intermediate Quantum Mechanics	3
or PHYS 621	Quantum Mechanics I	
PHYS 603	Classical Mechanics	3
PHYS 604	Classical Electrodynamics I	3
PHYS 791	Seminar I	1

No more than 12 credits numbered at the 500 level may be used to meet this requirement.

Up to 12 credits from other University departments may be used to meet this requirement if approved by the graduate program director.

Written Examination

In addition to these course requirements, the candidate must pass a written comprehensive examination. It is usually taken just before the student's third semester of study. If a student fails this examination, he or she is allowed a second attempt, which must be at the time when the Written Examination is next given. In all but the most extraordinary circumstances, a student will not be allowed any additional attempts to pass this examination. Normally, this written examination is the same as the written portion of the Ph.D. Candidacy Examination, graded at the master's level.

Thesis Option

Thirty graduate credits that must include the following courses:

PHYS 556	Intermediate Quantum Mechanics	3
or PHYS 621	Quantum Mechanics I	
PHYS 603	Classical Mechanics	3
PHYS 604	Classical Electrodynamics I	3
PHYS 698	Research	3
PHYS 699	Thesis	3
PHYS 791	Seminar I	1

No more than 12 credits numbered at the 500 level may be used to meet this requirement.

Up to 12 credits from other university departments may be used to meet this requirement if approved by the graduate program director.

Thesis Research

A student's research is supervised by his or her MS thesis committee. The committee is composed of three faculty members from the Physics Department (thesis advisor plus two additional faculty).

The format of the thesis is specified by the Guide for Preparation of Theses and Dissertations. The thesis defense is the final examination that a student must pass to receive a master's degree. This is a public presentation of the results contained in his or her thesis.

Doctor of Philosophy Physics (PhD)

The broad requirements for the Ph.D. degree are

1. satisfactory performance in a designated core of graduate courses,
2. successful completion of the Ph.D. Candidacy Examination, which has both written and oral parts,
3. successful completion of a teaching requirement, and
4. satisfactory completion of a dissertation.

Each student's course of study must have the advance approval of the graduate program director.

Admission

Applicants for admission to graduate study must have an earned bachelor's degree in physics or a closely related discipline from an accredited institution or an equivalent degree from a foreign institution. The applicant is normally required to have a minimum cumulative grade point average of 3.0 on a 4.0 scale. The general portion of the Graduate Record Examination (GRE) is optional for application to either the master's or the doctoral program; applicants to the doctoral program are encouraged to take the GRE specialized physics test as well. The Test of English as a Second Language (TOEFL) is required of all nonnative speakers of English who have resided in the U.S. for less than ten years.

It is normally expected that most incoming Ph.D. students will be supported as teaching assistants. Old Dominion University requires that all graduate teaching assistants who do not speak English as a first language pass a test of spoken English.

Admission decisions are based on undergraduate achievement, GRE scores if available, and personal reference letters. Graduate study may commence at the beginning of any academic term. Decisions regarding financial support for students entering in the fall term are normally made by April 15, so a student's completed application must be received by January 15. Anyone who applies after January 15 should communicate directly with the Department of Physics concerning the availability of support.

Curriculum Requirements

Seventy-eight graduate credits beyond the undergraduate degree or 48 graduate credits beyond the master's degree must be taken and must include the following courses:

PHYS 601	Mathematical Methods of Physics I	3
PHYS 602	Mathematical Methods of Physics II	1
PHYS 603	Classical Mechanics	3
PHYS 604	Classical Electrodynamics I	3
PHYS 621	Quantum Mechanics I	3
PHYS 804	Classical Electrodynamics II	3
PHYS 807	Statistical Mechanics	3
PHYS 811	Computational Physics	3
PHYS 821	Quantum Mechanics II	3
PHYS 891	Seminar I	1
PHYS 892	Seminar II	1

A minimum of six additional credits for specialized full-semester courses at the 800 level must be taken. A student may waive or substitute for any of these courses with the approval of the graduate program director.

Up to 12 credits from other university departments may be used to meet this requirement if approved by the graduate program director. A student may waive PHYS 892, with the approval of the Graduate Program Committee, if he or she presents a paper at a scientific meeting. Before formation of his or her dissertation committee, a student is formally advised about these courses and other academic matters by graduate faculty advisors.

Additional Requirements

Ph.D. Candidacy Examination

A student admitted to the Ph.D. program in physics becomes a bona fide candidate for the Ph.D. degree by passing the Ph.D. Candidacy Examination. The purpose of this comprehensive examination is to determine if a student has the foundation and maturity to begin research in physics. A student who does not pass the Ph.D. Candidacy Examination within the allowed number of attempts explained below will be dismissed from the Ph.D. program. However, that student would still have the opportunity to satisfy the requirements for the M.S. degree in physics.

The Ph.D. Candidacy Examination consists of two parts—the Written Examination and the Oral Examination. Each part must be passed independently in order to pass the Ph.D. Candidacy Examination.

After passing the Written Examination, a student has to form a dissertation committee. Details of the committee are stated in the Dissertation section below.

Written Examination

The written examination is given two times each year—in late May and early January. A student admitted to the Ph.D. program must take this examination by the beginning of his or her third semester of graduate study. In circumstances such that the student has not had the appropriate courses to meet this deadline, he or she may petition the Graduate Program Committee for an extension. If a student fails this examination, he or she is allowed a second attempt, which must be at the time when the Written Examination is next given. In all but the most extraordinary circumstances, a student is dismissed from the Ph.D. program after failing the written examination twice.

Oral Examination

The Oral Examination is a one-hour presentation given by a student to an oral examination committee (normally consisting of his or her dissertation committee, minus the external member), meeting in closed session, normally on a topic relevant to the student's dissertation research. This presentation must be made within one year after a student passes the written examination. A request for extension of the deadline must be made in writing to the Graduate Program Committee.

A student's dissertation advisor, in consultation with the student, may choose from two possible formats for this presentation:

1. a presentation by the student directly on his or her dissertation research or
2. a presentation on a specific topic that the student has been assigned to investigate for several months.

For either option, the student must write a short paper of 10 or fewer pages on his or her presentation topic and give it to all members of the oral examining committee at least two weeks before the scheduled date of the examination. The committee will determine whether the student passes or fails the oral examination. More than one negative vote from the examining committee will result in failure. A student who fails the oral examination will be allowed a second attempt. The student's dissertation advisor will decide the format and timing of such a second attempt, with the provision that the second attempt must be completed within six months of the first attempt. Extensions of the deadline for completing this requirement must be requested in writing to the Graduate Program Committee.

Dissertation

The dissertation is the final and most important requirement that must be completed by a candidate for the Ph.D. degree in physics. It must be based on original research in physics that makes a contribution to existing knowledge and be of sufficient quality and interest to merit publication in a refereed physics journal. Research that is classified by the U. S. Government (in a way that restricts its distribution) is not a suitable basis for a dissertation, as one essential characteristic of a dissertation is that its contents must be disseminated freely.

The candidate's dissertation research is supervised generally by his or her dissertation committee. Close supervision is provided by the candidate's research advisor, who is a member of the dissertation committee and may be a tenured, tenure-track, research, or adjunct member of the graduate-certified faculty of the Department of Physics. If the research advisor is a tenured or tenure-track member of the faculty, he or she is the chair of the candidate's dissertation committee. If the research advisor is an adjunct or research faculty member, a tenured or tenure-track graduate-certified faculty member must serve as co-advisor and also serve as chair of the dissertation committee. The dissertation committee is composed of five members, a majority of whom must be tenured or tenure-track members of the graduate-certified faculty of the Department of Physics and one of whom must be a tenured or tenure-track faculty member of the graduate-certified faculty

in a department of Old Dominion University other than the Department of Physics. It is the responsibility of the research advisor and the candidate to nominate prospective members for the dissertation committee to the graduate program director, who must formally approve the membership of the dissertation committee.

The format of the dissertation is specified by the Guide for Preparation of Theses and Dissertations, and variations allowed within the Department of Physics are specified by the graduate program director.

Dissertation Defense

The final examination that a candidate must pass in order to receive the Ph.D. is an oral examination by the dissertation committee based on the candidate's public presentation of the results contained in his or her dissertation. This defense is conducted in two phases:

1. a public presentation in front of the dissertation committee that is open to any person who may wish to attend and direct relevant questions to the candidate and
2. a closed session between the candidate and the dissertation committee in which the candidate is questioned further by that committee.

The dissertation committee determines by majority vote whether the candidate passes or fails this final oral defense. If the candidate fails, he or she is allowed only one additional attempt to pass at a later time.

Teaching Requirement

Each candidate for the Ph.D. degree must earn a minimum of four teaching credits, which are defined in the following way:

- One such credit is awarded for teaching a one-hour recitation for one semester in the Department of Physics, and
- Two such credits are awarded for teaching a one-semester laboratory course in the Department of Physics.

The graduate program director may approve the substitution of an equivalent amount of teaching experience for this requirement.

Department of Psychology

Web Site: <http://sci.odu.edu/psychology/>

Mills Godwin Bldg
Norfolk, VA 23529

George Noell, Chair

Graduate Study

The Department of Psychology offers a program of study leading to the degree of Master of Science in psychology and programs leading to the Doctor of Philosophy with concentrations in health psychology, human factors psychology, and industrial/organizational psychology.

The department also participates in a program leading to the degree of Doctor of Philosophy in clinical psychology. This program, the Virginia Consortium Program in Clinical Psychology, is a joint venture of the Departments of Psychology at Old Dominion University and Norfolk State University.

Programs

Doctor of Philosophy Programs

- Clinical Psychology (PhD) (p. 378)
- Psychology with a Concentration in Clinical Psychology (PhD) (p. 379)
- Psychology with a Concentration in Health Psychology (PhD) (p. 380)
- Psychology with a Concentration in Human Factors Psychology (PhD) (p. 382)
- Psychology with a Concentration in Industrial and Organizational Psychology (PhD) (p. 383)

Master of Science Program

- Psychology (MS) (p. 377)

Certificate Program

- Modeling and Simulation for Human Factors Psychology Certificate (p. 385)

Master of Science Psychology (MS)

James Paulson, Graduate Program Director

The master's program in psychology offers a course of study leading to the Master of Science in general psychology. The master's degree program is appropriate for individuals wishing to gain additional research experience prior to enrolling in a psychology doctoral program at Old Dominion University or another university or for those individuals who are seeking the master's as a terminal degree. The curriculum is designed to provide a strong background in statistics, research methods, and general psychology so that the student will have a wide range of choices for future professional education and development. The master's degree is not a licensing or practicing degree.

The master's program uses a mentor-model, such that an applicant is admitted based on the recommendation of a faculty member who is interested in mentoring that applicant. In addition to reasonable GRE scores and GPAs, successful applicants have research interests and/or experiences that coincide with their mentor. Therefore, it is recommended that applicants explicitly identify the desired mentor(s) whose research program best fits with their career goals in their application. Applicants are also encouraged to contact potential mentors prior to applying.

Once admitted, graduate students are expected to work closely with members of the faculty and to participate in the research and other professional activities that are available within the department. Faculty are involved in research in the general areas of clinical, health, developmental, human factors, organizational, personnel, and community psychology. Individual faculty research interests can be found on the ODU Psychology Department website.

Admission

To qualify for admission, a candidate must meet the general university admission requirements. In addition, applicants are highly encouraged to meet the following preferred minimum qualifications:

1. The applicant should have taken at least five undergraduate psychology courses, including undergraduate courses in psychological statistics and psychological research methods.
2. The applicant should submit official scores for the Graduate Record Examination (GRE) (applicants who do not have a bachelor's degree in psychology should also take the advanced psychology GRE test).
3. The applicant should submit transcripts of all undergraduate and graduate work.
4. The applicant should submit a copy of their curriculum vitae or academic resume.
5. The applicant should submit a brief statement outlining their personal goals, academic objectives, and research interests, with attention to how these interests are compatible with identified faculty research.
6. The applicant should request that three letters of reference be submitted on their behalf, at least two of which are from former college or university faculty.

All credentials in support of applications should be sent to the Office of Admissions or uploaded into the Office of Admissions website.

Curriculum Requirements

To qualify for the Master of Science in psychology, a student must meet the following requirements:

1. The student must maintain a B average (3.00 on a 4.00 scale) in a minimum of 36 hours of course work.
2. The student is required to successfully complete a core of courses established by the faculty with at least a B (3.00) average in these courses. Core courses consist of a sequence of 11 hours in research tools coursework (PSYC 713, PSYC 727, and PSYC 728) and a 6 hours of supervised research (PSYC 698 and PSYC 699) that culminates in the Thesis.

Core Courses

PSYC/CPSY 713	Research Methods in Psychology	3
PSYC/CPSY 727	Analysis of Variance and Experimental Design	4
PSYC/CPSY 728	Regression and Correlational Design	4
PSYC/CPSY 698	Research in Psychology	3
PSYC/CPSY 699	Thesis	1-3

Research Coursework

Select Two of the Following:		6
PSYC/CPSY 651	Developmental Psychology	
PSYC/CPSY 661	Psychopathology	
PSYC 731	Human Cognition	
PSYC 741	Sensation and Perception	
PSYC 749	Social and Affective Bases of Behavior	
PSYC 750	Organizational Psychology	
PSYC 763	Personnel Psychology	

Electives 13

Selected in Consultation with Academic Advisor

Total Credit Hours 34-36

Electives

PSYC 662	Human-Computer Interface Design	3
PSYC 731	Human Cognition	3
PSYC 741	Sensation and Perception	3
PSYC 745	Applied Psychometrics	3
PSYC 750	Organizational Psychology	3
PSYC 770	Human Factors Psychology	3
PSYC 771	Ergonomics	3
PSYC 763	Personnel Psychology	3
PSYC 836	Multilevel Models: HLM	3
PSYC 846	Structural Equation Modeling	3
PSYC 851	Organizational Leadership	3
PSYC 853	Job Attitudes and Motivation	3
PSYC 864	Human Resource Development	3
PSYC 865	Psychology of Personnel Selection	3
MSIM 601	Introduction to Modeling and Simulation	3

Other relevant courses

Courses that are not listed but are relevant to the student's goals may be used to fulfill the requirements for the degree as approved by the student's advisor. Courses that are taken outside the Psychology Department to be used to fulfill degree requirements need to be approved by the master's graduate program director.

3. In addition to core courses, students are required to complete an additional 13 hours of coursework (electives); therefore, students are required to complete a minimum of 36 credit hours for the degree. Elective courses should be selected after consultation with the student's academic advisor in order to support that student's learning and research objectives. Students enrolled in the Master's program may not enroll in 800-level courses without instructor permission.
4. Prior to beginning thesis research, the student will submit a request to the graduate program director to form a thesis committee. The student will identify two members of the committee and the graduate program director will appoint the third member. When the student has completed

the research, a written thesis must be submitted to the thesis committee. Completion of the thesis depends on acceptance of the thesis by the thesis committee and the graduate program director, as well as passing an oral exam in a public defense of the thesis.

Additional Requirements

To maintain their standing in the program students must demonstrate progress toward completing degree requirements, i.e., enrollment and satisfactory performance in courses during the fall and spring semesters. Students who have completed all course work and are working on their thesis must register for PSYC 998 (<http://catalog.odu.edu/search/?P=PSYC%20998>) (one credit) in fall and spring semesters continuously until graduation. The graduate catalog requires students who are using university resources or consulting with faculty to be registered for a minimum of one credit. Students who fail to register for one credit may be terminated from the program in at the end of the semester in which they failed to register.

If students have not completed their thesis by the end of their third year, they must submit a plan to their advisor and the graduate program director outlining target dates for completing the various elements of the thesis. Students may be terminated from the program if they fail to meet their target dates.

Students will not be allowed to validate courses that are older than eight years. They must retake the course(s), or complete an alternative course that meets the current requirements, that have exceeded the eight-year limit.

Doctor of Philosophy Clinical Psychology (PhD)

Christina M. Rodriguez, PhD, Graduate Program Director

The Department of Psychology has participated in the Virginia Consortium Program in Clinical Psychology for over 43 years. This unified PhD program is offered jointly by Old Dominion University and Norfolk State University, and it is nationally accredited by the American Psychological Association. Students are engaged in research activities and clinical work throughout their training. The Program follows a scientist-practitioner training model. NOTE: This joint program is no longer accepting applications and is scheduled to close by 2031 when the last accepted students complete the program.

Admission

This program is no longer accepting applications. Please see the PhD in Psychology with a Concentration in Clinical Psychology page.

Curriculum Requirements

The Clinical Psychology PhD program of the Virginia Consortium Program in Clinical Psychology (VCPCP) provides students with a high level of professional training consistent with the standards required for accreditation by the American Psychological Association (APA). To attain the degree, a minimum of five years of post-baccalaureate training is required, including four years full-time in residence (excluding the pre-doctoral internship and doctoral dissertation). An oral and written comprehensive examination, empirical doctoral dissertation, multiple years of clinical practicum training, and a full-time one year APA-approved pre-doctoral clinical internship are also required for the degree. The APA pre-doctoral internships are offered outside the Consortium. Additional details about the VCPCP program can be found in its Program Handbook which is available on the Consortium's website (www.odu.edu/vcpcp) (<https://sci.odu.edu/vcpcp/>).

Two pathways toward degree completion are possible:

PATH A: For students **entering the program with a master's degree**, students are required to complete a minimum of **116 credit hours** as noted below. Students entering the program who have already completed an empirical master's thesis in a graduate program prior to admission may have it evaluated to meet the program's requirement for a Foundational Research Project (FRP). Students with a master's degree but without an empirical master's thesis will be required to complete an FRP or, alternatively, may

elect to pursue a master's thesis (see Path B below). The following curricular requirements will be followed for students in Path A:

Path A Curriculum Requirements

Core Courses		
CPSY 632	Intellectual Assessment	3
CPSY 651	Developmental Psychology	3
CPSY 661	Psychopathology	3
CPSY 664	Clinical Assessment: Personality and Individual Differences	3
CPSY 700	Clinical and Ethical Practice	3
CPSY 713	Research Methods in Psychology	3
CPSY 720	Multicultural Issues in Clinical Psychology	3
CPSY 725	Cognitive Behavioral Therapy	3
CPSY 727	Analysis of Variance and Experimental Design	4
CPSY 728	Regression and Correlation Design	4
CPSY 749	Social and Affective Bases of Behavior	3
CPSY 801	Empirically-Supported Therapies	3
CPSY 826	Biological and Cognitive Aspects of Behavior	3
Total Credits for Core Courses		41
Clinical Practicum		33
CPSY 895	Clinical Practicum	
or CPSY 896	Advanced Clinical Practicum	
Research		18
CPSY 883	Research in Clinical Psychology	
Clinical Dissertation		12
CPSY 899	Clinical Dissertation	
Internship		12
CPSY 890	Internship in Clinical Psychology	
Total Credit Hours		116

PATH B: For students **entering the program *without a master's degree*** from a graduate program, students are required to complete a minimum of **116 credit hours**. Students who are not interested in completing a master's thesis would complete a Foundational Research Project (FRP) and notify the program within their first semester their intention to follow Path A.

Otherwise, students entering the program without a master's degree earned from a graduate program may first attain a master's degree in Old Dominion University (*36 credits*) followed by completing the requirements for the doctoral degree (*80 credits*). The following curricular requirements will be followed for students in Path B:

Path B Curriculum Requirements

Master's Degree in Psychology		36
See curriculum for M.S. in Psychology for more information.		
Clinical Psychology students will be advised by their research mentor or DCT regarding the appropriate courses to take to prepare them for the PhD in Clinical Psychology.		
The Graduate Program Director for the M.S. in Psychology program will work with Clinical Psychology students regarding curriculum choices for the master's program.		
Total Credit Hours		36
PhD in Clinical Psychology		
Section A-Required Foundational Core (9 credits)*		
Select three of the following:		9
CPSY 651	Developmental Psychology	
CPSY 661	Psychopathology	
CPSY 720	Multicultural Issues in Clinical Psychology	
CPSY 749	Social and Affective Bases of Behavior	

CPSY 826	Biological and Cognitive Aspects of Behavior	
(*whichever two courses not selected for master's Section B contribute here)		
Section B-Required Clinical Courses (54 credits)		
Required Clinical Courses		6
CPSY 725	Cognitive Behavioral Therapy	
CPSY 801	Empirically-Supported Therapies	
Clinical Practicum		33
CPSY 895	Clinical Practicum	
or CPSY 896	Advanced Clinical Practicum	
Internship in Clinical Psychology		12
CPSY 890	Internship in Clinical Psychology	
Section C-Required Research Courses (20 credits)		
Research in Clinical Psychology		8
CPSY 883	Research in Clinical Psychology	
Clinical Dissertation		12
CPSY 899	Clinical Dissertation	
Total Credit Hours		80

Additional Requirements

Student Evaluation

Students are regularly evaluated in academic course work, research activities, clinical work, and professional behavior. A formal evaluation of student's progress is conducted at least annually. Each student is also evaluated through a written and oral comprehensive examination.

Dissertation Award

The David Leigh Pancoast Award is given to the student in the Virginia Consortium Program in Clinical Psychology with the outstanding doctoral dissertation.

**Doctor of Philosophy
Psychology with a Concentration in
Clinical Psychology (PhD)**

Christina M. Rodriguez, PhD, Director of Clinical Training

The PhD in Clinical Psychology is a doctoral concentration in the ODU Department of Psychology. A founding member of the American Psychological Association (APA) accredited Virginia Consortium Program in Clinical Psychology, ODU has led the administration of the Consortium and trained doctoral students in clinical psychology for over 43 years.

The ODU Clinical PhD Program applied for APA accreditation as a clinical psychology PhD program, independent of the Consortium, in Summer 2025 with a site visit anticipated in Fall 2026. Although the timeline and application outcome are not assured, we hope to receive independent APA Accreditation on Contingency in Spring 2027; if a student completes a program that is Accredited on Contingency prior to graduation, that student is deemed to have completed an APA accredited program. We will provide updates on the status of our ongoing efforts to secure independent APA accreditation online.

This PhD program requires four years in residence with an additional final year in a 12-month predoctoral internship that is completed off-site. The program follows a scientist-practitioner training model wherein students are engaged in research activities and clinical work throughout their training.

Admission

Admission to the PhD in Psychology is available through Graduate Admissions. Applicants must select Clinical Psychology to obtain the correct application. All applications for clinical psychology have a deadline of December 1. To be considered for admission to the Clinical Ph.D. program, an applicant is required to have a baccalaureate degree with a substantive

background in psychology, substantive research experience, clinically relevant experience, three compelling letters of recommendation, and strong fit to the program mission and to a specific research mentor. A personal interview is also required prior to selection.

Students are admitted into the program with a specific research mentor (please see the website to see which faculty affiliated with the clinical program are recruiting in any given year). Applicants are encouraged to contact potential research mentors for additional information and to express interest to be prepared to clearly indicate their alignment with the mentor in their personal statements.

For applications to receive full review, the following materials are required:

1. Official scores on the Graduate Record Examination are currently optional.
2. Official transcripts of academic coursework (transcripts from every institution contributing to the baccalaureate degree and transcripts for additional advanced degrees as applicable).
3. Supplemental application materials for clinical psychology includes:
 - a. A personal statement outlining (a) personal career goals, (b) how those career goals fit with the training program, (c) clinical interests, experiences, and goals, (d) research interests, experiences, and goals, (e) how those research interests and goals align with the program and with potential specific research mentor(s).
 - b. Statement that articulates your unique background and experiences that have shaped your career aspirations and would contribute to serving a diverse community.
 - c. A curriculum vitae.
4. A minimum of three professional letters of recommendation.
5. Ranked choices of potential research mentors.
6. Completed graduate school application.

Curriculum Requirements

The PhD in Psychology Concentration in Clinical Psychology provides students with a high level of professional training. As the program seeks accreditation as independent institution, the curriculum follows the standards required for accreditation by the American Psychological Association (APA). To attain the degree, a minimum of five years of post-baccalaureate training is required, including four years full-time in residence (excluding predoctoral internship). An oral and written comprehensive examination, empirical doctoral dissertation, multiple years of clinical practicum training, and a full-time one year APA-approved predoctoral clinical internship are also required for the degree. All APA predoctoral internships are nationally competitive clinical placements that are offered off-site.

Students are required to complete a minimum of **87 credit hours** as noted below.

Coursework	
CPSY 632	Intellectual Assessment
CPSY 651	Developmental Psychology
CPSY 661	Psychopathology
CPSY 664	Clinical Assessment: Personality and Individual Differences
CPSY 700	Clinical and Ethical Practice
CPSY 713	Research Methods in Psychology
CPSY 720	Multicultural Issues in Clinical Psychology
CPSY 725	Cognitive Behavioral Therapy
CPSY 727	Analysis of Variance and Experimental Design
CPSY 728	Regression and Correlation Design
CPSY 749	Social and Affective Bases of Behavior
CPSY 801	Empirically-Supported Therapies
CPSY 826	Biological and Cognitive Aspects of Behavior

Total Credits for Required Coursework		0
Clinical Practicum		27
CPSY 895 or CPSY 896	Clinical Practicum Advanced Clinical Practicum	
Research		6
CPSY 698	Research in Psychology	
CPSY 699	Thesis	
Clinical Dissertation		12
CPSY 899	Clinical Dissertation	
Internship		1
CPSY 890	Internship in Clinical Psychology	

Additional Requirements

Student Evaluation

Students are regularly evaluated in academic course work, research activities, clinical work, and professional behavior. A formal evaluation of student’s progress is conducted at least annually. Each student is also evaluated through a written and oral comprehensive examination.

Doctor of Philosophy Psychology with a Concentration in Health Psychology (PhD)

James F. Paulson, Graduate Program Director

Doctor of Philosophy - Psychology

The Doctor of Philosophy in Psychology program is comprised of three doctoral concentrations: Health Psychology, Human Factors Psychology, and Industrial/Organizational Psychology. The program involves a blend of core training and requirements and concentration-specific training and requirements.

Overview of Topical Areas

The health psychology doctoral program emphasizes psychological theory and research as they apply to understanding how psychological, behavioral, and cultural factors contribute to physical and emotional health and illness and how these can be used to create prevention and intervention programs that improve well-being.

The general philosophy and plan of the HP psychology program at Old Dominion University is to provide graduate training consisting of four phases:

1. A core of basic courses in health psychology and related areas, acquired primarily at the master’s level.
2. In-depth training in statistics, methodology, and grant and manuscript writing;
3. Research experience in a field of health psychology;
4. Completion of a dissertation representing a significant contribution to health psychology.

Admission

The graduate program in health psychology (HP) admits students at two levels: with a master’s degree or with a bachelor’s degree. Degrees held must be in psychology or a related field. Each applicant must submit:

1. Official scores on the General Test of the Graduate Record Examination (GRE);
2. A brief statement outlining personal goals and academic objectives;.
3. Three letters of reference, at least two of which are from former college/ university teachers or research supervisors;.
4. Transcripts of all prior academic work;.

5. A sample of recent academic writing (e.g., a paper required in an undergraduate course). Applicants are encouraged to submit a writing sample.

Curriculum Requirements

Core Requirements

The Ph.D. in Psychology requires at least 84 semester hours of credit beyond the bachelor's degree or at least 48 semester hours of post-master's training. Students entering the program with a bachelor's degree must complete the first phase of the program by meeting the requirements for the master's degree in Psychology (i.e., 36 semester hours with appropriate course work). For the student with a bachelor's degree, completion of the program requires approximately four years of study. For the student who holds the master's degree upon entering the Ph.D. program, completion requires approximately three years. The student is required to complete a core of master's-level courses with at least a B average. If the GPA falls below 3.0 the student may be placed on probation or suspended from graduate study as specified in the University Catalog. Further, if the student receives a grade of C or lower, they will also be placed on probation; a second C or worse may result in dismissal from the program.

The core courses consist of the following:

Core Courses

PSYC 713	Research Methods in Psychology	3
PSYC 727	Analysis of Variance and Experimental Design	4
PSYC 728	Regression and Correlational Design	4
Dissertation		12
PSYC 899	Dissertation	
Total Credit Hours		23

Health Psychology Concentration

In addition to the core requirements for the PhD in Psychology, the PhD concentration in Health Psychology requires the following courses:

PSYC 745/845	Applied Psychometrics	3
PSYC 735	Health Psychology	3
PSYC 844	Program Evaluation	3
PSYC 833	Grant and Manuscript Writing	3
Select two of the following:		6
PSYC 651	Developmental Psychology	
PSYC 661	Psychopathology	
PSYC 731/831	Human Cognition	
PSYC 749/849	Social and Affective Bases of Behavior	
Total Credit Hours		18

Additional Requirements

In addition to these requirements, students must complete the following requirements:

After completing the master's degree and/or before taking the candidacy examination, students are expected to form a committee of three graduate faculty members who will serve as a guidance committee. This committee assists the student in developing a plan of study tailored to the student's needs and interests. The plan of study outlines the minimum of 48 hours of post-master's training, including:

1. Completion of one additional quantitative course (3 credits);
2. Maintenance of a strong focus in research methods and statistics; and
3. Development of a viable research program.

Candidacy Examination

Prior to admission to candidacy (i.e., the beginning of formal work on the dissertation), each student is required to pass a written and oral candidacy examination. A student must pass both the written and oral parts to pass

the candidacy examination. The examination may not be reported as passed if there is more than one dissenting vote. A candidacy examination cannot be passed conditionally. A pass on the examination cannot be made contingent upon other factors such as the completion of additional course work, the preparation of extra research projects, and so on. If either part (written or oral) of the candidacy examination is failed, the faculty may permit the student to take it once more at a time mutually satisfactory but within 12 months from the date of the first examination. If either part of the examination is failed, the student may be required by the faculty to retake only that part. The student is allowed two attempts on the candidacy exam. The faculty considers a complete scheduled exam (written and oral combination) as one attempt. If the student fails the exam on two attempts, they may be asked to leave the program. There are two options for HP candidacy examination depending on the student's specialty and faculty approval:

1. Qualifying Exam:
 - a. Written questions that assess core Health Psychology topics and those relevant to research in Health Psychology, and the student's specific area of specialization (e.g., statistics, methodology, ethics, health, mental health, public health, health discrepancies).
 - b. An oral examination during which the student defends responses to the written questions.
2. Major Area Paper:
 - a. A review paper (quantitative or qualitative) or theoretical analysis of a research area designated by the student as an important area for contemporary applied psychological sciences.
 - b. The resulting paper should define the student as an expert in that area, and be of publishable quality.
 - c. The student must defend the work to the guidance committee, and submit the work for publication in a journal relevant to the student's research specialty or as a book chapter. The major area paper may be submitted as a grant proposal instead of as a journal publication or book chapter with prior approval from the guidance committee.

Research Emphasis

A major objective of the HP program is to provide the student with substantial experience in planning, designing, conducting, and reporting results of independent research. Toward this end, a student is expected to engage in a variety of research activities. This expectation is reflected in the program's few traditional classroom course requirements beyond the master's degree. The time should be spent on mostly research-related activities (e.g., reading, individual study [research], and dissertation). The student is expected to acquire research experiences that go well beyond formal course requirements. These research experiences may take a variety of forms and occur in a variety of settings. For example, the student is encouraged to engage in both laboratory and field research related to the HP sciences specialty, to serve as a member of a larger research team when appropriate or available (perhaps serving as a graduate research assistant on an externally sponsored grant), and to engage in independent non-sponsored research. The student is also encouraged to seek out opportunities to conduct research projects (including grants and contracts funded through the Old Dominion University Research Foundation) on his or her own and in collaboration with faculty members. The accumulation of these research experiences should result in presentation of papers at professional meetings, the publication of manuscripts in refereed journals, the publication of technical reports, and the submission of grant/contract proposals.

Graduate Student Teaching

Teaching a course is an experience that is worthwhile regardless of the eventual career role(s) that a student envisions, and the experience should be taken seriously for its professional value. Benefits associated with teaching a course include expanding and solidifying knowledge about general and Health psychology, polishing communication skills, and establishing professional identification. Although there are other ways to acquire these benefits (e.g., presentations at conferences, consulting experiences, organizing and conducting workshops), teaching a course systematically builds these experiences into a student's plan of study. Moreover, any student who plans an academic career should teach one or more courses in

preparation for that career. The student should also recognize that during the course of graduate training, financial support is often provided by the Psychology Department from graduate teaching assistant or adjunct teaching funds. This type of financial support almost always requires that the student be partially or fully responsible for teaching a course.

Dissertation

The doctoral dissertation must represent an achievement in research and a significant contribution to knowledge in the major area of study. It is equivalent to no more than 24 semester hours of course work.

Dissertation Defense

An oral examination in defense of the dissertation is required. The aim of the defense is to explore with the candidate the methodological and substantive contributions of the completed dissertation.

Research Opportunities

HP faculty conduct research on a wide variety of health-related topics. Students have access to laboratory facilities as well as field settings in which faculty work. Research is supported by a variety of funding agencies from federal (including the National Institutes of Health) to state agencies. Students are encouraged to become engaged in one of these research programs early in the process of their education.

Doctor of Philosophy
Psychology with a Concentration in
Human Factors Psychology (PhD)

James F. Paulson, Graduate Program Director

Overview of the Topical Areas

The HF doctoral program follows the scientist-practitioner model with emphasis on psychological theory and behavioral science, statistics and research methodology, practical experience, and fundamental and innovative areas of human factors/engineering psychology. The following is a partial list of these areas:

- aviation psychology
- behavioral modeling
- complex system operation
- display design
- driving and navigational performance
- ergonomics
- human-computer interaction
- perception and performance
- medical systems
- neuroergonomics
- simulation
- team performance
- training
- usability testing
- warnings and alarms
- virtual environments
- information processing and workload
- human-robot interaction

Admission

The PhD in Psychology with a concentration in Human Facotrs admits students at two levels: with a master’s degree or with a bachelor’s degree. Degrees held must be in psychology or a related field. Each applicant must submit:

1. Official scores on the General Test of the Graduate Record Examination (GRE);
2. A brief statement outlining personal goals and academic objectives;

3. Three letters of reference, at least two of which are from former college/ university teachers or research supervisors;.
4. Transcripts of all prior academic work;.
5. A sample of recent academic writing (e.g., a paper required in an undergraduate course).Applicants are encouraged to submit a writing sample.

Curriculum Requirements

The program requires at least 84 semester hours of credit beyond the bachelor’s degree with at least 48 hours being post-master’s education. For the individual entering with a bachelor’s degree, the general plan of graduate education consists of four phases:

1. A core of basic psychology, acquired while working toward the master’s degree;
2. Broad education in the general area of human factors psychology;
3. Research and applied experience in human factors psychology; and
4. Completion of a dissertation representing a significant professional contribution to human factors psychology.

For the individual entering with a master’s degree, a minimum of 48 hours of doctoral-level credits is required, based on the faculty’s and the Ph.D. program director’s review of the student’s educational background. Students who enter with a master’s degree will typically pursue a plan of study identical in spirit to the latter three phases of the plan of study followed by a student entering with a bachelor’s degree (see phases listed above). The student will form a guidance committee within the first year of entry. These are graduate faculty members who assist in developing the plan of study tailored to the student’s needs and interests. This plan of study outlines the minimum 48 hours of post-master’s education. For the student who holds the master’s degree upon entering the Ph.D. program, completion will require approximately three years.

For the student with a bachelor’s degree, completion of the program requires approximately five years of study. A student entering the program with a bachelor’s degree must complete the first phase of the program by meeting the requirements for the master’s degree in general psychology (i.e., 36 semester hours with appropriate course work). The student is required to complete successfully a core of master’s-level courses, with at least a B average in these courses. If the GPA falls below 3.0 the student may be placed on probation or suspended from graduate study as specified in the University Catalog. Further, if the student receives a C grade or less he or she will also be placed on probation; a second C or worse may result in dismissal from the program.

Core Requirements

The Ph.D. in Psychology requires at least 84 semester hours of credit beyond the bachelor’s degree or at least 48 semester hours of post-master’s training. Students entering the program with a bachelor’s degree must complete the first phase of the program by meeting the requirements for the master’s degree in Psychology (i.e., 36 semester hours with appropriate course work). For the student with a bachelor’s degree, completion of the program requires approximately four years of study. For the student who holds the master’s degree upon entering the Ph.D. program, completion requires approximately three years. The student is required to complete a core of master’s-level courses with at least a B average. If the GPA falls below 3.0 the student may be placed on probation or suspended from graduate study as specified in the University Catalog. Further, if the student receives a grade of C or lower, they will also be placed on probation; a second C or worse may result in dismissal from the program.

The core courses consist of the following:

Core Courses		
PSYC 713	Research Methods in Psychology	3
PSYC 727	Analysis of Variance and Experimental Design	4
PSYC 728	Regression and Correlational Design	4
Dissertation		12

PSYC 899	Dissertation	
Total Credit Hours		23

Human Factors Psychology Concentration

In addition to the core requirements for the PhD in Psychology, the PhD concentration in Human Factors Psychology requires the following courses:

PSYC 731/831	Human Cognition	3
PSYC 741/841	Sensation and Perception	3
Total Credit Hours		6

Additional Requirements

Completion of the first phase requires two years of study. Following the student's second year, the student forms a guidance committee of graduate faculty members who assist in developing a plan of study tailored to the student's needs and interests. The plan of study outlines the student's minimum 48 hours of post-master's education.

Candidacy Examination

Prior to admission to doctoral candidacy (i.e., the beginning of formal work on the dissertation), each student is required to pass a qualifying examination to evaluate a student's achievement and understanding of concepts, theories, practices, and empirical facts about fundamental HF information, as well as information relevant to the student's major area of concentration within HF. The examination consists of a six-hour essay exam covering general HF knowledge (a reading list is provided) and a 10-page literature review covering knowledge in the student's area of concentration (the literature review may be incorporated into the student's dissertation proposal). The literature review can be turned in any time during the semester, but MUST be submitted within a week of completion of the general knowledge essay exam. If the both written components are passed, the oral part of the examination must be completed within one month of notification. The oral exam covers the material contained on the candidate's reading list, answers on the written exam, and the literature review. A student must pass both the written and oral parts to pass the candidacy examination. The examination may not be reported as passed if there is more than one dissenting vote by exam committee members. A candidacy examination cannot be passed conditionally. A pass on the examination cannot be made contingent upon other factors such as the completion of additional course work or the preparation of extra research projects. If either part (written or oral) of the candidacy examination is failed, the faculty may permit the student to take it once more at a time mutually satisfactory but within 6 to 12 months from the date of the first examination. If either part of the examination is failed, the student may be required by the faculty to retake only that part. The student is allowed two attempts on the candidacy exam. If the student fails the exam twice, they may be asked to leave the program. When determining failure, the faculty considers a complete scheduled exam as one attempt. Failure of one part of the exam on the first attempt (such as the written part), but then failure of a different part of the exam (even the oral part) at the second attempt is considered two failures.

Publication and Application

Prior to graduation, students are required to submit a research article as first author for publication in a refereed journal, and to create an application of research methodology and/or computing skills. An example of such an application might include a data analysis program, a simulation program or a patentable technology innovation.

Practical Experience

The student must obtain professional practice experiences during the course of graduate education. An internship is one excellent option for meeting this requirement. However, the student can also meet the requirement by participating in at least two applied research projects or consulting activities under the direct supervision of a Ph.D. psychologist (or psychologists). The student's guidance committee establishes the criteria for meeting the professional-practice experience requirement and judges the adequacy of the experiences.

Graduate Student Teaching

Teaching an academic course is an experience that is worthwhile regardless of the eventual career role(s) that a student envisions, and the experience should be taken seriously for its professional value. Benefits associated with teaching a course include expanding and solidifying knowledge about general and HF psychology, polishing communication skills, and establishing professional identification. Although there are other ways to acquire these benefits (e.g., presentations at conferences, consulting experiences, organizing and conducting workshops), teaching a course systematically builds these experiences into a student's plan of study. Moreover, any student who plans an academic career should teach one or more courses in preparation for that career. During the course of graduate training, financial support is often provided by the Psychology Department from graduate teaching assistant or adjunct teaching funds. This type of financial support almost always requires that the student be partially or fully responsible for teaching a course.

Dissertation

The doctoral dissertation must represent an achievement in research and a significant contribution to knowledge in the major area of study. It is equivalent to no more than 24 semester hours of course work.

Dissertation Defense

An oral examination in defense of the dissertation is required. The aim of the defense is to explore with the candidate the methodological and substantive contributions of the completed dissertation.

Research Opportunities

Lab facilities are available for research in cognition, human perception and performance, modeling and simulation, and psychophysiology. Facilities include personal computers, local area networked testing stations, sound-attenuated testing chambers, driving simulators, flight simulators, and a human-computer interaction laboratory. Access to university computing and multimedia development facilities is also available. To complement the program's emphasis on modeling and simulation, students also have access to the Virginia Modeling, Analysis and Simulation Center (VMASC). VMASC is an ODU-affiliated research and development center where scientists from a number of disciplines create and test computer models and simulation applications to benefit industrial, academic, and governmental interests.

Research is supported by private sector, local, state or federal governmental organizations (e.g., National Science Foundation, National Institutes of Health, NASA, etc.), or one of the military services. Doctoral students are encouraged to become engaged in one of these research programs early in the process of their education.

Doctor of Philosophy Psychology with a Concentration in Industrial and Organizational Psychology (PhD)

James F. Paulson, Graduate Program Director

Overview of the Topical Areas

The program covers current theoretical and practical issues and topics within I-O psychology. The following is a partial list of these areas:

- Job Analysis
- Psychological Testing
- Selection Systems
- Personnel Training
- E-Training
- Human Resource Development
- Human Resource Management
- Occupational Safety and Health

- Work Motivation
- Work-Family Interface
- Career Development
- Job Satisfaction
- Organizational Commitment
- Leadership
- Group and Team Processes
- Organization Development and Change
- Organizational Justice
- New Forms of Work Organization, such as Telework and Virtual Teams
- International Aspects of I-O Psychology

Admission

The PhD in Psychology with a concentration in Industrial and Organizational Psychology admits students at two levels: with a master's degree or with a bachelor's degree. Degrees held must be in psychology or a related field. Each applicant must submit:

1. Official scores on the General Test of the Graduate Record Examination (GRE);
2. A brief statement outlining personal goals and academic objectives;.
3. Three letters of reference, at least two of which are from former college/university teachers or research supervisors;.
4. Transcripts of all prior academic work;.
5. A sample of recent academic writing (e.g., a paper required in an undergraduate course). Applicants are encouraged to submit a writing sample.

Curriculum Requirements

The program requires at least 84 semester hours of credit beyond the bachelor's degree with at least 48 hours being post-master's education. Post-master's credits include up to 24 dissertation research credits. For the individual entering with a bachelor's degree, the general plan of graduate education consists of four phases:

1. Course work in general psychology, acquired while working toward the master's degree;
2. Broad education in the general area of I-O psychology;
3. Research and professional-practice experience in I-O psychology; and
4. Completion of a dissertation representing a significant professional contribution to I-O psychology.

For the individual entering with a master's degree, a minimum of 48 hours of doctoral-level credits is required, based on a review of the student's educational background by the faculty and the Ph.D. programs director. The entering student holding a master's degree must pursue a plan of study identical in spirit to the latter three phases of the student with the bachelor's degree (see phases listed above).

For the student with a bachelor's degree, completion of the program requires approximately five years of study. For the student who holds the master's degree upon entering the Ph.D. program, completion requires approximately three years. A student entering the program with a bachelor's degree must meet the requirements for the master's degree in general psychology (i.e., 36 semester hours with appropriate course work). The student is required to complete a core of master's-level courses with at least a B average. If the GPA falls below 3.0 the student may be placed on probation or suspended from graduate study as specified in the University Catalog. Further, if the student receives a C grade or less they will also be placed on probation; a second C or worse may result in dismissal from the program.

Core Requirements

The Ph.D. in Psychology requires at least 84 semester hours of credit beyond the bachelor's degree or at least 48 semester hours of post-master's training. Students entering the program with a bachelor's degree must complete the first phase of the program by meeting the requirements for the master's degree in Psychology (i.e., 36 semester hours with appropriate course work).

For the student with a bachelor's degree, completion of the program requires approximately four years of study. For the student who holds the master's degree upon entering the Ph.D. program, completion requires approximately three years. The student is required to complete a core of master's-level courses with at least a B average. If the GPA falls below 3.0 the student may be placed on probation or suspended from graduate study as specified in the University Catalog. Further, if the student receives a grade of C or lower, they will also be placed on probation; a second C or worse may result in dismissal from the program.

The core courses consist of the following:

Core Courses		
PSYC 713	Research Methods in Psychology	3
PSYC 727	Analysis of Variance and Experimental Design	4
PSYC 728	Regression and Correlational Design	4
Dissertation		12
PSYC 899	Dissertation	
Total Credit Hours		23

Industrial and Organizational Psychology Concentration

In addition to the core requirements for the PhD in Psychology, the PhD concentration in Industrial/Organizational Psychology requires the following courses:

PSYC 745/845	Applied Psychometrics	3
PSYC 750/850	Organizational Psychology	3
PSYC 763/863	Personnel Psychology	3
Select six of the following:		18
PSYC 810	Seminar in Professional Aspects of Industrial/Organizational Psychology	
PSYC 822	Occupational Health Psychology	
PSYC 851	Organizational Leadership	
PSYC 864	Human Resource Development	
PSYC 865	Psychology of Personnel Selection	
PSYC 879	Careers	
PSYC 895	Topics in Psychology I	
PSYC 896	Topics in Psychology II	
Total Credit Hours		27

Additional Requirements

Students may be permitted to substitute another course within the Psychology department or from another university department for one or more of the six doctoral-level courses with permission of their guidance committee.

By November 1 of the third fall of study for a student entering with a bachelor's degree, or the first fall of study for a student entering with a master's degree, a plan of study must be prepared with the aid and approval of the academic mentor. The plan of study is then given to the Ph.D. programs director for approval. The plan of study outlines the student's minimum 48 hours of post-master's education. The student must include a plan to complete at least six of the doctoral-level content courses listed above.

Candidacy Examination

Prior to admission to candidacy (i.e., the beginning of formal work on the doctoral dissertation), each student is required to pass a candidacy exam. A student must pass both the written and oral parts to pass the candidacy examination. The examination may not be reported as passed if there is more than one dissenting vote. A candidacy examination cannot be passed conditionally. A pass on the examination cannot be made contingent upon other factors such as the completion of additional course work, the preparation of extra research projects, and so on. If either part (written

or oral) of the candidacy examination is failed, the faculty may permit the student to take it once more at a time mutually satisfactory but within 12 months from the date of the first examination. If either part of the examination is failed, the student may be required by the faculty to retake only that part. The student is allowed two attempts on the candidacy exam. If the student fails the exam twice, they may be asked to leave the program. When determining failure, the faculty considers a complete scheduled exam as one attempt. Failure of one part of the exam on the first attempt (such as the written part), but then failure of a different part of the exam (even the oral part) at the attempt is considered two failures. There are two methods an IO student might use to pass the candidacy exam:

1. The student publishes a series of manuscripts (see the IO Guide for details), at least one as first author, in peer-reviewed journals and completes an oral defense based on those manuscripts; or
2. The student completes a qualifying examination covering the student's areas of specialization. The candidate is examined broadly in the areas, not merely in a single aspect of concentration. The examination consists of a written part (12 hours) and an oral part (two hours).

Practical Experience

The student must obtain professional practice experiences during the course of graduate education. An internship is one excellent option for meeting this requirement. However, the student can also meet the requirement by active involvement in applied research or consulting activities under the direct supervision of one or more Ph.D. psychologists. The student's academic mentor establishes the criteria for meeting the professional-practice experience requirement and judges the adequacy of the experiences.

Graduate Student Teaching

Teaching a course is an experience that is worthwhile regardless of the eventual career role(s) that a student envisions, and the experience should be taken seriously for its professional value. Benefits associated with teaching a course include expanding and solidifying knowledge about general and I-O psychology, polishing communication skills, and establishing professional identification. Although there are other ways to acquire these benefits (e.g., presentations at conferences, consulting experiences, organizing and conducting workshops), teaching a course systematically builds these experiences into a student's plan of study. Moreover, any student who plans an academic career should teach one or more courses in preparation for that career. The student should also recognize that during the course of graduate training, financial support is often provided by the Psychology Department from graduate teaching assistant or adjunct teaching funds. This type of financial support almost always requires that the student be partially or fully responsible for teaching a course.

Dissertation

The doctoral dissertation is a significant and creative research achievement and a significant contribution to knowledge in I-O psychology. An oral examination in defense of the dissertation is required. The aim of the defense is to evaluate the doctoral candidate's mastery of the methodological and substantive contributions of the completed dissertation.

Research Opportunities

Laboratory and field research programs are conducted by the I-O faculty on such diverse topics as selection systems, training systems, development and implementation of performance appraisal systems, team performance and assessment, work-family interface, workplace diversity and inclusion, organizational change, occupational safety and health, innovation management, telework, virtual teams, and international I-O issues. Research is supported by a variety of agencies such as the National Science Foundation; National Institutes of Health; National Institute for Occupational Safety and Health; the NASA/Langley Research Center; the Virginia Modeling, Analysis and Simulation Center; and the military services. Students are encouraged to become engaged in one of these research programs early in the process of their education.

Certificate Modeling and Simulation for Human Factors Psychology Certificate

Mark Scerbo, Program Coordinator

Human factors is a discipline in which principles of cognition, information processing, learning, and perception are applied to the design of technology. Knowledge of human factors helps create a better match between user capabilities and system demand. Further, an understanding of human capabilities helps designers generate more veridical models of human behavior. Applying principles of human factors can create more effective simulator training systems. This modeling and simulation certificate provides students with a focus on psychological principles that address end-user capabilities with models of human behavior and with knowledge/skill acquisition.

This certificate is designed for graduate students in psychology who are interested in pursuing a career in modeling and simulation or for doctoral students who wish to focus on human factors issues in modeling and simulation. It is anticipated that students will complete the program in 2 semesters (full time enrollment) or 2 years (part-time enrollment or working to complement a graduate degree).

Admissions

Requirements for this program include a strong background in basic and applied areas of psychology as well as quantitative research methods. All applicants admitted to the certificate program must meet ODU requirements for admission to a graduate program in psychology—holding a baccalaureate or master's degree from a regionally-accredited institution or an equivalent degree from a foreign institution.

Curriculum Requirements

A 3.00 GPA for the four-course sequence is required for successful completion. Total amount of credit: 12.

Core Course		
MSIM 601	Introduction to Modeling and Simulation	3
Foundation Courses		
PSYC 731/831	Human Cognition	3
PSYC 741/841	Sensation and Perception	3
PSYC 770/870	Human Factors Psychology	3
Total Credit Hours		12

School of Supply Chain, Logistics & Maritime Operations

Overview

The School of Supply Chain, Logistics, and Maritime Operations offers an interdisciplinary curriculum to facilitate maritime-focused education in supply chain and logistics. Developed in collaboration with maritime supply chain partners throughout Coastal Virginia, the curriculum leverages the knowledge, skills, and strategic vision of world-class, industry-aligned faculty to ensure up-to-date insights and relevance for students transitioning to and from the practitioner world.

The interdisciplinary nature of this program allows students to seamlessly integrate their learning journey with specializations in industry 4.0, maritime and military defense logistics, port and ship operations, cybersecurity, data science, and supply chain informatics/analytics, among others.

Programs

Master's Degrees

- Maritime Trade and Supply Chain Management (MS) (p. 386)

Certificates

- Artificial Intelligence (AI) in Supply Chain Operations Certificate (p. 387)
- Maritime, Ports, and Logistics Management Certificate (p. 387)
- Supply Chain Management Certificate (p. 388)

Master of Science

Maritime Trade and Supply Chain Management (MS)

Dr. Rafael Diaz, Graduate Program Coordinator

The Master of Maritime Trade and Supply Chain Management is a maritime-focused graduate program that provides managers and supply chain professionals the opportunity to expand their knowledge, update their skill sets, and enhance their work with supply chain partners, transportation carriers, shippers, sourcing agents, warehouse managers, as well as third parties and governments directly or indirectly involved in the movement of cargo and material flow. The **30-credit hour** program requires critical thinking and investigation, all while gaining hands-on experience with industry partners. *This program is available on-campus and online.*

The MS in *Maritime Trade and Supply Chain Management* provides a comprehensive and interdisciplinary education through its core courses, electives, and capstone experience. Core classes establish a strong foundation in supply chain principles along the plan-source-make-deliver cycle, while *also* offering specialized insights into maritime trade dynamics and port efficiency. Cutting-edge advancements transforming supply chains are also explored as a core class. The interdisciplinary nature of the program offers a diverse pool of classes to choose as electives - from *analytics*, *industry 4.0*, and *maritime logistics* to *sustainability* and *public procurement*, among others. The program culminates in a *capstone* course, where students apply their knowledge to real-world challenges, ensuring they graduate with both theoretical expertise and practical problem-solving abilities.

Admission Requirements

Prospective students may apply for admission to the program for the fall, spring, and summer semesters. We welcome applicants who have earned bachelor's degrees from accredited institutions. Admission to the program is competitive and is granted only to those who show high ability and likely success in graduate study. Successful applicants will stand well above the average in most of the criteria used to measure graduate student promise.

To be considered for admission, students must submit the following:

- A bachelor's degree from a regionally-accredited university in the U.S. or an equivalent foreign institution;
- Official copies of transcripts of all colleges and universities attended;
- Two letters of recommendation from individuals familiar with the applicant's professional and/or academic background;
- A current resume;
- A statement of professional goals;
- Completion of GRE or GMAT; a waiver may be available for those who already have successfully completed a graduate degree or certificate, or those who have an undergraduate GPA ≥ 3.0 , or those who have taken the prerequisite course(s) determined and approved by the director of the program; and,
- English language requirements: TOEFL (IBT): 79, TOEFL (paper-based): 550, IELTS: 6.5 for those whose native language is not English (waived if an applicant has earned a college degree from an institution in an English-speaking country).

Students may be considered for conditional admission. Contact the Graduate Program Director for more information.

Application Deadlines

Fall Semester

Domestic Students - June 15th

International Students - May 15th

Spring Semester

Domestic Students - November 1st

International Students - October 1st

Curriculum Requirements

The program has been designed to address the advanced educational needs of students and employers in the area of maritime trade and supply chain studies. This proposed program consists of 30 credit hours: five core courses (15 credit hours), four electives (12 credit hours), and one capstone course (3 credit hours).

Core Courses

SCLM 550	Supply Chain 4.0 Technologies and Innovations	3
SCLM 630	Strategic Sourcing and Procurement	3
SCLM 641	Supply Chain Management and Logistics	3
PORT 611	International Maritime Transport	3
PORT 612	Port Operations and Management	3

Approved Electives (CHOOSE 4) 12

Electives must be approved in advance by the Graduate Program Coordinator **

BNAL 503	Data Visualization and Exploration	3
BNAL 507	Prescriptive Analytics of Management Science	3
BNAL 515	Advanced Business Analytics/Big Data Applications	3
BNAL 532	Predictive Analytics for Business	3
BNAL 721	Simulation Modeling for Business and Supply Chain Systems	3
CS 522	Introduction to Machine Learning	3
CS 580	Introduction to Artificial Intelligence	3
CS 733	Natural Language Processing	3
CYSE 530	Introduction to Cybersecurity Risk Management	3
CYSE 531	Advanced Techniques Cybersecurity Risk Management	3
CYSE 600	Cybersecurity Principles	3
ENMA 625	Introduction to Homeland Security Logistics	3
ENMA 724	Risk Analysis	3

IT 564	Essentials of Project Management	3
IT 650	Database Management Systems	3
IT 651	Business Intelligence	3
IT 660	Digitalizing Enterprises	3
PORT 613	International Maritime and Admiralty Law	3
PPCM 718	Public Sector Contract Administration	3
PPCM 726	Introduction to Public Procurement	3
PPCM 728	Public Sector Contract Planning and Formation	3
PADM 714	Public-Private Partnerships	3
PADM 734	Negotiation and Dispute Resolution	3
PORT 617	Transportation Management	3
SCLM 515	Maritime and Supply Chain Safety and Security	3
SCLM 519	Maritime and Supply Chain Risk and Insurance	3
SCLM 542	Supply Chain and Maritime Intelligence	3
SCLM 561	Warehousing, Distribution and Material Management	3
SCLM 572	Vessel Fleet Operations	3
SCLM 573	Inland Waterways and Dredging Operations	3
SCLM 574	Shipbuilding and Ship Repair Logistics	3
SCLM 581	Freight Brokerage and 3PL Services	3
SCLM 586	Cruise Ship Operations	3
Capstone Course		
SCLM 690	Supply Chain, Logistics, and Maritime Capstone	3

** Electives must be approved by the Graduate Program Director.

*** Students are allowed to take PPCM 726, PPCM 718, or PPCM 728 with the approval of the director of the PPCM program and the Graduate Program Coordinator at the School of Supply Chain, Logistics, and Maritime Operations.

**** Students can take one of the three PPCM courses (PPCM 726, PPCM 718, or PPCM 728) as an approved elective to be applied to the degree work.

Additional Requirements

Continuance

To remain in good standing after admission to the program, students must maintain a minimum, cumulative grade point average of 3.0 in all graduate course work attempted at the University. Students who fall below this minimum standard will have 12 credit hours to remedy this deficiency.

Additionally, students may earn no more than 2 courses with a grade of C or lower. Further, any student receiving a failing grade (F) in a course will be dismissed from the program.

Financial Assistance

Financial aid is available to graduate students at Old Dominion University. Financial aid may be available in the form of University fellowships, tuition grants, and research assistantships. In addition to the financial aid offered by the University, graduate students may be eligible for aid and student loans administered by other agencies. For information about part-time employment, scholarships, and student loans, contact the Office of Student Financial Aid.

For information and forms concerning application, contact:
Admissions Office
Old Dominion University
Norfolk, VA 23529
Phone: (757) 683-3685

For information concerning financial aid, contact:
Office of Student Financial Aid
Old Dominion University
Norfolk, VA 23529
Phone: (757) 683-3683

Certificate

Artificial Intelligence (AI) in Supply Chain Operations Certificate

The Graduate Certificate in Artificial Intelligence in Supply Chain Operations is designed to educate students on the application of machine learning algorithms to the systems, activities, and processes that are employed to move goods from the supplier to the end user. The application of automation and AI to logistics can ensure more resilient, adaptable and sustainable supply chains.

Admission Requirements

The following admission requirements will apply to all applicants. All students must:

- Submit a completed online application and the application fee.
- Submit transcripts of all undergraduate and graduate work from regionally accredited institutions.
- Have earned a baccalaureate degree from a regionally accredited institution of higher education, or international equivalent.

Applicants who have not earned a degree in the United States must also submit:

- Current scores on the Test of English as a Foreign Language (TOEFL), with a minimum score of 230 on the computer-based TOEFL or 80 on the TOEFL iBT.

Curriculum Requirements

The certificate is awarded based upon the student's successful completion of 12 credit hours of graduate level courses:

AI/CYSE 510	Artificial Intelligence (AI) Methods and Models	3
AI/PHIL 546	Artificial Intelligence (AI) Ethics and Policy	3
SCLM 550	Supply Chain 4.0 Technologies and Innovations	3
SCLM 641	Supply Chain Management and Logistics	3
AI Practicum *		0
Total Credit Hours		12

* AI 669/DASC 669

Certificate

Maritime, Ports, and Logistics Management Certificate

Dr. Rafael Diaz, Graduate Programs Coordinator

This certificate program is designed to help working maritime and port professionals develop and sharpen their maritime and port management skills. The program consists of four graduate courses that expose students to global maritime transport, port management (with a focus on shipbuilding and ship repair logistics), maritime and admiralty law, and maritime security and risk analysis.

Admission Requirements

Admission to the certificate program will require a bachelor's degree (or equivalent).

Curriculum Requirements

The certificate is awarded based upon the student's successful completion of 12 credit hours of graduate level courses in Ports and Maritime Management:

Required Courses

PORT 611	International Maritime Transport	3
PORT 613	International Maritime and Admiralty Law	3
Electives: Select two of the following:		6
PORT 612	Port Operations and Management	
SCLM 515	Maritime and Supply Chain Safety and Security	
SCLM 581	Freight Brokerage and 3PL Services	
Total Credit Hours		12

Certificate Supply Chain Management Certificate

Dr. Rafael Diaz, Graduate Program Coordinator

This certificate program is designed to help working supply chain professionals develop and enhance their supply chain management and leadership/planning skills. The program consists of four graduate courses that expose students to supply chain management and logistics, supply chain 4.0 and the superimposition of AI/ML, analytics, big data, and cybersecurity on supply chain processes, distribution center and material handling management, and strategic sourcing and supply management.

Admission Requirements

All applicants admitted to the certificate program must meet Old Dominion University requirements for graduate admission: an earned baccalaureate degree from a regionally-accredited institution or an equivalent degree from a foreign institution. Those whose native language is not English must satisfy any one of the following: a minimum score of 550 on the paper-based TOEFL, a 79 on the TOEFL IBT, an overall 6.5 or higher on the IELTS, a 150 on the GRE's verbal reasoning, a 480 on the GRE's verbal, a 480 on the SAT's critical reading, a 26 on the SAT's reading test, an O level pass in English for the GCSE or GCE, or a C or higher on the CPE.

Curriculum Requirements

The certificate is awarded based upon the student's successful completion of 12 credit hours of graduate level courses in Supply Chain Management.

For On-Campus Students & ODUGlobal Students

Required Courses		6
SCLM 630	Strategic Sourcing and Procurement	3
SCLM 641	Supply Chain Management and Logistics	3
Electives: Select two of the following:		
SCLM 519	Maritime and Supply Chain Risk and Insurance	
SCLM 542	Supply Chain and Maritime Intelligence	
SCLM 550	Supply Chain 4.0 Technologies and Innovations	
SCLM 561	Warehousing, Distribution and Material Management	
Total Credit Hours		12

The Graduate School

Web Site: <http://www.odu.edu/graduateschool> (<http://www.odu.edu/graduateschool/>)

Marisol P. Perez, Ph.D., Dean

TBD, Associate Dean

TBD, Director for Administration & Academic Services

Liz Smith, Director of Interdisciplinary Initiatives

Patricia Schiaffini-Vedani, Director of International Collaborations

2102 Monarch Hall, 757-683-4885

Laura Ray, Director, English Language Center

1108 Dragas Hall, 757-683-4424

Overview

One mission of the Old Dominion University Graduate School is to serve graduate students and graduate programs in an interdisciplinary framework that coordinates and optimizes available resources and enhances the visibility and value of graduate education across the region and world. The purpose of the Graduate School is to advocate for graduate students and graduate programs in a centralized manner so that policies and practices are consistently developed and applied across the academic colleges and schools. The work includes ongoing support for the university's forward-focused vision.

A second mission is to expand international collaborations via prestigious scholarships for undergraduates and graduate students, and support faculty who seek international teaching collaborations. Further, the English Language Center provides support for international recruiting, an intensive English language program for pre-matriculated students, an academic pathway program for conditionally admitted students (the Monarch English Transition Program), coursework for ODU students with interest in teaching multilingual students, and short-term contract programs focused on language and culture.

For more information regarding graduate programs or services, contact the Graduate School at 757-683-4885 or graduateschool@odu.edu.

Programs

Doctor of Philosophy Programs

- Biomedical Sciences with a Concentration in Bioelectrics (PhD) (p. 389)
- Biomedical Sciences with a Concentration in Bioinformatics and Genomics (PhD) (p. 390)
- Biomedical Sciences with a Concentration in Biological Chemistry (PhD) (p. 391)
- Biomedical Sciences with a Concentration in Microbiology and Immunology (PhD) (p. 393)
- Biomedical Sciences with a Concentration in One Health (PhD) (p. 394)
- Biomedical Sciences with a Concentration in Stem Cells and Regenerative Medicine (PhD) (p. 395)

Certificate Program

- Conservation Leadership Certificate (p. 396)
- Homeland Security Certificate (p. 397)

Doctor of Philosophy Biomedical Sciences with a Concentration in Bioelectrics (PhD)

Barbara Hargrave, Graduate Program Director

In this interdisciplinary program, students will master a broad range of basic biomedical science topics. Integration of the basic courses is reinforced by a rotation of laboratory experiences and by special seminars that highlight disciplinary interrelationships and approaches to biomedical research. The

student progresses from a core of basic courses to in-depth study of specific biomedical problems. This includes advanced doctoral courses and the doctoral research project. Under the guidance of the graduate faculty, the student will integrate knowledge from the broad spectrum of biomedical disciplines into their focus on an area of specialization.

The program graduate will be a scientist with a broad biomedical education and a demonstrated ability to carry out original and creative research, cognizant of disciplinary interfaces and implications and capable of pursuing and/or recommending continuing lines of study. They will be prepared to bridge the gap between practice and discovery in the art of medicine and the practice of science. The graduate is capable of serving in an industrial, governmental, or academic teaching or research setting, either independently or as a member of a team.

Admission

The requirements for admission to the biomedical sciences Ph.D. program are as follows:

1. A bachelor's degree from an accredited college or university with a B (3.00) average. Students with advanced degrees are encouraged to apply.
2. In addition to the University's English Language Proficiency Requirements, international applicants must have either a score of 84 on the TOEFL, with a score of 26 on the speaking portion, or an IELTS overall score of 8.
3. Prior training in biology (two years), calculus and/or statistics, and organic chemistry (one year). Additional courses in biology, chemistry, and physics are recommended.

Application Procedures

The completed application for the biomedical sciences Ph.D. program will include the following items:

1. Transcripts of coursework only from institutions awarding a bachelor's or master's degree.
2. A statement of personal goals and academic objectives.
3. Writing sample on a science related topic (from a course or from your research experience).
4. Resume listing all degrees earned and work experience.
5. Three letters of recommendation on letterhead, from faculty members at colleges attended who are familiar with the applicant's academic and research capabilities.
6. A completed application form.
7. Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS) test scores, sent directly from ETS to the ODU International Graduate Admissions Office. Test scores must accompany applications for non-native English speaking candidates with a degree issued outside of the United States.

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Students holding a bachelor's degree in another, related field, such as computer science, mathematics, or physics may need to take leveling courses in biological and chemical sciences or pursue master's level work in those fields. The Biological Sciences department and the Chemistry & Biochemistry department both offer master's degrees.

Financial Support

Sources of financial aid available to biomedical sciences Ph.D. students include:

1. Research and teaching assistantships
2. Students on research or teaching assistantships may be eligible for a tuition waiver.
3. Financial Aid

Curriculum Requirements

To accomplish the objectives of the program, the student:

1. Enrolls in the basic biomedical sciences courses to develop a broad foundation for more advanced course work and dissertation research;
2. Selects a concentration and completes the required advanced courses. Students choose the concentration with the selection of the mentor, which varies based on how they entered the program;
3. Completes at least 78 credit hours beyond the bachelor's degree or 50 to 51 credit hours beyond the master's degree;
4. Presents two seminars;
5. Candidacy Exam and Prospectus: Develops a written interdisciplinary research NIH style proposal based on preliminary and proposed research that is accepted by the student's committee. Successfully presents and passes an oral exam on the grant proposal and on coursework. The proposal must provide evidence of original and independent thinking.
6. Develops an interdisciplinary research proposal in NIH format that is accepted by the guidance committee;
7. Performs publishable research to demonstrate the ability to complete original and creative research projects; and
8. Prepares and successfully defends a dissertation.

Biomedical Sciences Core

Core Courses

BIOL 810	Advanced Cell Biology	3
BIOL 847	Responsible and Ethical Conduct of Research	3
BIOL 857	Statistics in Biology	4
BMS 899	Dissertation Research	6
CHEM 865	Advanced Biochemistry	3
HLSC 873	Planning Proposals and Developing Grants in Health Research	3
MDTS 850	Molecular Genetics, Gene Function and Genomics	3
Concentration Credits		13-14
Required Research Credits		12
BMS 898	Doctoral Research	
Total Credit Hours		50-51

Bioelectrics Concentration

BIOE 554	Introduction to Bioelectrics	3
BIOE 854	Advanced Bioelectrics	3
BIOE 855	Biomembranes and Ion Channels	3
Graduate Seminars		4
BIOE 890	Graduate Seminar *	
Total Credit Hours		13

* Two graded seminar courses required.

Electives

Optional elective courses require permission of dissertation committee.

Additional Requirements

Continuance

Students must maintain a 3.0 GPA and receive no more than one course grade of B- or lower to continue in the Ph.D. program. Students are also required to complete Responsible Conduct of Research training within their first 12 completed credit hours in the program.

Teaching

Students are required to successfully complete the GTAI Institute and teach at least one semester. International students or students where English is not their first language are required to either pass the SPEAK test or

demonstrate they have received a score of 26 or better on the speaking portion of their iBT TOEFL exam.

Exit Requirements

Students must complete the following in order to graduate:

1. Academic requirements - All core and concentration course requirements
2. Publication Research
3. Exit Survey

Doctor of Philosophy Biomedical Sciences with a Concentration in Bioinformatics and Genomics (PhD)

Barbara Hargrave, Graduate Program Director

In this interdisciplinary program, students will master a broad range of basic biomedical science topics. Integration of the basic courses is reinforced by a rotation of laboratory experiences and by special seminars that highlight disciplinary interrelationships and approaches to biomedical research. The student progresses from a core of basic courses to in-depth study of specific biomedical problems. This includes advanced doctoral courses and the doctoral research project. Under the guidance of the graduate faculty, the student will integrate knowledge from the broad spectrum of biomedical disciplines into their focus on an area of specialization.

The program graduate will be a scientist with a broad biomedical education and a demonstrated ability to carry out original and creative research, cognizant of disciplinary interfaces and implications and capable of pursuing and/or recommending continuing lines of study. They will be prepared to bridge the gap between practice and discovery in the art of medicine and the practice of science. The graduate is capable of serving in an industrial, governmental, or academic teaching or research setting, either independently or as a member of a team.

Admission

The requirements for admission to the biomedical sciences Ph.D. program are as follows:

1. A bachelor's degree from an accredited college or university with a B (3.00) average. Students with advanced degrees are encouraged to apply.
2. In addition to the University's English Language Proficiency Requirements, international applicants must have either a score of 84 on the TOEFL, with a score of 26 on the speaking portion, or an IELTS overall score of 8.
3. Prior training in biology (two years), calculus and/or statistics, and organic chemistry (one year). Additional courses in biology, chemistry, and physics are recommended.

Application Procedures

The completed application for the biomedical sciences Ph.D. program will include the following items:

1. Transcripts of coursework only from institutions awarding a bachelor's or master's degree.
2. A statement of personal goals and academic objectives.
3. Writing sample on a science related topic (from a course or from your research experience).
4. Resume listing all degrees earned and work experience.
5. Three letters of recommendation on letterhead, from faculty members at colleges attended who are familiar with the applicant's academic and research capabilities.
6. A completed application form.
7. Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS) test scores, sent directly

from ETS to the ODU International Graduate Admissions Office. Test scores must accompany applications for non-native English speaking candidates with a degree issued outside of the United States.

Applications must be completed online at <http://www.odu.edu/admission/graduate> (<http://www.odu.edu/admission/graduate/>) by the deadline posted on the website. The applicant is responsible for ensuring all application materials are received and the application is complete in all respects.

Students holding a bachelor's degree in another, related field, such as computer science, mathematics, or physics may need to take leveling courses in biological and chemical sciences or pursue master's level work in those fields. The Biological Sciences department and the Chemistry & Biochemistry department both offer master's degrees.

Financial Support

Sources of financial aid available to biomedical sciences Ph.D. students include:

1. Research and teaching assistantships
2. Students on research or teaching assistantships may be eligible for a tuition waiver.
3. Financial Aid

Curriculum Requirements

To accomplish the objectives of the program, the student:

1. Enrolls in the basic biomedical sciences courses to develop a broad foundation for more advanced course work and dissertation research;
2. Selects a concentration and completes the required advanced courses. Students choose the concentration with the selection of the mentor, which varies based on how they entered the program;
3. Completes at least 78 credit hours beyond the bachelor's degree or 50 to 51 credit hours beyond the master's degree;
4. Presents two seminars;
5. Candidacy Exam and Prospectus: Develops a written interdisciplinary research NIH style proposal based on preliminary and proposed research that is accepted by the student's committee. Successfully presents and passes an oral exam on the grant proposal and on coursework. The proposal must provide evidence of original and independent thinking.
6. Develops an interdisciplinary research proposal in NIH format that is accepted by the guidance committee;
7. Performs publishable research to demonstrate the ability to complete original and creative research projects; and
8. Prepares and successfully defends a dissertation.

Biomedical Sciences Core

Core Courses

BIOL 810	Advanced Cell Biology	3
BIOL 847	Responsible and Ethical Conduct of Research	3
BIOL 857	Statistics in Biology	4
BMS 899	Dissertation Research	6
CHEM 865	Advanced Biochemistry	3
HLSC 873	Planning Proposals and Developing Grants in Health Research	3
MDTS 850	Molecular Genetics, Gene Function and Genomics	3
Concentration Credits		13-14
Required Research Credits		12
BMS 898	Doctoral Research	
Total Credit Hours		50-51

Bioinformatics and Genomics Concentration

CS 823	Introduction to Bioinformatics	3
Select two of the following:		6
BDA 640	Genomic Data Science	
BIOL 801	Practical Computing for Biology	
BIOL 803	Advanced Genomics Data Analysis	
CHEM 881	Protein Bioinformatics and Functional Genomics	
CS 895	Topics in Computer Science	
MDTS 820	Genomic Databases: Content, Curation, and Application to Biomedical Research	
Graduate Seminars		4
BIOL 890	Biomedical Doctoral Seminar *	
Total Credit Hours		13

* Two graded seminar courses required.

Electives

Optional elective courses require permission of dissertation committee.

Additional Requirements

Continuance

Students must maintain a 3.0 GPA and receive no more than one course grade of B- or lower to continue in the Ph.D. program. Students are also required to complete Responsible Conduct of Research training within their first 12 completed credit hours in the program.

Teaching

Students are required to successfully complete the GTAI Institute and teach at least one semester. International students or students where English is not their first language are required to either pass the SPEAK test or demonstrate they have received a score of 26 or better on the speaking portion of their iBT TOEFL exam.

Exit Requirements

Students must complete the following in order to graduate:

1. Academic requirements - All core and concentration course requirements
2. Publication Research
3. Exit Survey

Doctor of Philosophy Biomedical Sciences with a Concentration in Biological Chemistry (PhD)

Barbara Hargrave, Graduate Program Director

In this interdisciplinary program, students will master a broad range of basic biomedical science topics. Integration of the basic courses is reinforced by a rotation of laboratory experiences and by special seminars that highlight disciplinary interrelationships and approaches to biomedical research. The student progresses from a core of basic courses to in-depth study of specific biomedical problems. This includes advanced doctoral courses and the doctoral research project. Under the guidance of the graduate faculty, the student will integrate knowledge from the broad spectrum of biomedical disciplines into their focus on an area of specialization.

The program graduate will be a scientist with a broad biomedical education and a demonstrated ability to carry out original and creative research, cognizant of disciplinary interfaces and implications and capable of pursuing

and/or recommending continuing lines of study. They will be prepared to bridge the gap between practice and discovery in the art of medicine and the practice of science. The graduate is capable of serving in an industrial, governmental, or academic teaching or research setting, either independently or as a member of a team.

Admission

The requirements for admission to the biomedical sciences Ph.D. program are as follows:

1. A bachelor's degree from an accredited college or university with a B (3.00) average. Students with advanced degrees are encouraged to apply.
2. In addition to the University's English Language Proficiency Requirements, international applicants must have either a score of 84 on the TOEFL, with a score of 26 on the speaking portion, or an IELTS overall score of 8.
3. Prior training in biology (two years), calculus and/or statistics, and organic chemistry (one year). Additional courses in biology, chemistry, and physics are recommended.

Application Procedures

The completed application for the biomedical sciences Ph.D. program will include the following items:

1. Transcripts of coursework only from institutions awarding a bachelor's or master's degree.
2. A statement of personal goals and academic objectives.
3. Writing sample on a science related topic (from a course or from your research experience).
4. Resume listing all degrees earned and work experience.
5. Three letters of recommendation on letterhead, from faculty members at colleges attended who are familiar with the applicant's academic and research capabilities.
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Students holding a bachelor's degree in another, related field, such as computer science, mathematics, or physics may need to take leveling courses in biological and chemical sciences or pursue master's level work in those fields. The Biological Sciences department and the Chemistry & Biochemistry department both offer master's degrees.

Financial Support

Sources of financial aid available to biomedical sciences Ph.D. students include:

1. Research and teaching assistantships
2. Students on research or teaching assistantships may be eligible for a tuition waiver.
3. Financial Aid

Curriculum Requirements

To accomplish the objectives of the program, the student:

1. Enrolls in the basic biomedical sciences courses to develop a broad foundation for more advanced course work and dissertation research;
2. Selects a concentration and completes the required advanced courses. Students choose the concentration with the selection of the mentor, which varies based on how they entered the program;

3. Completes at least 78 credit hours beyond the bachelor's degree or 50 to 51 credit hours beyond the master's degree;
4. Presents two seminars;
5. Candidacy Exam and Prospectus: Develops a written interdisciplinary research NIH style proposal based on preliminary and proposed research that is accepted by the student's committee. Successfully presents and passes an oral exam on the grant proposal and on coursework. The proposal must provide evidence of original and independent thinking.
6. Develops an interdisciplinary research proposal in NIH format that is accepted by the guidance committee;
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Biomedical Sciences Core

Core Courses		
BIOL 810	Advanced Cell Biology	3
BIOL 847	Responsible and Ethical Conduct of Research	3
BIOL 857	Statistics in Biology	4
BMS 899	Dissertation Research	6
CHEM 865	Advanced Biochemistry	3
HLSC 873	Planning Proposals and Developing Grants in Health Research	3
MDTS 850	Molecular Genetics, Gene Function and Genomics	3
Concentration Credits		13-14
Required Research Credits		12
BMS 898	Doctoral Research	
Total Credit Hours		50-51

Biological Chemistry Concentration

CHEM 847	Medical Biochemistry	3
Select two of the following:		6
CHEM 824	Bioinorganic Chemistry	
CHEM 844	NMR Spectroscopy	
CHEM 863	Mechanisms in Sensing and Signal Transduction	
CHEM 869	Nucleic Acids Biochemistry	
CHEM 875	Physical Biochemistry	
CHEM 891	Doctoral Seminar *	
Graduate Seminars		4
Total Credit Hours		13

* Two graded seminar courses required.

Electives

Optional elective courses require permission of dissertation committee.

Additional Requirements

Continuance

Students must maintain a 3.0 GPA and receive no more than one course grade of B- or lower to continue in the Ph.D. program. Students are also required to complete Responsible Conduct of Research training within their first 12 completed credit hours in the program.

Teaching

Students are required to successfully complete the GTAI Institute and teach at least one semester. International students or students where English is not their first language are required to either pass the SPEAK test or demonstrate they have received a score of 26 or better on the speaking portion of their iBT TOEFL exam.

Exit Requirements

Students must complete the following in order to graduate:

1. Academic requirements - All core and concentration course requirements
2. Publication Research
3. Exit Survey

Doctor of Philosophy Biomedical Sciences with a Concentration in Microbiology and Immunology (PhD)

Barbara Hargrave, Graduate Program Director

In this interdisciplinary program, students will master a broad range of basic biomedical science topics. Integration of the basic courses is reinforced by a rotation of laboratory experiences and by special seminars that highlight disciplinary interrelationships and approaches to biomedical research. The student progresses from a core of basic courses to in-depth study of specific biomedical problems. This includes advanced doctoral courses and the doctoral research project. Under the guidance of the graduate faculty, the student will integrate knowledge from the broad spectrum of biomedical disciplines into their focus on an area of specialization.

The program graduate will be a scientist with a broad biomedical education and a demonstrated ability to carry out original and creative research, cognizant of disciplinary interfaces and implications and capable of pursuing and/or recommending continuing lines of study. They will be prepared to bridge the gap between practice and discovery in the art of medicine and the practice of science. The graduate is capable of serving in an industrial, governmental, or academic teaching or research setting, either independently or as a member of a team.

Admission

The requirements for admission to the biomedical sciences Ph.D. program are as follows:

1. A bachelor's degree from an accredited college or university with a B (3.00) average. Students with advanced degrees are encouraged to apply.
2. In addition to the University's English Language Proficiency Requirements, international applicants must have either a score of 84 on the TOEFL, with a score of 26 on the speaking portion, or an IELTS overall score of 8.
3. Prior training in biology (two years), calculus and/or statistics, and organic chemistry (one year). Additional courses in biology, chemistry, and physics are recommended.

Application Procedures

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1. Transcripts of coursework only from institutions awarding a bachelor's or master's degree.
2. A statement of personal goals and academic objectives.
3. Writing sample on a science related topic (from a course or from your research experience).
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Financial Support

Sources of financial aid available to biomedical sciences Ph.D. students include:

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2. Students on research or teaching assistantships may be eligible for a tuition waiver.
3. Financial Aid

Curriculum Requirements

To accomplish the objectives of the program, the student:

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2. Selects a concentration and completes the required advanced courses. Students choose the concentration with the selection of the mentor, which varies based on how they entered the program;
3. Completes at least 78 credit hours beyond the bachelor's degree or 50 to 51 credit hours beyond the master's degree;
4. Presents two seminars;
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Biomedical Sciences Core

Core Courses		
BIOL 810	Advanced Cell Biology	3
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BIOL 857	Statistics in Biology	4
BMS 899	Dissertation Research	6
CHEM 865	Advanced Biochemistry	3
HLSC 873	Planning Proposals and Developing Grants in Health Research	3
MDTS 850	Molecular Genetics, Gene Function and Genomics	3
Concentration Credits		13-14
Required Research Credits		12
BMS 898	Doctoral Research	
Total Credit Hours		50-51

Microbiology and Immunology Concentration

BIOL 805	Advanced Microbiology	3
BIOL 845	Advanced Immunology	3

BIOL 840	Vaccinology	3
or BIOL 881	Autoimmunity and Transplantation	
Graduate Seminars		4
BIOL 890	Biomedical Doctoral Seminar *	
Total Credit Hours		13

* Two graded seminar courses required.

Electives

Optional elective courses require permission of dissertation committee.

Additional Requirements

Continuance

Students must maintain a 3.0 GPA and receive no more than one course grade of B- or lower to continue in the Ph.D. program. Students are also required to complete Responsible Conduct of Research training within their first 12 completed credit hours in the program.

Teaching

Students are required to successfully complete the GTAI Institute and teach at least one semester. International students or students where English is not their first language are required to either pass the SPEAK test or demonstrate they have received a score of 26 or better on the speaking portion of their iBT TOEFL exam.

Exit Requirements

Students must complete the following in order to graduate:

1. Academic requirements - All core and concentration course requirements
2. Publication Research
3. Exit Survey

Doctor of Philosophy Biomedical Sciences with a Concentration in One Health (PhD)

Barbara Hargrave, Graduate Program Director

In this interdisciplinary program, students will master a broad range of basic biomedical science topics. Integration of the basic courses is reinforced by a rotation of laboratory experiences and by special seminars that highlight disciplinary interrelationships and approaches to biomedical research. The student progresses from a core of basic courses to in-depth study of specific biomedical problems. This includes advanced doctoral courses and the doctoral research project. Under the guidance of the graduate faculty, the student will integrate knowledge from the broad spectrum of biomedical disciplines into their focus on an area of specialization.

The program graduate will be a scientist with a broad biomedical education and a demonstrated ability to carry out original and creative research, cognizant of disciplinary interfaces and implications and capable of pursuing and/or recommending continuing lines of study. They will be prepared to bridge the gap between practice and discovery in the art of medicine and the practice of science. The graduate is capable of serving in an industrial, governmental, or academic teaching or research setting, either independently or as a member of a team.

Admission

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1. A bachelor's degree from an accredited college or university with a B (3.00) average. Students with advanced degrees are encouraged to apply.
2. In addition to the University's English Language Proficiency Requirements, international applicants must have either a score of 84

on the TOEFL, with a score of 26 on the speaking portion, or an IELTS overall score of 8.

3. Prior training in biology (two years), calculus and/or statistics, and organic chemistry (one year). Additional courses in biology, chemistry, and physics are recommended.

Application Procedures

The completed application for the biomedical sciences Ph.D. program will include the following items:

1. Transcripts of coursework only from institutions awarding a bachelor's or master's degree.
2. A statement of personal goals and academic objectives.
3. Writing sample on a science related topic (from a course or from your research experience).
4. Resume listing all degrees earned and work experience.
5. Three letters of recommendation on letterhead, from faculty members at colleges attended who are familiar with the applicant's academic and research capabilities.
6. A completed application form.
7. Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS) test scores, sent directly from ETS to the ODU International Graduate Admissions Office. Test scores must accompany applications for non-native English speaking candidates with a degree issued outside of the United States.

Applications must be completed online at <http://www.odu.edu/admission/graduate> (<http://www.odu.edu/admission/graduate/>) by the deadline posted on the website. The applicant is responsible for ensuring all application materials are received and the application is complete in all respects.

Students holding a bachelor's degree in another, related field, such as computer science, mathematics, or physics may need to take leveling courses in biological and chemical sciences or pursue master's level work in those fields. The Biological Sciences department and the Chemistry & Biochemistry department both offer master's degrees.

Financial Support

Sources of financial aid available to biomedical sciences Ph.D. students include:

1. Research and teaching assistantships
2. Students on research or teaching assistantships may be eligible for a tuition waiver.
3. Financial Aid

Curriculum Requirements

To accomplish the objectives of the program, the student:

1. Enrolls in the basic biomedical sciences courses to develop a broad foundation for more advanced course work and dissertation research;
2. Selects a concentration and completes the required advanced courses. Students choose the concentration with the selection of the mentor, which varies based on how they entered the program;
3. Completes at least 78 credit hours beyond the bachelor's degree or 50 to 51 credit hours beyond the master's degree;
4. Presents two seminars;
5. Candidacy Exam and Prospectus: Develops a written interdisciplinary research NIH style proposal based on preliminary and proposed research that is accepted by the student's committee. Successfully presents and passes an oral exam on the grant proposal and on coursework. The proposal must provide evidence of original and independent thinking.
6. Develops an interdisciplinary research proposal in NIH format that is accepted by the guidance committee;
7. Performs publishable research to demonstrate the ability to complete original and creative research projects; and
8. Prepares and successfully defends a dissertation.

Biomedical Sciences Core

Core Courses

BIOL 810	Advanced Cell Biology	3
BIOL 847	Responsible and Ethical Conduct of Research	3
BIOL 857	Statistics in Biology	4
BMS 899	Dissertation Research	6
CHEM 865	Advanced Biochemistry	3
HLSC 873	Planning Proposals and Developing Grants in Health Research	3
MDTS 850	Molecular Genetics, Gene Function and Genomics	3
Concentration Credits		13-14
Required Research Credits		12
BMS 898	Doctoral Research	
Total Credit Hours		50-51

One Health Concentration

BIOL 837	Advanced One Health	3
BIOL 536	Infectious Disease Epidemiology	3
Select one of the following:		3
BIOL 540	Methods in Immunological Research	
BIOL 557	General Virology	
BIOL 570	Diseases that Changed our World	
BIOL 805	Advanced Microbiology	
BIOL 830	Emerging Infectious Diseases	
BIOL 832	GIS in the Life Sciences	
BIOL 840	Vaccinology	
BIOL 871	Vector-Borne Diseases	
BIOL 872	Modeling and Simulation in Life Sciences	
ENVH 520	Communicable Diseases	
ENVH 523	Vector-Borne Diseases and Their Control	
HLSC 876	Global Health	
ECON 535	Health Economics: A Global Perspective	
Graduate Seminars		4
BIOL 890	Biomedical Doctoral Seminar *	
Total Credit Hours		13

* Two graded seminar courses required.

Electives

Optional elective courses require permission of dissertation committee.

Additional Requirements

Continuance

Students must maintain a 3.0 GPA and receive no more than one course grade of B- or lower to continue in the Ph.D. program. Students are also required to complete Responsible Conduct of Research training within their first 12 completed credit hours in the program.

Teaching

Students are required to successfully complete the GTAI Institute and teach at least one semester. International students or students where English is not their first language are required to either pass the SPEAK test or demonstrate they have received a score of 26 or better on the speaking portion of their iBT TOEFL exam.

Exit Requirements

Students must complete the following in order to graduate:

1. Academic requirements - All core and concentration course requirements
2. Publication Research
3. Exit Survey

Doctor of Philosophy

Biomedical Sciences with a Concentration in Stem Cells and Regenerative Medicine (PhD)

Barbara Hargrave, Graduate Program Director

In this interdisciplinary program, students will master a broad range of basic biomedical science topics. Integration of the basic courses is reinforced by a rotation of laboratory experiences and by special seminars that highlight disciplinary interrelationships and approaches to biomedical research. The student progresses from a core of basic courses to in-depth study of specific biomedical problems. This includes advanced doctoral courses and the doctoral research project. Under the guidance of the graduate faculty, the student will integrate knowledge from the broad spectrum of biomedical disciplines into their focus on an area of specialization.

The program graduate will be a scientist with a broad biomedical education and a demonstrated ability to carry out original and creative research, cognizant of disciplinary interfaces and implications and capable of pursuing and/or recommending continuing lines of study. They will be prepared to bridge the gap between practice and discovery in the art of medicine and the practice of science. The graduate is capable of serving in an industrial, governmental, or academic teaching or research setting, either independently or as a member of a team.

Admission

The requirements for admission to the biomedical sciences Ph.D. program are as follows:

1. A bachelor's degree from an accredited college or university with a B (3.00) average. Students with advanced degrees are encouraged to apply.
2. In addition to the University's English Language Proficiency Requirements, international applicants must have either a score of 84 on the TOEFL, with a score of 26 on the speaking portion, or an IELTS overall score of 8.
3. Prior training in biology (two years), calculus and/or statistics, and organic chemistry (one year). Additional courses in biology, chemistry, and physics are recommended.

Application Procedures

The completed application for the biomedical sciences Ph.D. program will include the following items:

1. Transcripts of coursework only from institutions awarding a bachelor's or master's degree.
2. A statement of personal goals and academic objectives.
3. Writing sample on a science related topic (from a course or from your research experience).
4. Resume listing all degrees earned and work experience.
5. Three letters of recommendation on letterhead, from faculty members at colleges attended who are familiar with the applicant's academic and research capabilities.
6. A completed application form.
7. Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS) test scores, sent directly from ETS to the ODU International Graduate Admissions Office. Test scores must accompany applications for non-native English speaking candidates with a degree issued outside of the United States.

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on the website. The applicant is responsible for ensuring all application materials are received and the application is complete in all respects.

Students holding a bachelor's degree in another, related field, such as computer science, mathematics, or physics may need to take leveling courses in biological and chemical sciences or pursue master's level work in those fields. The Biological Sciences department and the Chemistry & Biochemistry department both offer master's degrees.

Financial Support

Sources of financial aid available to biomedical sciences Ph.D. students include:

1. Research and teaching assistantships
2. Students on research or teaching assistantships may be eligible for a tuition waiver.
3. Financial Aid

Curriculum Requirements

To accomplish the objectives of the program, the student:

1. Enrolls in the basic biomedical sciences courses to develop a broad foundation for more advanced course work and dissertation research;
2. Selects a concentration and completes the required advanced courses. Students choose the concentration with the selection of the mentor, which varies based on how they entered the program;
3. Completes at least 78 credit hours beyond the bachelor's degree or 50 to 51 credit hours beyond the master's degree;
4. Presents two seminars;
5. Candidacy Exam and Prospectus: Develops a written interdisciplinary research NIH style proposal based on preliminary and proposed research that is accepted by the student's committee. Successfully presents and passes an oral exam on the grant proposal and on coursework. The proposal must provide evidence of original and independent thinking.
6. Develops an interdisciplinary research proposal in NIH format that is accepted by the guidance committee;
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Biomedical Sciences Core

Core Courses

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CHEM 865	Advanced Biochemistry	3
HLSC 873	Planning Proposals and Developing Grants in Health Research	3
MDTS 850	Molecular Genetics, Gene Function and Genomics	3

Concentration Credits 13-14

Required Research Credits 12

BMS 898	Doctoral Research	

Total Credit Hours 50-51

Stem Cells and Regenerative Medicine Concentration

MDTS 830	Chromosome Biology and Human Disease	3
MDTS 840	Stem Cells: Biology and Therapy	3
BIOL 525	Cancer Biology	3
or MDTS 842	Tissue Engineering	

Graduate Seminars 4

MDTS 891 Doctoral Seminar

Total Credit Hours 13

* Two graded seminar courses required.

Electives

Optional elective courses require permission of dissertation committee.

Additional Requirements

Continuance

Students must maintain a 3.0 GPA and receive no more than one course grade of B- or lower to continue in the Ph.D. program. Students are also required to complete Responsible Conduct of Research training within their first 12 completed credit hours in the program.

Teaching

Students are required to successfully complete the GTAI Institute and teach at least one semester. International students or students where English is not their first language are required to either pass the SPEAK test or demonstrate they have received a score of 26 or better on the speaking portion of their iBT TOEFL exam.

Exit Requirements

Students must complete the following in order to graduate:

1. Academic requirements - All core and concentration course requirements
2. Publication Research
3. Exit Survey

Certificate Conservation Leadership Certificate

This interdisciplinary certificate in Conservation Leadership was developed, and is implement by Old Dominion University, in collaboration with the U.S. Fish and Wildlife Service (USFWS) as a part of a long-term, sustainable program of conservation-related service-learning, internships, and leadership programs. The certificate will facilitate the development of the next generation of professionals who can address the challenges for conservation posed by a changing climate and sea level rise.

Curriculum Requirements

The certificate requires four core courses (3 credit hours each) and one elective (3 credit hours). One of the core courses is a mentored internship, preferably at a USFWS or related facility. A unique aspect of this certificate is the requirement to take one course (3 credit hours) that is designated as a service-learning course in which the student will be engaged in a project at a USFWS (or related) facility.

Required Courses

BIOL/OEAS 566	Introduction to Mitigation and Adaptation	3
BIOL/OEAS 567	Sustainability Leadership	3
OEAS 658	Participatory and Agent-Based Modeling, Simulation, and Visualization	3
CL 668	Internship in Conservation Leadership	3

Electives

Select one of the following: 3-5

BIOL 504	Conservation Biology and Sustainable Development	
BIOL 545	Community Ecology	
BIOL 732	GIS in the Life Sciences	
COMM 600	Intercultural Communication: History, Theory and Application	

HLSC 778	Global Environmental Health	
POLS 555	The Politics of Climate Change	
PHIL 542	Studies in Applied Ethics	
Total Credit Hours		15-17

Certificate

Homeland Security Certificate

The ODU Graduate School offers a Graduate Certificate in Homeland Security. Designed to familiarize individuals with today's and tomorrow's homeland security challenges, the certificate program provides a multi-disciplinary, educational foundation in a broad range of homeland security issues and fosters an environment for information interchange, cooperation, and collaboration across governmental, business, non-profit, academic, and military organizations.

The Homeland Security Graduate Certificate Program is designed to provide knowledge useful in the development and improvement of organizational processes related to avoiding, preparing for, managing and recovering from major security-related problems. The certificate allows students to draw courses from several colleges of the University to tailor a program particularly suited for their needs.

Designed for career professionals in many aspects of public service including law enforcement, port operations and emergency management, this certificate will serve those who wish to pursue a homeland security option as part of their professional development or as a step towards a Master's Degree in Public Administration.

The Graduate Certificate in Homeland Security will be offered in face-to-face, online, and hybrid formats.

Admission Requirements

All degree-seeking applicants admitted to the certificate program must meet ODU requirements for graduate admission: an earned baccalaureate degree from a regionally-accredited institution or an equivalent degree from a foreign institution. Those whose native language is not English must submit a minimum score of 230 on the computer-based TOEFL or 80 on the TOEFL iBT.

Non-degree seeking students are required to have these same credentials, though documentation is not required. Ultimately, students must apply to the program in order to obtain the certificate.

Curriculum Requirements

Required Courses

ENMA 625	Introduction to Homeland Security Logistics	3

Electives

Select three of the following:		9

GEOG 573	Geographic Information Systems for Emergency Management
CYSE 600	Cybersecurity Principles
CYSE 605	Leadership and Management in Cybersecurity
PADM 712	Emergency Management and Policy
ENMA 724	Risk Analysis

Total Credit Hours		12

Continuing Education

Web Site: <http://www.odu.edu/cepd> (<http://www.odu.edu/cepd/>)

Renee Felts, Associate Vice President, Continuing Education
Robert Doherty, Director, Continuing Education

Continuing Education is focused on delivering practical, applied knowledge through its non-credit, and credit-bearing courses, certificates and certification preparatory classes. Staff interact with each of the academic colleges to utilize the existing courses in an interdisciplinary fashion, frequently at the request of the military, businesses and various industry sectors.

Mission

Continuing Education will meet the evolving needs of our local, regional and global community via online and face-to-face offerings. We help students, professional and lifelong learners move ahead and stay ahead.

Vision

Continuing Education will seek to add value to University programs by engaging with students, faculty, and alumni to help achieve their personal and professional goals.

Prior Learning Assessment

The Prior Learning Assessment unit awards Credit for Prior Learning (CPL) and offers students the opportunity to have their prior learning assessed and applied for academic credit. Visit odu.edu/prior-learning-assessment for more information.

Programs

Certificate Programs

- Public Sector Leadership Certificate (p. 402)

Center for Professional Development

The primary mission of the Center for Professional Development (CPD) is to develop interdisciplinary certificate programs targeted for specific groups of professionals. The CPD will work across the ODU campus, including all academic colleges as well as ODUGlobal, in developing new multidisciplinary certificates.

Non-Credit Continuing Education Programs

Hospitality Management Programs

XHSP 3000- Hospitality Management Certificate- The Hospitality Management Certificate is broken down into 3 Courses that each contain 4 Modules and last 4 weeks. The courses include Sales & Marketing, Hotel Operations, and Personnel & Financial Management. The content includes an explanation of both the management and operational functions of lodging operations, an overview of the history and challenges of the lodging industry, identifies traits and behaviors of successful lodging leaders, gives a strong base for revenue management, labor and operational budgeting, safety and security, and an exploration of the future of the industry.

Health Science Programs

XCMA 2000- Certified Medical Assistant- Our program includes three in-demand healthcare certifications: Clinical Medical Assistant, EKG Technician and Phlebotomy Technician. The program combines convenient online course with in-person clinical experience supervised by health professionals. In as little as five months, students are prepared to sit for nationally recognized exams through the National Health Career Association.

XMBC 3000- Medical Billing and Coding- This program includes two in-demand healthcare certifications: Certified Professional Biller (CPB) and Certified Professional Coder (CPC). Throughout the 30-week online course, students will learn about health insurance, billing principles, medical

terminology, medical records, and professional coding services for medical providers, along with job preparation guidance. The program is taught by industry experts from the credentialing body, AAPC, and includes textbooks, practice exams, certification exams, real-world practice software, and career services.

XHLC 2060- Dental Assistant- The Dental Assistant program enables learners to embark on a career in dental healthcare by providing the essential knowledge and skills needed to prepare for the Registered Dental Assistant (RDA) certification examination. Included in this course is the Registered Dental Assistant (RDA) certification.

XHLC 2080- Sterile Processing Technician- The Sterile Processing Technician program equips you for employment in surgical environments across a range of settings, including hospitals, surgical centers, clinics, and other medical facilities. Included in this course is the Certified Registered Central Services Technician (CRCST) certification.

XHLC 2090- Behavior Technician and the Medical Office- The Behavior Technician and Medical Office dual-certification training course offers a comprehensive curriculum that encompasses both front office skills and expertise in working within the behavioral health field. Included in this program are the Registered Behavior Technician (RBT) and Certified Medical Administrative Assistant (CMAA) certifications.

XHLC 2100- Behavior Technician Specialist- The Behavior Technician Specialist certification enables you to conduct individual patient sessions and provide behavior analysis services, all supervised by a licensed Board Certified Behavior Analyst (BCBA). Included in this course is the Registered Behavior Technician (RBT) certification.

XHLC 2110- Allied Healthcare Professional- The Allied Healthcare Professional program serves as a gateway into the healthcare sector, integrating the expertise of pharmacy technician, electronic health records management, billing and coding, and medical office administration. Included in this program are the CMAA (Certified Medical Administrative Assistant), CEHRS (Certified Electronic Health Records Specialist, CPhT (Certified Pharmacy Technician Certification), and MCBC (Medical Coder & Biller Certification) certifications.

XHLC 2120- Electronic Health Records Specialist- The Electronic Health Records Specialist program prepares individuals for healthcare careers by offering thorough training in the management of electronic health records. Included in this course is the CEHRS (Certified Electronic Health Records Specialist) certification.

XHLC 2150- Health Unit Coordinator- The Health Unit Coordinator program equips individuals to excel in coordinating healthcare units, imparting the essential skills and knowledge needed for efficient administration within healthcare environments. Included in this program are the Certified Health Unit Coordinator (CHUC) and Certified Electronic Health Records Specialist (CEHRS) certifications.

XHLC 2180- Medical Front Office Administration Specialist- The Medical Front Office Administrative Specialist program offers an ideal introduction to the front office setting within the healthcare industry. Included in this course is the Certified Medical Administrative Assistant (CMAA) certification.

XHLC 2190- Medical Front Office and Electronic Health Records- The Medical Front Office and Electronic Health Records program prepares individuals for proficient management of patient data, essential handling of health records, medical office procedures, and other critical aspects of healthcare roles. Included in this program are the Certified Medical Administrative Assistant (CMAA) and Certified Electronic Health Records Specialist (CEHRS) certifications.

XHLC 2200- Medication Care Coordinator- The Medication Care Coordinator program readies participants to offer outstanding assistance within a pharmacy context, emphasizing the importance of seamless service and optimal patient engagement. Included in this program are the Certified Pharmacy Technician (CPhT) and Certified Medical Administrative Assistant (CMAA) certifications.

XHLC 2210- Medical Front Office Assistant and Administration

Specialist- The Medical Front Office Assistant and Administrative Specialist program unveils the pathway for individuals to embark on a promising journey within the administrative realm of the healthcare industry, focusing on the critical roles at the front office. Included in this program are the Medical Coder and Biller Certification (MCBC) and Certified Medical Administrative Assistant (CMAA) certifications.

XHLC 2230- Pharmacy Technician Professional (ASHP/ACPE)- The Pharmacy Technician Professional program provides practical skills crucial for employment in pharmacies, including the management of medication orders and customer assistance, all within this ASHP/ACPE Accredited curriculum.

XHLC 2240- Pharmacy Technician Specialist- The Pharmacy Technician Specialist program imparts essential skills in managing medications and providing support in pharmacy environments, equipping students with the expertise needed for professional success. Included in this course is the Certified Pharmacy Technician (CPhT) certification.

XHLC 2250- NASM Personal Trainer & Nutrition Coach- The NASM Personal Trainer and Nutrition Coach program prepares participants for a fulfilling journey into the growing fields of fitness and nutrition, setting the stage for a rewarding career in health and wellness. Included in this program are the Certified Personal Trainer (CPT) and Certified Nutrition Coach (CNC) certifications.

XHLC 2260- Mental Health Support Specialist- The Mental Health Support Specialist program offers specialized training to assist psychiatrists, therapists, and clients in the care and management of mental health and substance use disorders, contributing valuable skills to support healing and recovery processes. Included in this course is the Mental Health Technician Certified (MHTC) certification.

XHLC 2270- Mental Health Support Professional- The Mental Health Support Professional program delivers a thorough education designed to jump start a career in the mental health field, with a special focus on the utilization and management of electronic health records to enhance patient care. Included in this program are the Mental Health Technician Certified (MHTC) and Certified Electronic Health Records Specialist (CEHRS) certifications.

Registered Play Therapy

The Registered Play Therapy Program provides professionals and students in the community with the opportunity to learn more about play therapy or to receive the training necessary to become a Registered Play Therapist (RPT). The Play Therapy program is offered as a series of eight (8) weekend workshops worth 19 continuing education hours each (16 contact CE's and 3 non-contact CE's). Individuals can attend one or all of the workshops. Old Dominion University is approved by the Association for Play Therapy to offer continuing education specific to play therapy (APT Approved Provider #08-234).

The Registered Play Therapy workshops are aligned with the guidelines established by the *Association for Play Therapy* and pertain to five main areas:

- Play Therapy History
- Play Therapy Seminal or Historically Significant Theories
- Play Therapy Skills and Methods
- Play Therapy Special Topics
- Cultural & Social Diversity

XPCL 4000-Workshop #1: Principles of Play Therapy- This workshop will provide information about the rationale, philosophy, history, and theoretical underpinnings specific to the application of play therapy with various populations and in different settings. Basic facilitation skills, specific goals, and the role of the play therapist will be explored and practiced in relation to specific theories and in terms of general process of play therapy.

XPCL 4010-Workshop #2: Expressive Arts in Play Therapy- The therapeutic power of selected games, structured activities and expressive arts will be explored as they pertain to play therapy. Techniques specific

to art, drama, children's literature, puppets, and music will be illuminated as ideal mediums through which children and adolescents express and heal themselves through the process of play therapy. Basic techniques and strategies for incorporating such tools and techniques will be described, demonstrated, and practiced.

XPCL 4005-Workshop #3: Games, Activities, and Narrative Techniques in Play Therapy- The therapeutic power of selected games, structured activities, and narrative techniques will be explored as they pertain to play therapy. Basic techniques and strategies for incorporating such tools and techniques will be described, demonstrated, and practiced.

XPCL 4015- Workshop #4: Systematic Interventions: Family Play Therapy and Filial Therapy- Fundamental, theoretical, and philosophical concepts related to systems theory and utilizing play therapy techniques in family counseling will be presented. Basic skills and methods to incorporate in family play therapy will be described, demonstrated, and practiced. In addition, methods will be covered illustrating how to implement filial therapy for parents to become healthy agents in their children's lives.

XPCL 4030- Workshop #5: Group Play Therapy: Play Therapy Skills and Methods in Group Work- Theoretical and philosophical concepts of Group Play Therapy with children, adolescents, and adults will be discussed. Group logistics, process, conflict resolution, and group facilitation skills will be described. Basic skills and methods to incorporate in group play therapy will be described, demonstrated, and practiced. In addition, multicultural and ethical considerations in group play therapy will be addressed.

XPCL 4025- Workshop #6: Play Therapy and Creative Interventions with Adolescents, Teens, and Adults- Research has indicated that play therapy is an effective treatment modality with people of all ages. This workshop will explore the process of play therapy and creative interventions when working with adolescents and adults. Basic skills and methods to incorporate in play therapy with adolescents and adults will be described, demonstrated, and practiced. Multicultural considerations and societal influences that specifically pertain to this population will also be addressed.

XPCL 4020- Workshop #7: Utilizing Sandtray in Play Therapy- Through experiential sand tray exercises and didactic methods, information about the rationale, history, and general application of sand tray in play therapy will be illustrated. Basic facilitation skills, theoretical constructs, and strategies for processing sand tray will be discussed, demonstrated, and practiced.

XPCL 4045- Workshop #8: Addressing Trauma, Grief, and Loss Through Play Therapy- This workshop will investigate specific issues faced by children, adolescents, and families affected by difficult environmental and systematic situations. The implications of trauma, grief, and loss as a result of abuse, crisis, death and divorce will be reviewed as they pertain to the process. The process of play, techniques, treatment plans and consultation procedures will also be explored. Skills and methods to incorporate play therapy techniques to address trauma, grief, and loss will be described, demonstrated, and practiced.

Business/Executive Development Programs**Executive Certificate in Financial Planning**

XEDC 1511- General Financial Planning Principles, Professional Conduct, and Regulation- This course examines basic financial planning concepts for developing client relationships; gathering, analyzing, and evaluating financial documents, statements, and other information; developing and communicating relevant recommendations to clients; implementing recommendations through the use of a financial planning team; and monitoring the financial plan on a periodic basis, all within CFP Board professional and regulatory standards. Students will develop a pragmatic perspective of the field of financial planning as they learn to analyze personal financial statements, understand time value of money concepts, explore education funding techniques, advise clients regarding the management of debt, apply behavioral finance concepts, gain an understanding of federal and state regulatory requirements, learn the ethical environment of financial planning and integrate the legal and economic aspects of financial planning within a practice.

XEDC 1512- Risk Management, Insurance, and Employee Benefits

Planning- This course explores fundamental insurance, annuity, and employee benefit concepts and products. Students will gain knowledge of the principles of risk and insurance; learn how to analyze and evaluate risk exposures; and understand the concepts of personal and business insurance for life, health, disability, long-term care and property insurance. Students will also develop perspectives regarding the integration of social insurance (e.g. Medicare, workers compensation) within the framework of financial planning. Equity-based compensation, non-qualified deferred compensation and other employee benefits will also be presented and discussed.

XEDC 1513- Investment Planning- This course examines the characteristics, uses and taxation of investment vehicles: stocks, bonds, cash and cash equivalents, promissory notes, guaranteed investment contracts, real estate, and alternative investments. Students will also develop an understanding of the various types of risk: systematic and unsystematic, purchasing power, interest rate, business, and financial risk. Students are introduced to quantitative investment concepts, measures of investment returns, bond and stock valuation concepts, investment theory, portfolio development and analysis, investment strategies, asset allocation, and asset pricing models.

XEDC 1514- Tax Planning- This course focuses on income tax fundamentals and calculations, tax accounting, characteristics and income taxation of business entities, basis, depreciation, and cost recovery concepts. The impact of the alternative minimum tax (AMT), passive activity, at-risk rules, charitable contributions and charitable deductions on a client's financial plan is also studied. Students will gain an understanding of the tax consequences of like-kind exchanges and the disposition of property and will learn how the loss of a spouse through death or divorce affects a client's tax status.

XEDC 1515- Retirement Savings and Income Planning- Students will be exposed to retirement needs analyses, types and characteristics of retirement plans, qualified plan rules and options, and provisions of tax-advantaged plans. The effects of ERISA on retirement plans is examined and the impact of Social Security on a client's retirement plan is also discussed. Students will gain an understanding of plan distribution options, rules, alternatives, and taxation, and will also explore key factors affecting plan selection for businesses and investment considerations for retirement plans.

XEDC 1516- Estate Planning- This course analyzes the various techniques and strategies used in developing estate plans based on client criteria and needs. Property titling, property transfer at death, gifting strategies, and sources of estate liquidity are discussed. Students will also gain insight on wills, probate, and the types, uses and taxation of trusts during estate planning.

XEDC 1517- Capstone: Financial Plan Development Course- Students participate in a case analysis and evaluation in which the following major areas of financial planning are integrated:

- General Financial Planning Principles, Professional Conduct, and Regulation
- Risk Management, Insurance, and Employee Benefits Planning
- Investment Planning
- Income Tax Planning
- Retirement Savings and Income Planning
- Estate Planning

SHRM Learning System

XEDC 1165- SHRM Learning System- The SHRM Learning System for SHRM-CP and SHRM-SCP includes five modules covering the comprehensive SHRM Body of Competency and Knowledge™ (SHRM BoCK™) so you'll learn everything you need for the SHRM-CP or SHRM-SCP exam. Study with learning modules that provide an in-depth exploration of the knowledge domains and behavioral competencies tested on the SHRM exams. SHRM Certified Professional (SHRM-CP™) and SHRM Senior Certified Professional (SHRM-SCP™) are the new standard for all HR professionals around the globe, as it is among the first HR certification that is focused on the practical, real-life information HR professionals need to

excel in their careers today, including behavioral competencies, knowledge and skills.

XEDC 1164- SHRM Essentials- The perfect course for managers who need to know basic HR concepts BEFORE disciplinary action is required and HR has to get involved. This program provides a broad overview of the human resource function. Key topic areas include: Essentials of HR Management, Employment Law, Effective Recruitment, Basics of Compensation, and Orienting and Training your employees.

Paralegal Certificate Program

XLGL 3010- Paralegal Certificate Program- This face-to-face offering is taught by an esteemed faculty of judges and attorneys. Students learn legal processes, court structure, interviewing, investigation, document preparation, file maintenance, correspondence, research, writing and analysis, as well as substantive topics of law, such as Tort Law, Contract Law and Civil Procedures. Students will be trained in online legal research with individual subscriptions to LexisNexis and Westlaw.

XLGL 3020- Paralegal Certificate Program, Self-Paced- The self-paced version of our Paralegal Certificate program is designed for students to study when convenient for them and can be done completely online. Students will be assigned their own attorney/judge liaison and learn legal processes, court structure, interviewing, investigation, document preparation, file maintenance, correspondence, research, writing and analysis, as well as substantive topics of law, such as Tort Law, Contract Law and Civil Procedures. Students will be trained in online legal research with individual subscriptions to LexisNexis and Westlaw.

Project Management and Lean Six Sigma Certificates

XLSS 5010- Lean Six Sigma Green Belt Certification- This program focuses on managing quality projects utilizing the fundamentals of Lean and Six Sigma methodologies. Lean topics include the concepts of the elimination of waste and reduction of cycle time in organizational processes. Six Sigma principles consist of problem solving techniques, data collection and analysis, reduction of process variation, process capability and control, and continual improvement.

XLSS 5040- Lean Six Sigma Black Belt Certification- Build upon the process improvement skills acquired during the Green Belt certification with our industry-leading Lean Six Sigma Black Belt certification. In just seven sessions over the course of two to three months, you'll master the tools to mentor Green Belts and other team members using real-world process improvement methods. Black belts leverage the tools and concepts in their lean six sigma "toolbox" to successfully lead projects that deliver meaningful results to the organization.

XITS 4100- Project Management Essentials- Project Management Essentials equips participants with the crucial skills needed to manage and direct projects successfully across various industries, ensuring effective leadership and organizational outcomes. This offering includes the following certification(s): Certified Associate in Project Management (CAPM)

XIPJ 5000- PMP Exam Preparation- Old Dominion University's Project Management Professional (PMP)® Exam Preparation course prepares you for the PMP® exam offered through the Project Management Institute (PMI®). The PMP® credential has become the most recognized certification in Project Management in the world and is considered the gold standard of PM qualifications. Recognized and demanded by organizations worldwide, the PMP® validates your competence to perform in the role of a project manager, leading and directing projects and teams. To earn your PMP® credential, you must meet the experience and education requirements, and pass the PMP® examination.

Professional Development Programs

XGEN 2060- Au Pair Career Development Strategies for Personal & Professional Success- This Au Pair weekend class will help you develop a successful plan for your personal and career goals. Become more aware of who you are and what you want in your life and career. This class will help you become more aware, competitive and employable in any part of the world by developing key soft skills.

Digital Career Programs

Cybersecurity

XCYS 2500- Cybersecurity Fundamentals- This course is designed to introduce participants to the critical field of cybersecurity, emphasizing the skills and knowledge needed to navigate the evolving threat landscape. It adopts a workshop format to ensure a comprehensive learning experience, incorporating a mix of lectures, case studies, and hands-on labs. The course aims to prepare learners for the ISACA Cybersecurity Fundamentals Certificate Exam by covering a wide range of topics, from cybersecurity principles and privacy to risk management and security architecture.

XCYS-3000 Cybersecurity Audit- The Cybersecurity Audit Certificate equips audit and assurance professionals with the necessary expertise to thrive in assessing cybersecurity processes, policies, and tools. It aids in fortifying organizational infrastructure against cyber threats. Additionally, this certificate offers IT risk professionals insights into cyber-related risks and strategies for mitigating them.

XCYS 3010- Cybersecurity Bootcamp- The Cybersecurity Bootcamp is a 24-week part-time program designed to prepare participants for careers in the fast-growing field of cybersecurity. It includes courses on fundamentals, advanced networking and cryptography, security operations and incident response, and certification preparation for the CompTIA Security+ exam. The program emphasizes hands-on learning through labs, projects, and a real-world capstone project, ensuring practical skills in areas like penetration testing, incident response, and secure network design. Participants receive unlimited career support, including resume assistance, interview preparation, and salary negotiation coaching. Graduates can pursue diverse roles in industries such as finance, healthcare, and technology with competitive salaries and job stability.

Digital Marketing Bootcamp

XDGM 2020- Digital Marketing Bootcamp- The Digital Marketing Bootcamp is a part-time Career Bootcamp that teaches the essential skills necessary to launch a digital marketing career. Learners will start with the fundamentals and progress through a variety of strategies and topics to solve complex marketing challenges within the evolving tech space.

Software Development Bootcamp

XSWD 2010- Software Development Bootcamp- 24 Week Part-Time- Over the course of 24 weeks, you will learn how to build, test, and deploy software applications using JavaScript on the client- (front-end) and server-side (back-end) of an application. Starting with fundamentals, you will quickly move into more complex programming concepts that are solidified through challenges, such as: pair programming, weekly projects, lab exercises, and code reviews. The projects that you create throughout the program will be used to build your portfolio, which will serve as a showcase of your work and be a valuable asset in your post-bootcamp job hunt. You will also receive time with a professional career mentor through one-on-one coaching sessions and bi-weekly workshops. In the final four weeks, you will work with a client and your classmates on a team to develop a real product. This is what we call your “capstone project”. At the end of the program, you will demonstrate your capstone project to an audience of hiring partners and tech community members at our Demo Day. This bootcamp part-time bootcamp is typically held during the weekday evenings and weekends.

Data Analytics Bootcamp

XDAB 2010- Data Science and Analytics Bootcamp, Extended Class- The Data Analytics Bootcamp is a part-time, flex, mentor-led, Career Bootcamp that covers a variety of tools used to drive and guide complex, big data-oriented decisions. Learners will become experts in analysis, cleaning, mining, synthesis, and decision-making in order to influence key decisions with an increasingly complex business environment.

UX/UI Design Bootcamp

XUIX 2010- UX/UI Design Bootcamp- The process for creating the outward facing appearance of a website or application is referred to as user interface (UI) design, while the process of gathering research and using data to inform design decisions is referred to as user experience (UX) design. In this program, you will learn both. Starting with the fundamentals, you

will quickly advance through topics of increasing complexity, applying creative problem-solving skills to design, and iterating on your designs based on research. You will learn how to defend your designs with data using performance metrics that you create. Lastly, you will leave this program knowing how to clearly implement every step of the design process, from concept to full-scale design prototypes.

General IT Related Programs

XITS 3400- AWS Cloud Foundations- AWS Academy Cloud Foundations is intended for students who seek an overall understanding of cloud computing concepts, independent of specific technical roles. It provides a detailed overview of cloud concepts, AWS core services, security, architecture, pricing, and support.

XITS 3410- AWS Solutions Architect- AWS Academy Solutions Architect is focused on the design of cost and performance optimized solutions. This is an ideal starting point for candidates with AWS Cloud or strong on-premises IT experience.

XITS 4000- IT Systems Support Specialist- Our online, asynchronous program is designed to equip you with the necessary skills and knowledge to become an IT Support Specialist. The program comprises multiple modules that cover essential topics such as technical support, hardware and operating systems, software, programming and databases, networking and storage, cybersecurity essentials, and cloud computing.

XITS 4020- Microsoft Office Specialist- The Microsoft Office Specialist program provides essential computer skills, along with training in business communication, etiquette, and problem-solving, covering a broad range of topics necessary for proficiency in the modern workplace. This offering includes the following certification(s): Microsoft Office Specialist (MOS)

XITS 4040- Red Hat Linux System Administrator I- The first of two courses covering the core system administration tasks needed to manage Red Hat Enterprise Linux servers Red Hat System Administration I is designed for IT professionals without previous Linux system administration experience. The course provides students with Linux administration competence by focusing on core administration tasks. This course also provides a foundation for students who plan to become full-time Linux system administrators by introducing key command-line concepts and enterprise-level tools. This course is the first of a two-course series that takes a computer professional without Linux system administration knowledge to become a fully capable Linux administrator.

XITS 4050- Red Hat Linux System Administrator II- Red Hat System Administration II is the second part of the RHCSA training track for IT professionals who have already attended Red Hat System Administration I. The course goes deeper into core Linux system administration skills in storage configuration and management, installation and deployment of Red Hat Enterprise Linux, management of security features such as SELinux, control of recurring system tasks, management of the boot process and troubleshooting, basic system tuning, and command-line automation and productivity. This course assumes that students have attended Red Hat System Administration I.

XITS 4070- Cybersecurity Analyst (CySA+)- The Cybersecurity Analyst program prepares participants for a profession in cybersecurity, with a focus on defensive tactics designed to protect organizations against emerging threats and vulnerabilities. This offering includes the following certification(s): CompTIA CySA+

XITS 4080- Ethical Hacker (PenTest+)- The Ethical Hacker program prepares participants for a cybersecurity career, focusing on offensive tactics designed to proactively defend organizations from potential threats and ensure their digital assets remain secure. This offering includes the following certification(s): CompTIA PenTest+

XITS 4160- IT Helpdesk Administrator- The IT Help Desk Administrator program serves as an ideal entry point into the IT field, concentrating on the development and upkeep of network systems for businesses and organizations, preparing participants for critical support roles. This offering includes the following certification(s): CompTIA Network+, CompTIA A+

XITS 4210- CompTIA Security+ Preparation- The new CompTIA Security+ (SY0-701) represents the latest and greatest in cybersecurity, covering the most in-demand skills related to current threats, automation, zero trust, IoT, risk – and more. Once certified, you’ll understand the core skills needed to succeed on the job – and employers will notice too. The Security+ exam verifies you have the knowledge and skills required to: Assess the security posture of an enterprise environment and recommend and implement appropriate security solutions. Monitor and secure hybrid environments, including cloud, mobile, Internet of Things (IoT), and operational technology. Operate with an awareness of applicable regulations and policies, including principles of governance, risk, and compliance. Identify, analyze, and respond to security events and incidents. CompTIA Security+ is compliant with ISO 17024 standards and approved by the U.S. DoD to meet Directive 8140.03M requirements.

XCLO-2000 Cloud Fundamentals- The Cloud Fundamentals Certificate program is designed to help students learn essential cloud computing principles, covering concepts, governance, security, and service support. Explore how the cloud facilitates remote connection of critical services and data, enabling businesses globally to pursue digital transformation and enhance agility.

XDAT-2000 Data Science Fundamentals

With the Data Science Fundamentals Certificate, you’ll showcase your comprehension of vital data analysis principles and techniques for leveraging data in guiding strategic business choices. You’ll be able to articulate data attributes, classifications, applications, and frameworks, delineate various data management systems, and discuss fundamental principles and protocols of data governance.

XITA-2000 IT Audit Fundamentals- The IT Audit Fundamentals Certificate establishes a groundwork of knowledge and expertise essential for a successful career as an IT auditor. It encompasses fundamental audit principles, effective control utilization for conducting objective audits, and the hands-on application of audit principles in real-world scenarios.

XITR-2000 IT Risk Fundamentals- The IT Risk Fundamentals Certificate is designed for individuals seeking to gain insight into risk and information and technology (I&T)-related risk. It can be used as a pathway to the CRISC® certification.

XNET-2000 Networks and Infrastructure Fundamentals- Through the Networks and Infrastructure Fundamentals Certificate, you’ll bolster and validate your comprehension of network architecture, infrastructure, and components, along with mastering the foundational terminology of networking.

XISA-5000 Certified Information Systems Auditor® (CISA®)- Certified Information Systems Auditor® (CISA®) is globally recognized as the gold standard for auditing, monitoring, and evaluating IT and business systems. Earning a CISA certification demonstrates your expertise and ability to apply a risk-based approach to audit engagements. Registration includes Online Course, Review Manual, Certification Exam, QAE Database, and Student Membership.

XISM-5000 Certified Information Security Manager® (CISM®)- Certified Information Security Manager® (CISM®) validates your capacity to evaluate risks, establish robust governance, and proactively handle incidents. It emphasizes emerging technologies like AI and blockchain, ensuring your skillset aligns with evolving security challenges and industry standards. By addressing critical issues such as data breaches and ransomware attacks, CISM keeps IT professionals ahead of the curve.

XRIS-5000 Certified in Risk and Information Systems Control® (CRISC®)- The Certified in Risk and Information Systems Control® (CRISC®) certification will elevate your proficiency in Risk Management. By delving into a proactive strategy rooted in Agile methodology, you’ll acquire the skills to bolster your company’s resilience, provide value to stakeholders, and streamline Risk Management practices throughout the organization.

Certificate Public Sector Leadership Certificate

This certificate program is interdisciplinary in nature and is focused on organizational leadership within non-profit, military, governmental, and other public sector entities. Leadership theories, best practices, and competencies are addressed for students enrolled in this program. Four key competency areas within the scope of leadership are presented to those employed or seeking employment in military and other public organizations: financial management, strategic management, contracting principles, and network security.

Members of the Armed Forces in Hampton Roads requested this program in order to provide officers with enhanced knowledge and understanding of leadership components pertinent to public sector work. Graduates will be prepared to lead teams in contract negotiations, finance, and strategic initiatives. In addition, they will have a strong understanding of cyber security within this arena. The courses are ones that will meet the needs of both military and other public sector organizations.

Admission Requirements

All applicants admitted to the certificate program must meet ODU requirements for graduate admission: an earned baccalaureate degree from a regionally-accredited institution or an equivalent degree from a foreign institution. Those whose native language is not English must submit a minimum score of 230 on the computer-based TOEFL or 80 on the TOEFL iBT.

Curriculum Requirements

CYSE 600	Cybersecurity Principles	3
PADM 671	Public Budgeting and Financial Management	3
FOUN 722	Introduction to Applied Statistics and Data Analysis	3
PPCM 726	Introduction to Public Procurement	3
PADM 745	Managing Development and Change in Organizations	3
Total Credit Hours		15

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Li-Wu Chen, Ph.D., *Dean of the Joint School of Public Health*

Holly A. Handley, Ph.D., *Interim Dean of Interdisciplinary Schools*

Marisol P. Perez, Ph.D., *Dean of the Graduate School*

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JOHN ROTH, M.F.A., *Art*

HOLLY D. GAFF, Ph.D., *Biological Sciences*

CRAIG A. BAYSE, Ph.D., *Chemistry and Biochemistry*

SANDEEP KUMAR, Ph.D., *Civil and Environmental Engineering*

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JAMES D. BLANDO, Ph.D., *Epidemiology, Biostatistics, and Environmental Health*

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FRANK Y. LIU, Ph.D., *School of Data Science*

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VERONICA T. WATSON, Ph.D., *English*

DANIEL M. RUSSELL, Ph.D., *School of Exercise Science*

BRUCE RUBIN, Ph.D., *Finance*

BRIAN C. MARTIN, Ph.D., *Health Behavior, Policy, and Management (Interim)*

INGO HEIDBRINK, Ph.D., *History*

XIHE ZHU, Ph.D., *Human Movement Studies and Special Education*

WEIYONG ZHANG, Ph.D., *Information Technology and Decision Sciences*

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GORDON MELROSE, Ph.D., *Mathematics and Statistics*

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KUNTAL BHATTACHARYYA, Ph.D., *School of Supply Chain, Logistics, and Maritime Operations*

ANGELA L. ECKHOFF, Ph.D., *Teaching and Learning*

ELIZABETH GROENEVELD, Ph.D., *Women's and Gender Studies*

ELIZABETH C. BLACK, Ph.D., *World Languages and Cultures*

Faculty

Please see the A to Z directory on the ODU website for Faculty information: <https://www.odu.edu/directory> (<https://www.odu.edu/directory/>).

Faculty Emeriti

Faculty Emeriti

A

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John A. Adam, *University Professor Emeritus and Professor Emeritus of Mathematics & Statistics*

Clifford L. Adams, *Professor Emeritus of Physics**

Kimberly Adams Tufts, *Professor Emerita of Nursing*

Cephas J. Adkins, Jr., *Professor Emeritus of Psychology**

Abdel M. Agami, *Professor Emeritus of Accounting*

Ali Osman Akan, *Professor Emeritus of Civil and Environmental Engineering*

Robert "Bob" L. Ake, *University Professor Emeritus and Associate Professor Emeritus of Chemistry and Biochemistry*

William Gerald Akers, *Professor Emeritus of German Language and Literature**

Betty B. Alexy, *Associate Professor Emerita of Nursing*

Tami C. Al-Hazza, *Associate Professor Emerita of Teaching and Learning*

Dwight W. Allen, *Eminent Scholar Emeritus of Educational Reform and Professor Emeritus**

Claire J. Anderson, *Associate Professor Emerita of Management*

Eric E. Anderson, *Associate Professor Emeritus of Economics*

Michael C. Andrews, *Eminent Scholar Emeritus and Louis I. Jaffe Professor Emeritus of English*

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Robert L. Ash, *Eminent Scholar Emeritus and Professor Emeritus of Mechanical and Aerospace Engineering*

Steven K. Atiyah, *Assistant Professor Emeritus of Mathematics and Statistics**

Larry P. Atkinson, *Eminent Scholar Emeritus and Professor Emeritus of Ocean, Earth and Atmospheric Sciences**

Roy E. Aycock, *Professor Emeritus of English**

B

Howard W. Baeumler, *Associate Professor Emeritus of Mathematics**

Virginia S. Bagley, *Associate Professor Emerita of Biological Sciences**

Han P. Bao, *Professor Emeritus of Mechanical and Aerospace Engineering and Mitsubishi Kasei Professor Emeritus of Engineering Manufacturing*

Peter Stephen Barna, *Professor Emeritus of Mechanical Engineering and Mechanics**

Barbara R. Bartkus, *University Professor Emerita and Associate Professor Emerita of Management*

William S. Bartolotta, *Associate Professor Emeritus of Music*

David R. Basco, *Professor Emeritus of Civil and Environmental Engineering*

Deborah "Debbie" B. Bauman, *Assistant Dean Emerita of Health Sciences and Associate Professor Emerita of Dental Hygiene*

Nancy Topping Bazin, *Eminent Scholar Emerita and Professor Emerita of English*

Jacob Becher, *Associate Professor Emeritus of Physics*

William W. Beck, *Professor Emeritus of Civil Engineering Technology**

Walter Herman Bell, Sr., *Professor Emeritus of French Language and Literature**

Charles E. Bell, Jr., *Professor Emeritus of Chemistry and Biochemistry**

Richardean S. Benjamin, *Associate Dean Emerita, College of Health Sciences, and Associate Professor Emerita of Nursing*

Linda K. Bennington, *Clinical Associate Professor Emerita of Nursing*

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Richard Hugh Bigelow, *Professor Emeritus of Civil Engineering**

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Thomas W. Blossom, *Professor Emeritus of History**

Kathryn W. Boone, *Librarian III Emerita*

Darwin F. Bostick, *Associate Professor Emeritus of History (posthumous)**

Nicholas G. Bountress, *Professor Emeritus of Communication Disorders and Special Education*

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Wayne E. Bowman, *Associate Professor Emeritus of English**

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Violet Breneiser, *Assistant Professor Emerita of Foreign Languages & Literatures**

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Dana D. Burnett, *Professor of Practice Emeritus of Educational Foundations and Leadership*

Carroll "C.J." M. Butler, *Master Lecturer Emeritus of Communication Disorders and Special Education*

C

James Van Dyck Card, *Professor Emeritus of English**

Dianne C. Carmody, *University Professor Emerita and Associate Professor Emerita of Sociology and Criminal Justice*

Leslie G. Carr, *Associate Professor Emeritus of Sociology and Criminal Justice**

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D

Ram C. Dahiya, *Eminent Scholar Emeritus and Professor Emeritus of Mathematics and Statistics*

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Ralph deBedts, *Professor Emeritus of History**

Dianne DeBeixedon, *Associate Professor Emerita of Art*

Charles M. DeHority, *Professor Emeritus of Management**

David E. Delzell, *Professor Emeritus of Biological Sciences**

Ayodeji "Deji" O. Demuren, *Professor Emeritus of Mechanical and Aerospace Engineering*

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Gail K. Dickinson, *Professor Emerita of STEM Education and Professional Studies*

Terry L. Dickinson, *Professor Emeritus of Psychology*

Paul A. Dicklin, *Associate Professor Emeritus of Speech Communication and Theater Arts (posthumous)**

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Carol A. Doll, *Professor Emerita of Teaching and Learning*

Frances McGrath Dolloph, *Community and Student Success Director Emerita, Distance Learning*

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Lawrence G. Dotolo, *President Emeritus of the Virginia Tidewater Consortium*

Michael J. Doviak, *Associate Professor Emeritus of Mathematics and Statistics*

Suzanne D. Doviak, *Senior Lecturer Emerita of Mathematics and Statistics**

Lynn H. Doyle, *Associate Professor Emerita of Educational Leadership*

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ReNeé S. Dunman, *Assistant Vice President Emerita for Equity and Diversity*

William M. Dunstan, Jr., *Professor Emeritus of Ocean, Earth and Atmospheric Sciences**

E

Carolyn S. Eakin, *Director Emerita of Technology and Data Analysis*

John L. Echternach, *Eminent Scholar Emeritus of Physical Therapy**

Patricia A. Edwards, *Senior Lecturer Emerita of Art*

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A. James "Jim" English, *Associate Professor Emeritus of Community and Environmental Health**

Elizabeth H. Esinhart, *Senior Lecturer Emerita of Political Science and Geography*

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Natalie W. Etheridge, *Associate Professor Emerita of Health, Physical Education and Recreation**

Rodney "Rod" L. Evans, Jr., *Senior Lecturer Emeritus of Philosophy and Religious Studies*

F

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Joong Fang, *Professor Emeritus of Philosophy**

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Justin C. Friberg, *Professor Emeritus of Political Science and Geography**

Morel A. Fry, *Assistant University Librarian Emerita for Administration*

Agnes Rose Fuller Wynne, *Master Lecturer Emerita of Music**

G

Robert A. Gable, *Eminent Scholar Emeritus and Professor Emeritus of Communication Disorders and Special Education*

Ann E. Gargett, *Professor Emerita of Ocean, Earth and Atmospheric Sciences*

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Elizabeth C. Guy, *Associate Professor Emerita of Psychology (posthumous)**

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Joyce L. Neff, *Professor Emerita of English*

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Wolfgang Pindur, *Professor Emeritus of Urban Studies and Public Administration (posthumous)**

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AAST - African-American Studies

AAST 597 Independent Study (1-3 Credit Hours)

Students are exposed to opportunities to conduct independent research and/or study in areas focused on the political, social and cultural experiences of people of African descent in the U.S. and the African Diaspora.

Prerequisites: Permission of instructor

ACCT - Accounting

ACCT 505 Accounting and Auditing in the Public/Nonprofit Sector (3 Credit Hours)

The application of accounting principles to governmental funds and not-for-profit organizations. Emphasis is placed on budgeting and control as well as auditing concerns for such entities.

Prerequisites: Enrollment in a Strome College of Business Master's program; ACCT 305 and ACCT 306 or the equivalent with a C or better, and 6 hours from ACCT 307, ACCT 311, ACCT 411/ACCT 511, ACCT 425 or ACCT 426 or the equivalent with a C or better; or ACCT 301 or the equivalent with a C or better, and 6 hours of ACCT 302, ACCT 311, or ACCT 421 or the equivalent with a C or better, and an overall grade point average of 3.00 in all coursework taken at Old Dominion University

ACCT 511 Financial Auditing (3 Credit Hours)

Current financial auditing processes are emphasized, and Generally Accepted Accounting Principles (GAAP) are used to evaluate the fairness of financial statements. Additionally, standards and ethics of the public accounting profession, generally accepted auditing standards, and public reporting are covered.

Prerequisites: Enrollment in a Strome College of Business Master's program, ACCT 305 and ACCT 306 or the equivalent with a C or better, and 6 hours of coursework from ACCT 311, ACCT 425 or ACCT 426 or the equivalent with a C or better; or ACCT 301 or the equivalent with a C or better and 6 hours from ACCT 302, ACCT 311, or ACCT 421 or the equivalent with a C or better; and an overall grade point average of 3.00 in all coursework taken at Old Dominion University

ACCT 521 Taxation (3 Credit Hours)

An analysis of federal income tax law and its application to personal and business tax situations. Reconciliation of tax and accounting concepts.

Prerequisites: Graduate standing and a level of competency in accounting at the intermediate level or higher

ACCT 522 Tax Research (3 Credit Hours)

An intensive course in taxation. Focuses on the choice of business entity by covering taxation of corporations (both C and S corporations), partnerships and sole proprietorships. The course emphasizes research skills and professional ethics.

Prerequisites: Enrollment in a Strome College of Business Master's program, ACCT 305 and ACCT 306 or the equivalent with a B- or better and 3 hours of coursework from ACCT 307 or ACCT 311 or the equivalent with a B- or better; or ACCT 301 and ACCT 421 or the equivalent with a B- or better, 3 hours of coursework from ACCT 302 or ACCT 311 or the equivalent with a B- or better; and an overall grade point average of 3.00 in all coursework taken at Old Dominion University

ACCT 540 Introduction to Accounting (3 Credit Hours)

This course provides a succinct working knowledge of the underlying concepts of financial and managerial accounting. With a strong emphasis on the interpretation of real-world financial statements, the course teaches students how to read, analyze, and interpret financial and managerial accounting data to make informed business decisions.

Prerequisites: Admission to the MBA program OR approval by the MBA program office/instructor

ACCT 550 International and Advanced Accounting (3 Credit Hours)

The study of accounting for international operations and business combinations.

Prerequisites: Enrollment in a Strome College of Business Master's program; ACCT 305, ACCT 306 and ACCT 307 or the equivalent with a B- or better and 3 hours of coursework from ACCT 311, ACCT 425, or ACCT 426 or the equivalent with a B- or better; or ACCT 301 and 302 or the equivalent with a B- or better and 3 hours of coursework from ACCT 311 or ACCT 421 or the equivalent with a B- or better or equivalent; and an overall grade point average of 3.00 in all coursework taken at Old Dominion University

ACCT 623 Accounting Analytics and Operational Reviews (3 Credit Hours)

Accounting analytics appropriate for professional accountants, whether in public accounting, industry, or government/non-profit. Much of the course involves hands-on learning focusing on decision, descriptive, predictive, and prescriptive analytics using the latest analytics/data visualization software.

ACCT 624 Information Technology Assurance Services (3 Credit Hours)

Standards, ethics, and practice of information technology assurance services particularly as it concerns the governance and control of information systems.

ACCT 625 Fraud Examination and Forensic Accounting (3 Credit Hours)

Standards, ethics, and practice of fraud examination and forensic accounting particularly as it concerns the accounting profession.

ACCT 626 Financial and Global Accounting (3 Credit Hours)

This course covers current financial accounting standards and the problems faced by national and multinational corporations in reporting financial information to external users in a global economy. There will be a discussion of the various techniques for presenting and analyzing financial statements and the ethical issues related to those presentations.

ACCT 627 Operational Cost Control (3 Credit Hours)

Covers cost concepts and analysis in both a manufacturing and service operational environment. Provides an introduction to activity based costing and standard cost systems, methodology for measuring productivity changes and cost of quality and measurement and control of operating performance.

ACCT 630 Business Valuations using Financial Statement Analysis (3 Credit Hours)

This course covers the analysis and interpretation of financial statements, including the significant accounting issues involved in performing an effective valuation of a company.

ACCT 640 Professional Ethics and Legal Issues In Accounting (3 Credit Hours)

An intensive course covering ethical and legal issues confronted by practicing accountants. The course emphasizes rigorous analysis of complex situations leading to appropriate solutions.

Prerequisites: Enrollment in a Strome College of Business master's program and a B- or better in ACCT 301 and ACCT 302 or the equivalent

ACCT 645 Accounting for Decision Making (3 Credit Hours)

This course provides students with an integrated financial and managerial accounting framework and captures how it can be used to promote value relevant decision making along with the use of data analytics tools. From a financial perspective, the content showcases a review of the financial reporting process and the development of financial statements for external users to provide students with a sufficient fluency to be intelligent readers of financial accounting information. From a managerial perspective, the course adopts a set of tools that utilize managerial accounting information that provides direction for students to solve business problems and promote internal decision-making, planning, and control. By the end of the course, students should be able to prepare and analyze financial statements and use accounting information for managerial decision making.

Prerequisites: ACCT 540 or ACCT 609 or course instructor approval

ACCT 650 Tax Strategies for Business Decisions (3 Credit Hours)

An intensive course in taxation. Focuses on the choice of business entity by covering taxation of corporations (both C and S corporations), partnerships and sole proprietorships. The course emphasizes research skills and professional ethics.

ACCT 651 Taxation of Corporations I (3 Credit Hours)

Covers federal income taxation of corporations and shareholders. Includes organizing a corporation; establishing capital structure; determining tax liability; dividends and other non-liquidating distributions; stock redemptions; and liquidations.

ACCT 652 Taxation of Partners and Partnerships (3 Credit Hours)

Taxation of partners and partnerships: formation, termination, distributions and liquidations, and sales of partnership interests. Limited partnerships in conjunction with their use as tax shelters, and the multifaceted attributes of family partnerships.

ACCT 653 Taxation of Estates and Gifts (3 Credit Hours)

Examines transfers under federal estate and gift tax laws. Includes property owned by the decedent; retained life estates; transfers taking effect at death; transfers with retained powers; concurrent property interest; powers of appointment; valuation problems; expenses, debts, and taxes; charitable bequests; marital deduction; taxable inter vivos gifts; gift splitting and credits; consideration of Chapter 14 and asset freezing techniques; and transfer taxation of life insurance.

ACCT 654 Income Taxation of Estates, Trusts & Beneficiaries (3 Credit Hours)

Examines simple, complex, and revocable trusts; trusts accumulation distributions; income in respect of decedents; trust accounting income; distributable net income; terminations; excess deductions; basis rules; and the decedent's final income tax return.

Prerequisites: ACCT 653

ACCT 655 Taxation of Corporations II (3 Credit Hours)

Analyzes the different types of taxable and tax-free acquisitions and reorganizations. Includes determining tax consequences for corporations and shareholders involved in an acquisition or reorganization and analyzing necessary requirements for a tax-free corporate division (spin-off). Covers aspects of filing consolidated federal income tax returns.

Prerequisites: ACCT 651

ACCT 656 Taxation of Deferred Compensation (3 Credit Hours)

Discusses federal income taxation of deferred compensation plans with emphasis on qualified retirement plans. Reviews plan qualification requirements, reporting and disclosure requirements, and distribution rules. Includes discussion of specific types of plans such as Sec. 401(K) and ESOPs.

Prerequisites: ACCT 651

ACCT 657 State and Local Taxation (3 Credit Hours)

Examines state levying of individual income, corporate income, property, sales, and excise taxes.

ACCT 658 Tax Aspects of International Business (3 Credit Hours)

Taxation of foreign persons conducting business in the U.S. including FIRPTA, source of income rules, and residency requirements; taxation of U.S. individuals and businesses doing business abroad including FSCs, CFCs, FHP Co's and possessions corporations.

Prerequisites: ACCT 425 and 426 or equivalent

ACCT 660 Taxation of Property Transactions (3 Credit Hours)

Covers determination of realized and recognized gains and losses and their tax treatment on property dispositions. Includes consequences of property transactions, such as depreciation, depletion, basis and capital gains problems.

Prerequisites: ACCT 521 or equivalent

ACCT 661 Taxation of the Small Business Corporation (3 Credit Hours)

Covers federal income taxation of S corporations including election eligibility; termination of status; treatment of income and deduction items; distributions; and basis of stock and debt. Also discusses compensation arrangements in closely held corporations; fiscal year issues; personal service corporations; the advantages of C corporations versus S corporations; corporation liquidation and redemption rules; and the S corporations' built-in gains tax.

Prerequisites: ACCT 521 or equivalent

ACCT 662 Tax Procedure and Practice (3 Credit Hours)

Discusses procedures for dealing with the IRS. Includes sources of IRS policy; processing returns; auditing returns; rulings and determination letters; assessments and collections; and interest and civil penalties.

ACCT 667 Cooperative Education (1-3 Credit Hours)

Student participation in a full-time professional work experience.

Prerequisites: Permission of the departmental chair in accordance with departmental Cooperative Education policies; student participation in a professional work experience; approval for enrollment and allowable credits are determined by the department; additional support may be provided by the Monarch Internship and Co-Op Office in at least one semester prior to enrollment

ACCT 668 Accounting Internship (1-3 Credit Hours)

The course is a practicum in the profession of accounting where theories, concepts, and financial management techniques are applied in a business environment.

Prerequisites: Permission of the department chair or graduate program director for the MS in Accounting

ACCT 695 Selected Topics in Accounting (3 Credit Hours)

Study designed for students who have had one of the required courses waived or for students desiring additional work in an area of particular interest in accounting.

Prerequisites: Permission of the department chair and the graduate program director, and a minimum GPA of 3.0 or higher in graduate work in the MS in Accounting program

ACCT 697 Independent Study in Taxation (3 Credit Hours)

Individually supervised research projects in selected tax areas. Approval of supervising professor as to topic and evaluation of project required at time of registration.

ACCT 727 Strategic Cost Management (3 Credit Hours)

This course focuses on advanced costing concepts, current management accounting practices, and analytical techniques employed by controllers in supporting their organizations' strategic planning processes.

ACCT 730 Financial Management Decision Making (3 Credit Hours)

This course provides an overview of the role of financial accounting in internal and external decision making. Financial modeling with an emphasis on assessing and valuing economic return will be included.

ACCT 747 Seminar in Controllorship (3 Credit Hours)

This course is the capstone course for the study of management accounting. It includes a review of management accounting practices and analytical techniques employed by controllers in supporting their organization's strategic decision-making process.

ACCT 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of graduation.

Prerequisites: All coursework in the MS program in Accounting

ACCT 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

AI - Artificial Intelligence

AI 510 Artificial Intelligence (AI) Methods and Models (3 Credit Hours)

This course offers an introduction to Artificial Intelligence (AI). Students will explore the field's fundamental concepts, techniques, and applications. Methods, such as Generative AI (GenAI) that enable machines to learn and process information, and models, such as machine learning (ML) that uses data sets to recognize patterns and make decisions without human intervention will be covered. The course is designed for non-specialists and does not require prior computer science or programming knowledge.

AI 521 Generative AI in Cybersecurity (3 Credit Hours)

This course provides an in-depth examination of the intersection between Generative AI (Gen AI) and Cybersecurity. It focuses on the dual nature of advanced AI systems as both enhancers and potential threats to security infrastructure. Students will acquire a comprehensive understanding of the underlying principles, algorithms, and practical applications of Gen AI models in the discovery of attack vectors, identification of cyber threats, and automation of security tasks. Additionally, the course will address defensive strategies aimed at mitigating the risks stemming from AI-driven cyberattacks.

AI 546 Artificial Intelligence (AI) Ethics and Policy (3 Credit Hours)

This course explores whether and how ethical AI is possible by examining moral standards as they apply to the various dimensions of AI development and use. It reviews the major ethical theories and discusses how principles such as transparency, privacy, safety, non-discrimination, and sustainability should govern the creation and use of AI technologies. Moreover, it considers how these principles could serve as the ethical framework for the social and policy structures that regulate and shape the future development of these technologies.

AI 566 Principles and Practices of Cyber Defense (3 Credit Hours)

This course is designed to help students gain a thorough understanding of vulnerabilities and attacks in systems and networks and learn cyber defense best practices. It covers fundamental security design principles and defense strategies and security tools used to mitigate various cyber attacks. The topics may include identification of Recon Ops, intrusion detection, identification of C2 Ops, data exfiltration detection, identifying malicious codes, network security techniques, cryptography, malicious activity detection, system security architectures, defense in depth, distributed/cloud and virtualization.

AI 581 Trustworthy Health Analytics (3 Credit Hours)

This course offers a comprehensive, project-driven approach to integrating AI in healthcare, focusing on building prototype models for prevention, diagnosis, and treatment while stressing the need of adopting ethical, responsible methods to reduce risks and improve patient outcomes.

AI 583 Artificial Intelligence Applications in Health (3 Credit Hours)

This course offers an exploration of how artificial intelligence (AI) is transforming healthcare delivery and improving patient outcomes. Building on foundational knowledge from AI Ethics and Policy and AI Methods and Models, students will dive deeper into the integration of AI in clinical and operational contexts. Key topics include the role of AI in diagnostics and personalized medicine and other AI implementations in healthcare.

AI 595 Topics in Artificial Intelligence (AI) (1-3 Credit Hours)

The advanced study of selected artificial intelligence topics designed to permit small groups of qualified students to work on subjects of mutual interest. These courses will appear in the course schedule and will be more fully described in information distributed to academic advisors.

AI 610 Strategic Artificial Intelligence (AI) Leadership (3 Credit Hours)

This course examines the leadership and organizational challenges of successfully integrating AI into business strategy and operations. Students will explore AI's impact on organizational structure, culture, and decision-making processes, and develop the skills to lead AI-driven transformations while considering ethical implications and societal impact.

AI 611 AI Product Management & Operations (3 Credit Hours)

This course will go over AI product management, as well as the challenges in operations for AI based products. The primary focus will be on the foundations for leadership, product development, and operations for AI products, which differ significantly from those found in typical software products.

AI 620 Foundations of Artificial Intelligence (AI) in Education and Learning Technologies (3 Credit Hours)

This course introduces students to the foundational concepts of Artificial Intelligence (AI) as applied to education and learning design. Students will explore key AI frameworks and theories within the context of learning design, including the use of AI tools in various educational processes. Topics covered include AI-enhanced course design, AI application in instructional delivery, the role of AI in assessments and personalized feedback, AI in research and evaluation, and AI's impact on academic integrity, as well as additional ethical considerations.

AI 621 Applications of Artificial Intelligence (AI) in Education and Learning Technologies (3 Credit Hours)

This course focuses on the practical application of AI in designing instructional strategies, activities, and materials. Students will use AI tools to brainstorm various pedagogical techniques as well as to create still images, videos, animations, audio narration, slides-based presentations, gamification, virtual environments, and personal AI learning assistants/chatbots. Through hands-on projects, students will demonstrate mastery of the instructional design process by developing AI-enhanced tools and media to solve real-world instructional problems.

AI 669 Artificial Intelligence (AI) Practicum (3 Credit Hours)

Students demonstrate an ability to integrate and synthesize competencies from their certificate or degree program coursework applied to concentration areas. Students produce high quality written products and an e-portfolio that demonstrate the analysis, synthesis and intersection of AI knowledge with specific domains.

Prerequisites: Good academic standing (Graduate GPA of at least 3.0)

AL - Arts and Letters

AL 595 Topics in Humanities (1-3 Credit Hours)

An advanced study of selected topics in humanities.

AL 596 Topics in Social Studies (3 Credit Hours)

An advanced study of selected topics in social studies.

AL 597 Tutorial Work in Arts and Letters Topics (3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: Permission of instructor

AL 695 Topics (1-3 Credit Hours)

An interdisciplinary study of selected topics in arts and letters.

AL 795 Topics (1-3 Credit Hours)

1-3 credits. Seminar on special interdisciplinary topics for small groups of qualified students.

Prerequisites: Advanced graduate standing

AL 797 Tutorial Work in Arts and Letters Topics (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

AL 895 Topics (1-3 Credit Hours)

Seminar on special interdisciplinary topics for small groups of qualified students.

Prerequisites: Advanced graduate standing

AL 897 Tutorial Work in Arts and Letters Topics (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

ANTR - Anthropology

ANTR 697 Tutorial Work in Special Topics in Anthropology (3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of a member of the graduate faculty. Conferences and papers as appropriate.

ANTR 698 Tutorial Work in Special Topics in Anthropology (3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of a member of the graduate faculty. Conferences and papers as appropriate.

ARTH - Art History

ARTH 508 Hieronymus Bosch (3 Credit Hours)

Before Dalí...before Magritte...before De Chirico, there was Hieronymus Bosch. Well before the advent of the Surrealism movement in the twentieth century, the late fifteenth-century/early sixteenth-century Dutch painter Hieronymus Bosch rocked the art world with his fantastical, disturbing, and enigmatic paintings. Bosch's contemporaries and modern scholars have deemed his art as the product of both his madness and genius. This course will critically examine Bosch and his work. Students will work like detectives, first by dismantling long-standing misinterpretations about Bosch's work, then by analyzing and deciphering his iconography through the lens of the period in which he lived, including art theory, politics, religion, devotion, and alchemy, among other topics.

Prerequisites: Graduate standing

ARTH 510 Michelangelo (3 Credit Hours)

This course examines the life, sculptures, paintings, and architecture of one of the greatest Italian Renaissance artists, Michelangelo Buonarroti.

Prerequisites: Graduate standing

ARTH 511 Caravaggio (3 Credit Hours)

This course examines the life and revolutionary paintings of the Italian Baroque painter Caravaggio.

Prerequisites: Graduate standing

ARTH 516 Myths of Venice (3 Credit Hours)

Venice is set apart from other cities in Italy and from Europe not only by its geography—a city seemingly floating on water, with canals instead of streets—but also by its unique history, traditions, and cultural identity. The consideration and examination of its mythical origins in the fifth century, through its history as a territory of the Byzantine Empire, and the establishment of their Republic in 1297, this course will examine how Venice fashioned its own identity through its art and architecture during the Italian Renaissance.

Prerequisites: Graduate standing

ARTH 517 Renaissance and Baroque Women (3 Credit Hours)

This course will examine the ways in which prevailing ideas about women shaped visual imagery, and in turn, how these images, influenced, perpetuated, and even changed perceptions about women from the fifteenth through seventeenth centuries in Italy (Renaissance and Baroque periods). Students will explore how text and visual imagery informed one another, and closely examine works of art by women artists, commissioned by women patrons, and works featuring women through thematic topics. Although patriarchy dominated the Renaissance and Baroque periods, the course will recover the histories of women artists, patrons, and writers, and examine how women navigated the gender oppression of their periods to reclaim their power and value.

Prerequisites: Graduate standing

ARTH 520 Pompeii (3 Credit Hours)

This seminar is an exploration of the visual and material culture of Pompeii, incorporating a broad spectrum of evidence, ranging from the city's temples to the wall paintings in the city's brothels. The goal of the class is to instill a working knowledge of the most recent scholarship on the ancient city and to contextualize Pompeii's art and architecture in the historical narrative of the city and the broader body of scholarship on Roman cultural history.

Prerequisites: Graduate standing

ARTH 534 Romantic Architecture (3 Credit Hours)

A survey of the aesthetic, technological and social forces that transformed international architecture in the 18th and 19th centuries.

Prerequisites: Graduate standing

ARTH 535 Modern Architecture (3 Credit Hours)

An examination of the architecture, planning, and related design of the twentieth and twenty-first centuries around the globe. Special emphasis is placed on the formation of the international style between the world wars and its disintegration in the recent past.

Prerequisites: Graduate standing

ARTH 541 Realism in Modern and Contemporary Art (3 Credit Hours)

This course examines the changing motivations, contexts, and characteristics of realist art since the inception of modernism. While definitions of radical and conservative have wavered and flipped, recognizable imagery seems always to function as a critical intervention within aesthetic racial, or gender-based hegemonies. As students examine numerous artists' strategies, they will see that reality isn't always so easy to pin down.

Prerequisites: Graduate standing

ARTH 542 Painting Now (3 Credit Hours)

Anxiety about painting's purpose and relevance are woven into modern art's linear concept of history. The goal of this class is to help students understand, both intellectually and emotionally, the ambitions that motivate painting, as well as to give them an opportunity to sample the diverse practices and critical approaches that make up the painterly landscape, and finally to examine how or if it fits within the broader scope of contemporary art.

Prerequisites: Graduate standing

ARTH 550 Public Art (3 Credit Hours)

This course is a collaborative exploration of the problems and opportunities of national and international public art that combines the practical with the theoretical, and the studio with the art-historical.

Prerequisites: Graduate standing

ARTH 595 Topics in Art History (3 Credit Hours)

A study of selected topics in art history to be specified in the class schedule each semester. May be repeated for credit as topics vary.

Prerequisites: Graduate standing

ARTH 596 Topics in Art History (3 Credit Hours)

A study of selected topics in art history to be specified in the class schedule each semester. May be repeated for credit as topics vary.

Prerequisites: Graduate standing

ARTH 597 Tutorial Work in Art History (3 Credit Hours)

Independent research on a topic to be selected under the guidance of a faculty advisor.

Prerequisites: Graduate standing; approval of program director

ARTH 598 Tutorial Work in Art History (3 Credit Hours)

Independent research on a topic to be selected under the guidance of a faculty advisor.

Prerequisites: Graduate standing; approval of program director

ARTH 668 Internship (3 Credit Hours)

An unpaid, structured work experience in a museum, gallery, archive, or related environment for credit. Criteria for evaluation will be determined by work supervisor and cooperating faculty advisor. May be repeated for credit. Available for pass/fail grading only.

Prerequisites: Graduate standing; Approval of program director

ARTH 695 Topics in Art History (3 Credit Hours)

Topics to be specified in the class schedule. Intensive critical investigations of specialized areas in art history. May be repeated for credit as topics vary.

Prerequisites: Graduate standing

ARTH 697 Tutorial in Art History (3 Credit Hours)

Independent research on a topic to be selected under the guidance of a faculty advisor.

Prerequisites: Graduate standing and approval of program director

ARTS - Art, Studio

ARTS 512 Photo Seminar 1 (3 Credit Hours)

The first of a two-semester sequence of concentrated individual work. Students will identify a topic and create a complete body of work. Lectures, readings, discussion, critique, and field trips to develop the articulation of ideas and the clarification of purpose.

ARTS 513 Photo Seminar 2 (3 Credit Hours)

This is the second in a two-semester sequence of concentrated individual work. Through readings, discussion, critiques, field trips, and intense individual work, students will compile a body of work realizing their personal vision and articulate their ideas through the crafting of an artist statement.

ARTS 531 Drawing Studio (3 Credit Hours)

Further concentration on conceptual content and drawing skills, development of individual body of work exploring preferred concepts, subject matter, techniques, and media. May be repeated for credit.

ARTS 532 Figure Drawing Anatomy (3 Credit Hours)

A study of visually important aspects of the structural, skeletal and muscular systems of the body. Anatomical study will be related to drawing from the live model.

ARTS 533 Figure Drawing/ Composition (3 Credit Hours)

This course places the emphasis on advanced composition using the figure as the central theme. The figure's expressive potential, along with a study of historical responses to figure drawing, will be examined in depth.

Prerequisites: ARTS 532

ARTS 542 Painting and Drawing Studio (3 Credit Hours)

Students develop an individual body of work exploring preferred concepts, subject matter, techniques, and media in close consultation with faculty. Written proposal by students required at registration.

ARTS 550 Printmaking Studio (3 Credit Hours)

Experimental work in selected print media.

ARTS 555 Letterpress Printmaking (3 Credit Hours)

A visual and literary investigation of language and wordplay using foundry and wood type and a Vandercook SP-20 proofing press. Projects include expressive printed impressions of personal poetry and song lyric, political rant, and broadsides for entertainment or proselytizing. A theme group project such as a folio or a bound book, is usually assigned.

ARTS 561 Sculpture Studio (3 Credit Hours)

Experimental work reflecting individual initiative and attitude.

ARTS 563 Advanced Ceramics (3 Credit Hours)

An advanced course in the science and art of ceramics. Students will engage in guided independent research, developing their own direction by investigating clay bodies, glazes, firing methods and contemporary ceramic art.

ARTS 569 Assemblage (3 Credit Hours)

Assemblage combines elements of various art and non-art media and materials. Lectures will be comprised of presentations about relevant artists, gallery and studio visits, and critiques. Studio time allows students to explore personal directions in the medium.

ARTS 572 Art Therapy (3 Credit Hours)

This class is designed to initiate students from both studio art and non-studio backgrounds to the study of art therapy. It examines the history of art therapy in the United States, introduces the Expressive Therapies Continuum (ETC), and explores the application of art therapy techniques and their underlying rationales.

ARTS 573 The Book (3 Credit Hours)

The book as a work of art. Lecture will explore historical and technical aspects of book design and production. Studio work will be devoted to the production of a series of books involving page design, paper selection, printing and binding.

ARTS 581 Crafts III: Fibers (3 Credit Hours)

Advanced work in pattern drafting, loom techniques, off-loom weaving and fabric painting.

ARTS 591 Advanced Jewelry and Metalsmithing (3 Credit Hours)

This course offers further exploration and concentration on jewelry and metalsmithing techniques. Through readings, discussions, self-directed and self-determined projects, students will explore new methods and content to develop an individual body of work. Additional emphasis will be placed on developing supplemental portfolio materials. May be repeated once for credit.

Prerequisites: Permission of instructor

ARTS 593 Jewelry and Metalsmithing Studio (3 Credit Hours)

This course offers further exploration and concentration on jewelry and metalsmithing techniques. Through readings, discussions, self-directed and self-determined projects, students will explore new methods and content to develop an individual body of work. Additional emphasis will be placed on developing supplemental portfolio materials. May be repeated for credit once.

ARTS 595 Topics in Studio Art (3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on studio projects of mutual interest.

Prerequisites: permission of the instructor

ARTS 597 Tutorial Work in Special Studio Topics (3 Credit Hours)

Independent investigation of a subject to be selected under the advisement of the instructor.

ARTS 668 Internship (3 Credit Hours)

A structured work experience involving aspects of art, design or craft; film or video making; and/or museum/gallery work.

ARTS 695 Graduate Seminar: Special Topics in Contemporary Art (3 Credit Hours)

Topics to be specified in the class schedule. Intensive critical investigations of selected aspects of the visual arts which focus on the role of the artist in contemporary urban society. May be repeated for credit as topics vary.

ARTS 697 Independent Study (3-6 Credit Hours)

Supervised individual inquiry in specific studio projects relating to the areas of major interest.

Prerequisites: permission of graduate program director required

ARTS 698 Graduate Studio (3-6 Credit Hours)

Supervised individual inquiry in specific studio projects relating to the areas of major interest.

Prerequisites: permission of graduate program director required

ARTS 700 Directed Field Experience (3-6 Credit Hours)

Intern experiences in museums, community centers and arts programs, teaching assistantships, special apprenticeships, and field projects under the supervision of graduate faculty. Required of all M.F.A. candidates.

Prerequisites: permission of graduate program director required

ARTS 701 Thesis Exhibition (3 Credit Hours)

Required of M.F.A. candidates. Course requirements to be determined by the student's advisory committee. Final grade to be determined by the student's thesis review committee.

Prerequisites: permission of graduate program director required

ARTS 702 Documentation (3 Credit Hours)

Studio work in preparation for required graduate exhibition. Public exhibition to be approved by the student's advisory committee and must be accompanied by final review. Documentation may be required. Required of all M.A. and M.F.A. candidates. Final grade to be determined by the student's thesis review committee.

Prerequisites: permission of graduate program director required

ARTS 797 Graduate Studio (3-6 Credit Hours)

Supervised individual inquiry in specific studio projects relating to areas of major interest. Individual studio spaces will be assigned.

Prerequisites: permission of graduate program director required

ARTS 798 Graduate Studio (3-6 Credit Hours)

Supervised individual inquiry in specific studio projects relating to areas of major interest. Individual studio spaces will be assigned.

Prerequisites: permission of graduate program director required

ARTS 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

ASIA - Asian Studies

ASIA 595 Topics in Asian Studies (3 Credit Hours)

This course is designed for small groups of qualified students to conduct advanced study of selected topics on Asian Studies, topics which may not be taught in regularly scheduled classes. The description of the course for each offering will appear in the course schedule that is distributed to each advisor.

Prerequisites: Appropriate survey source or permission of the instructor

ASTP - Astrophysics

ASTP 506 Observational Astronomy (3 Credit Hours)

Observational techniques in astronomy with emphasis on constellation identification, celestial movements, and telescopic observation. Individualized night observations are required.

ASTP 508 Astronomy for Teachers (3 Credit Hours)

A course in astronomy dealing with stars and stellar systems. Topics will include observational astronomy, the electromagnetic spectrum, relativity, stellar and galactic structures, cosmology, and the search for extraterrestrial intelligence.

ASTP 595 Special Topics in Astrophysics (3 Credit Hours)

In-depth study of a selected topic in astrophysics at the introductory graduate level. May include a laboratory or computational component.

Prerequisites: Permission of the instructor

AT - Athletic Training

AT 602 Foundations of Sports Medicine for Health Care Providers (3 Credit Hours)

An overview of tissue response to injury and pain transmission provide the foundation from which students will learn about physical agents and specific conditions from a medical perspective. Pathology for specific injuries will be taught, and students will become familiar with the theoretical and practical application of physical agents as it relates to tissue response to injury and pain control. An introduction to the basic principles and underlying theories relating to examination and treatment techniques will also be presented.

Prerequisites: Students must be admitted into the Master of Science in Athletic Training degree program

AT 603 Clinical Examination and Patient Care-Spine & Head (4 Credit Hours)

This course is designed to provide information relative to the prevention, recognition, evaluation, treatment, rehabilitation, and return to function and/or activity of athletic injuries involving the spine or head.

Prerequisites: Students must be admitted into the Master of Science in Athletic Training program

AT 604 Clinical Examination and Patient Care-Lower Extremity (4 Credit Hours)

This course is designed to provide information relative to the prevention, recognition, evaluation, treatment, rehabilitation, and return to function and/or activity of athletic injuries involving the lower extremity.

Prerequisites: Students must be admitted into the Master of Science of Athletic Training program to register for this course

AT 605 Clinical Examination and Patient Care-Upper Extremity (4 Credit Hours)

This course is designed to provide information relative to the prevention, recognition, evaluation, treatment, rehabilitation, and return to function and/or activity of athletic injuries involving the upper extremity.

Prerequisites: Students must be admitted into the Master of Science of Athletic Training program to register for this course

AT 607 Management of Medical Conditions for Healthcare Providers I (3 Credit Hours)

Instruction and practice in advanced first aid, Emergency Cardiac Care techniques, and oxygen administration for the paramedical professional. A study of the knowledge and skills required to recognize, triage, refer, and treat, as appropriate, internal injuries, general medical conditions, and disabilities of patients involved in physical activity.

Prerequisites: Students must be admitted into the Master of Science in Athletic Training program

AT 612 Functional Movement for Healthcare Providers (3 Credit Hours)

This course is designed to cover the anatomical and mechanical analysis of human musculoskeletal function. Principles of biomechanics, connective tissue behavior, and muscle physiology are integrated with joint structure and function to form the basis of understanding normal and pathological movement.

Prerequisites: AT 691

AT 615 Research I (2 Credit Hours)

This course is designed to introduce the graduate student to research processes in the athletic training field. The focus is on understanding and recognizing principles of evidence-based practice in athletic training, understanding the elements of evidence, appraising the evidence, and considering the evidence for use in clinical practice.

Prerequisites: Students must be admitted into the Master of Science of Athletic Training program to register for this course

AT 617 Management of Medical Conditions for Healthcare Providers II (3 Credit Hours)

Advanced management of acute conditions including wound management, phlebotomy, medication administration, dislocation reduction, and appropriate referral strategies. Advanced therapeutic techniques will also be incorporated.

Prerequisites: AT 607

AT 618 Current Research in Athletic Training (1 Credit Hour)

Designed to provide an understanding of evidence-based practice to the sports medicine setting and the intricacies of performing evidence-based practice research projects.

AT 623 Athletic Training Practicum I (1 Credit Hour)

This course is designed to provide practical experience in the athletic training setting and an understanding of evidence-based practice in sports medicine.

AT 625 Research II (1 Credit Hour)

This course is designed to systematically guide professional athletic training students through the research process. Coursework will focus on development of an original research idea, building the theoretical background, and identifying the rationale for a research project. Based on the nature of this course, students will be required to meet with a research supervisor outside of the time permitted for class.

Prerequisites: AT 615

AT 626 Advanced Orthopaedic Evaluation and Rehabilitation (4 Credit Hours)

This course is designed for sports medicine clinicians and will focus on advanced topics in the study of orthopaedic evaluation, assessment, management, and rehabilitation of common athletic injuries. A combination of discussion, lecture, critical review of literature, laboratory activities, and student presentations will be employed throughout the course.

AT 628 The Spine: Evaluation and Rehabilitation (3 Credit Hours)

A course designed to provide information relative to the recognition, evaluation, and treatment of athletic injuries involving the spine.

AT 630 Interprofessional Healthcare in Clinical Practice (3 Credit Hours)

This clinical experience entails interaction with healthcare providers associated with sports medicine specialties and general medical concerns.

AT 633 Athletic Training Practicum II (1 Credit Hour)

This course is designed to provide practical experience in the athletic training setting and an understanding of evidence-based practice in sports medicine.

AT 635 Research III (1 Credit Hour)

This is a course designed to guide professional athletic training students through aspects of the research process. Coursework will focus on writing the Methods sections for a research manuscript, writing the results section for a research manuscript and proper data entry techniques for a research project. Based on the nature of this course, students will be required to meet with a research supervisor and collect data for their respective project outside of the time permitted for class.

Prerequisites: AT 615 and AT 625

AT 638 Documentation & Quality Improvement for Healthcare Providers (3 Credit Hours)

This course will provide an overview of medical terminology, and best practices in medical documentation will be emphasized. Use of documentation strategies to analyze practice trends to identify and implement quality improvement strategies will be stressed.

Prerequisites: Students must be admitted into the Master of Science of Athletic Training program to register for this course

AT 640 Clinical Medicine for Healthcare Providers I (3 Credit Hours)

This course introduces the healthcare student to the normal and abnormal physiology of different body systems as well as differential diagnoses in common medical conditions. Factors associated with those body systems that influence examination and intervention will be discussed. Also discussed is when referral to other practitioners is recommended and required. A case study approach is employed to enforce critical thinking and to mimic practical application.

Prerequisites: AT 691

AT 641 Clinical Medicine for Healthcare Providers II (3 Credit Hours)

This course will address health across the lifespan, as well as highlight strategies to mitigate the risk of long-term health complications. This course will additionally identify and describe various modes of imaging techniques and tests used in medical practice for the neurological, musculoskeletal, cardiovascular, and pulmonary systems.

Prerequisites: AT 691 and AT 640

AT 643 Athletic Training Practicum III (1 Credit Hour)

This course is designed to provide practical experience in the athletic training setting and an understanding of evidence-based practice in sports medicine.

AT 645 Research IV (1 Credit Hour)

This course is designed to guide professional athletic training students through aspects of the research process. Coursework will focus on writing the discussion section for a research manuscript, writing a research abstract for submission to a conference, developing an oral research presentation for a conference, and creating a poster presentation for a conference. Based on the nature of this course, students will be required to meet with a research supervisor outside of the time permitted for class.

Prerequisites: AT 615, AT 625 and AT 635

AT 647 Interprofessional Clinical I (1 Credit Hour)

This clinical experience entails interactions with healthcare providers associated with orthopedic specialties and general medical concerns.

Prerequisites: Students must be admitted in the Master of Science of Athletic Training program to register for this course

AT 648 Interprofessional Clinical II (1 Credit Hour)

This clinical experience entails interaction with healthcare providers associated with sports medicine specialties and general medical concerns.

Prerequisites: Students must be admitted into the Master of Science of Athletic Training program to register for this course

AT 650 Integration of Evidence for Clinical Decision Making in Sports Medicine (3 Credit Hours)

This course is designed to introduce the graduate student to research processes in the athletic training field. The focus is on understanding and recognizing principles of EBP in athletic training, understanding the elements of evidence, appraising the evidence, and considering the evidence for use in clinical practice.

AT 651 Statistical Techniques for Clinical Decision Making in Sports Medicine (3 Credit Hours)

This course includes conceptual and computational applications associated with the common statistical techniques relevant to sports medicine clinicians. The intent is to provide students with an introduction to frequently used descriptive and inferential statistical methods for clinical or research purposes in sports medicine. Lectures and laboratory exercises will be utilized to instruct students on using statistics to be intelligent consumers of the research literature. Emphasis will be placed on using statistics to make informed, evidence-based clinical decisions with the goal of enhancing patient care.

Prerequisites: AT 650

AT 652 Pharmacology (3 Credit Hours)

Introduces principles of drug therapy across the lifespan and their use pertaining to the healthcare of the physically active. An emphasis on the application of knowledge and skills required of the healthcare provider, including indications, contraindications, precautions, interactions, documentation, and governing regulations.

Prerequisites: AT 691 or other graduate-level human anatomy course as approved by the instructor

AT 653 Athletic Training Practicum IV (1 Credit Hour)

This course is designed to provide practical experience in the athletic training setting and an understanding of evidence-based practice in sports medicine.

AT 655 Teaching Strategies and Assessment (3 Credit Hours)

This course is designed to provide information related to teaching strategies and techniques along with supervised and mentored teaching experiences within fields applicable to athletic training.

AT 657 Lower Extremity Injury Management Strategies (3 Credit Hours)

Stresses clinical techniques used in the management and assessment of the lower extremity and spine through utilization of evidence-based practice.

AT 661 Behavioral Health in Sports Medicine (3 Credit Hours)

The focus of this course is on identification, referral, and coordinated treatment options for patients with mental and behavioral health conditions.

Prerequisites: Students must be admitted into the Master of Science of Athletic Training program to register for this course

AT 664 Ethics in Healthcare (3 Credit Hours)

This course will provide in-depth coverage of legal and ethical concerns for sports medicine healthcare providers. Identification and analysis of applicable local, state, and federal laws and regulations that are specific to the delivery of healthcare.

Prerequisites: Students must be admitted into the Master of Science of Athletic Training program to register for this course

AT 666 Athletic Training Practicum I (1 Credit Hour)

This course is designed to provide practical experience in the athletic training setting and an understanding of evidence-based practice in sports medicine.

Prerequisites: AT 603

AT 667 Athletic Training Practicum II (1 Credit Hour)

This course is designed to provide practical experience in the athletic training setting and an understanding of evidence-based practice in sports medicine.

Prerequisites: AT 604

AT 668 Athletic Training Practicum III (2 Credit Hours)

This course is designed to provide practical experience in the athletic training setting and an understanding of evidence-based practice in sports medicine.

Prerequisites: AT 605

AT 669 Athletic Training Practicum IV (1 Credit Hour)

This course is designed to provide practical experience in the athletic training setting and an understanding of evidence-based practice in sports medicine.

Prerequisites: Students must be admitted into the Master of Science of Athletic Training program to register for this course

AT 670 Athletic Training Research I (1 Credit Hour)

This course is designed to systematically guide post-professional athletic training students through the research process. Coursework will focus on development of an original research idea, building the theoretical background, and identifying the rationale for a research project. Based on the nature of this course, students will be required to meet with a research supervisor outside of the time permitted for class.

Prerequisites: AT 650

AT 671 Athletic Training Research II (2 Credit Hours)

This is a course designed to guide post-professional athletic training students through aspects of the research process. Coursework will focus on writing the Methods sections for a research manuscript, writing the results section for a research manuscript and proper data entry techniques for a research project. Based on the nature of this course, students will be required to meet with a research supervisor and collect data for their respective project outside of the time permitted for class.

Prerequisites: AT 670

AT 672 Athletic Training Research III (3 Credit Hours)

This course is designed to guide post-professional athletic training students through aspects of the research process. Coursework will focus on writing the discussion section for a research manuscript, writing a research abstract for submission to a conference, developing an oral research presentation for a conference, and creating a poster presentation for a conference. Based on the nature of this course, students will be required to meet with a research supervisor outside of the time permitted for class.

Prerequisites: AT 671

AT 673 Healthcare Administration and Policy (3 Credit Hours)

An overview of administrative and organizational concepts that relate to healthcare entities that provide athletic training services. Facility design, fiscal management, organizational management, and insurance issues will be emphasized. Students will learn about the development and implementation of policies and procedures that occur within an organization that delivers patient care that can impact delivery and quality of care.

Pre- or corequisite: Students must be admitted into the Master of Science of Athletic Training program to register for this course

AT 686 Performance Enhancement in Sports Medicine (3 Credit Hours)

A study of the principles and techniques utilized in optimizing physical performance and reducing injury through proper and effective strength and conditioning programs. Special emphasis will be placed on current research findings, breakthrough and advanced weight training techniques, and popular conditioning practices. This course will also provide the student with skills in exercise leadership. The student will learn how to lead resistance training, flexibility training, cardiovascular training involving a variety of exercise modes, and group exercise.

Prerequisites: AT 612

AT 687 Contemporary Issues in Athletic Training (2 Credit Hours)

Seminar-based course that will involve discussion of critical questions and contemporary issues and problems in athletic training/sports medicine.

Prerequisites: Students must be admitted into the Master of Science of Athletic Training program to register for this course

AT 689 Professional Competence Assessment in Athletic Training (3 Credit Hours)

Knowledge and skills for successful pursuit of athletic training credentials, including Board Of Certification (BOC) examination preparation, employment, and continuing professional competence. Will include self-analysis of patient encounter portfolio and identification of clinical needs.

Prerequisites: Students must be admitted into the Master of Science of Athletic Training program to register for this course

AT 691 Gross Anatomy for the Rehabilitation Sciences (6 Credit Hours)

This course is designed to provide students in the School of Rehabilitation Sciences an interprofessional education experience that teaches the basic principles and concepts of human gross anatomy so they can apply it to their clinical practice. While multiple body systems will be covered, emphasis will be on the musculoskeletal, articular, nervous, and vascular systems.

AT 697 Independent Study in Athletic Training (3 Credit Hours)

An overview of clinical reasoning strategies and opportunities for clinical practice implementation will be provided. Students are provided a review of both human anatomy and evidence-based strategies for the delivery of care. Students will learn about the development and implementation of policies and procedures that can impact delivery and quality of care.

AT 711 Analysis of Human Motion for Sports Medicine Clinicians (3 Credit Hours)

This course includes theories and applications of techniques concerning the analysis of human motion for the sports medicine clinician. The intent of this course is to provide students with an introduction to quantitative analysis of human motion and the concepts and equipment to collect objective quantifiable data for clinical or research purposes.

AT 756 Education in Athletic Training (4 Credit Hours)

Designed to introduce current concepts of curriculum development, evaluation methods, course construction and testing as related to the athletic training clinical and didactic experience. Designed to introduce the graduate student to aspects of the management of learning and instruction; how learners learn and how teachers can facilitate their learning as related to the athletic training didactic and clinical experience.

AT 811 Analysis of Human Motion for Sports Medicine Clinicians (3 Credit Hours)

This course includes theories and applications of techniques concerning the analysis of human motion. It is designed to provide opportunities for the advanced study of motion analysis techniques for the study of human movement. The intent of this course is to provide students with an extensive knowledge concerning quantitative analysis of human motion and the concepts and equipment to collect objective quantifiable data to be used for clinical or research purposes.

AT 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

BDA - Big Data Analytics

BDA 501 Programming Languages for Data Science (3 Credit Hours)

An introductory course on programming languages and tools which are relevant to data analytics. Each language or tool is introduced as a separate module and incorporates applications in mathematics and statistics. Examples of included programming languages and tools are MATLAB, Python, R and SAS. Additional languages and tools may be covered based on current trends in data analytics. Students will complete hands-on programming assignments throughout the course.

Prerequisites: MATH 312, MATH 316 and STAT 330 or STAT 331

BDA 511 Introduction to Machine Learning (3 Credit Hours)

An introductory course on machine learning. Machine Learning is the science of discovering pattern and structure and making predictions in data sets. It lies at the interface of mathematics, statistics and computer science. The course gives an elementary summary of modern machine learning tools. Topics include regression, classification, regularization, resampling methods, and unsupervised learning. Students enrolled are expected to have some ability to write computer programs, some knowledge of probability, statistics and linear algebra.

Prerequisites: MATH 312, MATH 316, and STAT 330 or STAT 331

BDA 531 Modern Statistical Methods for Big Data Analytics (3 Credit Hours)

The statistical perspective of data mining is emphasized for majority of the course. Both applied aspects (programming, problem solving, and data analysis) and theoretical concepts (learning, understanding, and evaluating methodologies) of data mining will be covered. Topics include Regularization and Kernel Smoothing Methods, Tree-based Methods, Neural Networks and optional topics such as deep learning.

Prerequisites: BDA 511 and STAT 505 or permission of the instructor

BDA 532 Introduction to Optimization in Data Science (3 Credit Hours)

Topics considered include the solution of non-smooth optimization problems arising in data science, including unconstrained and constrained optimization problems, Lagrange multiplier methods, inequality constraints, Kuhn-Tucker conditions, and applications. Also considered are linear and nonlinear inverse problems, regularization of ill-posed problem including singular value decomposition, and Tikhonov regularization methods and sparse regularization methods, inverse eigenvalue problems and applications such as compressed sensing, image reconstruction and machine learning.

Prerequisites: MATH 307, MATH 312 and MATH 316

BDA 611 Mathematical Foundations of Machine Learning (3 Credit Hours)

This course will introduce mathematical foundations of machine learning theory and algorithms. Topics include statistical learning theory, kernel methods and generative models. Some modern machine learning methods such as dictionary learning, deep learning, online learning, and reinforcement learning may also be included, time permitting. Students enrolled are expected to have some knowledge of probability, linear algebra, optimization, and analysis.

Prerequisites: BDA 511, MATH 518 and STAT 330 or 331

BDA 620 Large-Scale Optimization (3 Credit Hours)

This course will introduce optimization methods for large-scale problems by exploiting special structures including convexity and sparsity. Topics include introduction to convexity, gradient-related methods, dual methods, sparse optimization methods and nonconvex optimization methods. Students enrolled are expected to have some knowledge of linear algebra, optimization, probability, and analysis.

Prerequisites: MATH 518 and STAT 330 or 331

BDA 632 Computational Data Analytics Project (3 Credit Hours)

Under the guidance of a faculty member in the Department of Mathematics and Statistics, the student will undertake a significant computational data analysis problem. A written report and/or public presentation of results will be required.

Prerequisites: Permission of graduate program director

BDA 640 Genomic Data Science (3 Credit Hours)

Introductory discussion on central dogma of molecular biology, concepts of transcription, translation, gene regulation, and the need for high throughput methods. Other topics covered are Introduction to R and Bioconductor, Advanced microarray data analysis, NGS data analysis using edgeR in Bioconductor, Network Biology, sequence, pathway informatics, SNPs, GWAS, informatics for genome variants.

Prerequisites: BDA 511, BDA 531, and STAT 505 or permission of the instructor

BDA 697 Topics in Big Data Science (3 Credit Hours)

Advanced study of selected topics.

BDA 721 High-Dimensional Statistics (3 Credit Hours)

Techniques for obtaining basic tail bounds and concentration inequalities, uniform laws of large numbers, Rademacher complexity of a set, covering and packing in metric spaces, and metric entropy. Also, high dimensional random matrices described in a non-asymptotic framework, with a focus on the estimation of sparse and structured covariance matrix, are studied. The sparse linear regression models and the principal component analysis in the unstructured and sparse setting will be covered.

Pre- or corequisite: STAT 727, STAT 728, MATH 616, and MATH 618

BDA 731 Applied Functional Data Analysis (3 Credit Hours)

An introduction to the statistical analysis of sample curves or functions. Topics include smoothing, registration, functional principal component analysis, scalar-on-function regression, and functional response models. All these techniques will be applied using the statistical software R.

Prerequisites: STAT 725 or STAT 825

BDA 745 Transform Methods for Data Science (3 Credit Hours)

Various transform methods from the data domain to coefficients of the data in certain discrete bases are studied. Transforms studied include FFT, DCT, wavelet transforms and framelet transform. Both theory and applications of these transforms are covered.

Prerequisites: MATH 518 and MATH 616

BDA 821 High-Dimensional Statistics (3 Credit Hours)

Techniques for obtaining basic tail bounds and concentration inequalities, uniform laws of large numbers, Rademacher complexity of a set, covering and packing in metric spaces, and metric entropy. Also, high dimensional random matrices described in a non-asymptotic framework, with a focus on the estimation of sparse and structured covariance matrix are studied. The sparse linear regression models and the principal component analysis in the unstructured and sparse setting will be covered.

Prerequisites: STAT 727, STAT 728, MATH 616, and MATH 618

BDA 831 Applied Functional Data Analysis (3 Credit Hours)

An introduction to the statistical analysis of sample curves or functions. Topics include smoothing, registration, functional principal component analysis, scalar-on-function regression, functional response models. All these techniques will be applied using the statistical software R.

Prerequisites: STAT 725 or STAT 825

BDA 845 Transform Methods for Data Science (3 Credit Hours)

Various transform methods from the data domain to coefficients of the data in certain discrete bases are studied. Transforms studied include FFT, DCT, wavelet transforms and framelet transform. Both theory and applications of these transforms are covered.

Prerequisites: MATH 518 and MATH 616

BIOE - Bioelectrics

BIOE 554 Introduction to Bioelectrics (3 Credit Hours)

Covers the electrical properties of cells and tissues as well as the use of electrical and magnetic signals and stimuli in the diagnosis and treatment of disease. Typical topics to be covered include basic cell physiology, endogenous electric fields in the body, electrocardiography, cardiac pacing, defibrillation, electrotherapy, electroporation, and electrotherapy in wound healing. In addition, ultrashort electrical pulses for intracellular manipulation and the application of plasmas to biological systems will be covered.

Prerequisites: PHYS 111N or higher and MATH 200 or higher

BIOE 754 Advanced Bioelectrics (3 Credit Hours)

Bioelectrics is a new field encompassing both the science and technology of applying electrical stimuli to biological systems. This course covers the pulsed power technology that is required to generate electrical stimuli as well as the biological responses they evoke in cells and tissues. Particular emphasis is placed on the medical applications of bioelectrics, including tumor ablation, gene electrottransfer, wound healing, decontamination with cold plasma, and treatment of cardiac arrhythmias.

Prerequisites: ECE 454 or ECE 554 or BIOE 454 or BIOE 554

BIOE 755 Biomembranes and Ion Channels (3 Credit Hours)

This course will give an overview of the structure and dynamics of biomembranes, the ion channels that are embedded in them, and the electrical properties of biomembranes. Topics include molecular dynamics modeling of biomembranes, membrane damage and repair, ion channel dynamics and their experimental assessment using patch clamping, and excitability in neurons and cardiomyocytes.

Prerequisites: ECE 454 or ECE 554 or BIOL 523

BIOE 854 Advanced Bioelectrics (3 Credit Hours)

Bioelectrics is a new field encompassing both the science and technology of applying electrical stimuli to biological systems. This course covers the pulsed power technology that is required to generate electrical stimuli as well as the biological responses they evoke in cells and tissues. Particular emphasis is placed on the medical applications of bioelectrics, including tumor ablation, gene electrottransfer, wound healing, decontamination with cold plasma, and treatment of cardiac arrhythmias.

Prerequisites: ECE 454 or ECE 554 or BIOE 454 or BIOE 554

BIOE 855 Biomembranes and Ion Channels (3 Credit Hours)

This course will give an overview of the structure and dynamics of biomembranes, the ion channels that are embedded in them, and the electrical properties of biomembranes. Topics include molecular dynamics modeling of biomembranes, membrane damage and repair, ion channel dynamics and their experimental assessment using patch clamping, and excitability in neurons and cardiomyocytes.

Prerequisites: ECE 454 or ECE 554 or BIOL 523

BIOE 890 Graduate Seminar (2 Credit Hours)

This course can be taken either as an attendee or as a presenter. Attendees will receive a pass/fail grade based on whether they satisfy the attendance requirements. Presenters will receive a letter grade for their presentation from a committee of faculty in the audience.

BIOE 891 Graduate Seminar (1 Credit Hour)

This course can be taken either as an attendee or as a presenter. Attendees will receive a pass/fail grade based on whether they satisfy the attendance requirements. Presenters will receive a letter grade for their presentation from a committee of faculty in the audience.

BIOL - Biological Sciences

BIOL 500 Plant Systematics (4 Credit Hours)

An evolutionary survey of vascular plant families and the principles and methodologies that define them; lab emphasis is placed on recognition and skills of identification. A lab and field intensive hands-on course.

Prerequisites: A botany course

BIOL 501 Entomology (4 Credit Hours)

A comprehensive survey of the insects, including taxonomy, morphology, physiology, reproductive and developmental biology, and ecology. Research techniques in entomology will be learned through both field and laboratory work.

BIOL 502 Scientific Diving Methods for Marine Research (4 Credit Hours)

This lecture/field experience course will train students in the common techniques used by marine scientists who employ scuba for their research. It satisfies the requirements for an American Academy of Underwater Scientist certification and covers other topics such as: use of underwater research equipment and marine resource surveys. A multi-day scuba trip is required.

Prerequisites: Open Water Scuba Certification and ODU Dive Physical Form signed/completed by a physician

BIOL 503 Medical Microbiology (3 Credit Hours)

This course integrates the disciplines of microbiology, immunology, and biochemistry with the pathophysiology of infections and the appropriate pharmacology in a problem-based learning setting. Students will learn the fundamental concepts and terminologies of infectious diseases. The material will be case studies in small group tutorials and emphasize independent learning.

Prerequisites: Microbiology and Biochemistry courses, anatomy course recommended, or instructor approval

BIOL 504 Conservation Biology and Sustainable Development (5 Credit Hours)

The application of fundamental biological principles to the preservation of biodiversity, including the role of ecological and evolutionary theory to the preservation of biotas on a regional and global basis. Lectures will cover modern approaches to conservation biology, including conservation ethics and management issues. Laboratories will include discussion of case studies, introduction to software applicable to conservation biology, presentations by regional conservation practitioners, and visits to relevant field sites.

BIOL 507 The Pharmacology and Neurobiology of How Recreational Drugs Work (3 Credit Hours)

This course in drug use and abuse is designed to distinguish between drug use and drug abuse as well as provide pharmacological knowledge of how recreational drugs work. Students will acquire knowledge regarding the abuse of prescription drugs, depressants, stimulants, hallucinogens, marijuana and inhalants. This information will be used to analyze pathophysiological conditions that can occur as a result of drug use and abuse.

Prerequisites: Background in cell biology

Pre- or corequisite: BIOL 508 recommended

BIOL 508 Introduction to Pharmacology (3 Credit Hours)

This is a general introductory course in pharmacology dealing with chemistry, general properties and pharmacological effects on various physiological systems, therapeutic usefulness and toxicities of drugs. The course is designed to prepare upper-level undergraduate and graduate students for more advanced courses in pharmacology.

BIOL 511 Zymology: Fermentation Science (4 Credit Hours)

This is an introductory course in the theory and practice of zymology (fermentation). Edible and potable products of fermentation (beer, wine, mead, yogurt, cheese) have been known since antiquity and play an important role in today's society. The science of fermentation touches on many biological disciplines, such as microbiology and biochemistry, and the study of yeasts has provided considerable foundation to the fields of cell biology and molecular biology. In this course, we will cover fundamentals of fermentation and its practical application to production of beer, one of the oldest beverages produced by humans.

Prerequisites: BIOL 293

BIOL 512 Plant Physiology (4 Credit Hours)

Discover the incredible secrets behind what makes our green friends tick. This course includes a traditional lecture covering the physiological and chemical processes occurring in plants. A laboratory, greenhouse, and/or field-oriented lab will provide hands-on opportunities to understand plant stress responses, nutrient use, cell metabolism-respiration, photosynthesis, hormones, and processes driving growth patterns.

BIOL 515 Marine Ecology (5 Credit Hours)

A lecture and laboratory course designed to introduce students to important ecological processes operating in coastal marine environments. The course covers synthetic topics as well as the ecology of specific marine habitats. The laboratory is designed to provide students with experience in marine research and the organisms and ecological conditions common in various marine habitats visited by the class.

Prerequisites: BIOL 291 and BIOL 331 and ENGL 211C or ENGL 221C or ENGL 231C must be passed with a grade of "C" or higher; instructor approval required

BIOL 516 Clinical Immunology (3 Credit Hours)

A description of common immunological problems seen in the clinic.

Prerequisites: Coursework in cell biology and immunology

BIOL 519 Wetland Plants (4 Credit Hours)

An exploration of the ecology of inland and coastal wetlands and their plants. This course emphasizes wetland and aquatic plant identification, field and laboratory methods, and core concepts important to wetland plants and their ecology. Linkages to wetland delineation and wetland adjacent systems will be made. Weekly field-based laboratories are expected to local wetlands focusing on hands on opportunities and research methods.

Prerequisites: A botany course

BIOL 520 Ichthyology (5 Credit Hours)

The biology of marine and freshwater fishes including morphology, physiology, evolution, distribution, ecology, and reproduction.

BIOL 522 Field Studies in Ornithology (4 Credit Hours)

A combined lecture and field study of birds with emphasis on identification, behavior, and field methods. Extensive field trips, including at least one weekend, are taken.

BIOL 523 Cellular and Molecular Biology (3 Credit Hours)

The molecular organization of eukaryotic cells is presented along with cell evolution, molecular genetics, the internal organization of the cell and the behavior of cells in multicellular organisms.

Prerequisites: course background in cell biology and genetics or permission of the instructor

BIOL 524 Comparative Animal Physiology (5 Credit Hours)

An introduction to the basic mechanisms by which different animals function. How organisms acquire and use energy, regulate their internal environment, circulate and exchange gases and wastes, receive and conduct information about their environment, and move and use muscles will be some of the topics covered. Emphasis will be on how organisms make changes in these basic mechanisms to deal with different environmental conditions.

BIOL 525 Cancer Biology (3 Credit Hours)

This course will examine how mutation leads to altered gene products and expression, subverted cell activity, cell immortalization, and tumor formation. Students will explore the differences between benign tumors and malignant tumors as well as the factors involved in malignancy. The course will conclude with the exploration of current cancer therapy.

Prerequisites: Cell Biology and Genetics courses

BIOL 526 Histology (5 Credit Hours)

The structure and function of cells, tissues and organs at both the light microscopic and ultrastructural levels.

BIOL 530 Microbial Pathogenesis (3 Credit Hours)

Examination of bacterium-host interactions with an emphasis on how bacteria cause disease, particularly the means by which the bacterium is able to circumvent host defense mechanisms

Prerequisites: microbiology course

BIOL 535 Marine Conservation Biology (3 Credit Hours)

This highly interdisciplinary science of conserving marine biodiversity will be taught through a review of old and new literature. This will include its history, marine ecology related to conservation biology, threats to marine biodiversity, assessment of extinction risk, conservation challenges of marine habitats and regions, and methods for conserving marine biodiversity.

BIOL 536 Infectious Disease Epidemiology (3 Credit Hours)

This lecture/lab course will focus on concepts related to the spread and control of infectious diseases. The lectures will focus on concepts while the labs will provide quantitative skills essential to the study of infectious diseases.

Prerequisites: Undergraduate coursework in statistics and biology

BIOL 537 One Health: People, Animals and the Environment (3 Credit Hours)

A course that examines the interdependence between human health, animal health and environmental health. The One Health approach to the threat of emerging infectious diseases includes understanding the interconnectedness of human and animal pathogens, epidemic zoonoses and corresponding environmental factors, insights into mechanisms of microbial evolution towards pathogenicity, new technologies and approaches towards disease surveillance, and political and bureaucratic strategies.

Pre- or corequisite: A Microbiology course is recommended

BIOL 540 Methods in Immunological Research (4 Credit Hours)

The major objective of this hands-on course is to prepare students to independently perform basic laboratory techniques, assays, and experiments commonly used in entry-level immunology laboratory positions. The course will cover theory, sample and reagent preparation, instrumentation, data analysis and interpretation, and applications in immunology. Several topics covered in-class include ELISAs, mammalian cell culture, and flow cytometry, however additional topics (such as confocal microscopy) will be covered using virtual technologies. This course is ideal for students who intend to pursue careers at the laboratory bench.

Prerequisites: microbiology laboratory course, immunology course

BIOL 541 Animal Behavior (5 Credit Hours)

Animal behavior with special attention to its evolution and ecological significance. Field and laboratory activities will emphasize observational and experimental techniques used to study behavior.

BIOL 544 Field Studies in Marine Biology (5 Credit Hours)

An intensive study abroad field course offered during the summer at a foreign marine laboratory where students will be engaged in lectures and field studies of coastal marine environments. Check with the Director of the Marine Biology Concentration Program for details.

Prerequisites: BIOL 331

BIOL 545 Community Ecology (3 Credit Hours)

The goal of this course is to introduce and evaluate both classical and emerging paradigms in community ecology. This will be achieved by examining those processes (biotic and abiotic) that structure ecological communities, and by exposing students to quantitative and theoretical aspects of these paradigms.

Prerequisites: Ecology course

BIOL 546 Comparative Biomechanics (3 Credit Hours)

The principles of fluid and solid mechanics will be applied to a variety of plant and animal systems to understand how organisms deal with the immediate physical world and its accompanying constraints. A diverse range of topics will be covered, including aerial flight in insects, wind resistance in trees, jet propulsion in squid, flow within blood vessels, forces on intertidal organisms, viscoelasticity in biological materials, and energy storage during terrestrial movement.

Prerequisites: Cell biology course and physics course recommended

BIOL 550 Principles of Plant Ecology (4 Credit Hours)

This course explores theoretical concepts in plant ecology through review of classical and cutting-edge literature and practice with field-based experimental design and statistical methods. This course emphasizes the structure, development, and processes that drive patterns in plant communities and the ecological communities they support. Weekly field-based laboratories involve hands-on experience and opportunities to explore field methods in ecological research.

BIOL 551 Bioinformatics and Genomics I (4 Credit Hours)

The application of computer science to biology has led to major breakthroughs in the ability to read and understand the code written in genomes. This course will give students the skills to participate in the computational revolution in biology. The course will give students hands-on experience in writing simple yet powerful computer programs in the Python programming language and making beautiful data visualizations in the R programming language. Students will also learn how to combine existing pieces of bioinformatics software for their own workflows.

Prerequisites: background in introductory-level biology and permission of the instructor

BIOL 552 Bioinformatics and Genomics II (4 Credit Hours)

The application of computer science to biology has led to major breakthroughs in the ability to read and understand the code written in genomes. This course will give students the skills to participate in the computational revolution in biology. The course will build on the knowledge of writing programs. Students will learn about some key techniques “under the hood” of software that have been critical to the genomics revolution. Topics will include: graph algorithms, evolutionary trees, probability models for DNA and protein sequences, and an introduction to deep learning in biology.

Prerequisites: BIOL 551 or permission of the instructor

BIOL 553 Molecular Ecology (4 Credit Hours)

This course will explore the biology of organisms by using molecular (nucleic acid and/or protein) techniques and data. It covers a wide variety of subdisciplines within Biology, including genetics, physiology, ecology, and evolution. This course will explore basic theory in population genetics, ecology, and evolution and cover DNA, RNA, and Protein techniques and their application to biological research.

BIOL 554 Research in Pathogen Biology I: Laboratory Investigation (4 Credit Hours)

This is the first course of a two-semester laboratory and analysis sequence that is designed to provide a genuine research experience for students. Students will design a novel research question in pathogen biology, then use modern laboratory techniques such as polymerase chain reaction and next-generation DNA sequencing to examine this question and test hypotheses. Data generated in this course will be analyzed in the second course in the series, BIOL 555. Data and analyses generated during these courses may be used for publication in scientific journals.

Prerequisites: BIOL 294

BIOL 555 Research in Pathogen Biology II: Analysis (4 Credit Hours)

This is the second course of a two-semester laboratory and analysis sequence that is designed to provide a genuine research experience for students. In this semester, students will analyze data generated during the previous semester in BIOL 554. Modern methods of data analysis will be used, including statistical and bioinformatics techniques. Data and analyses generated during these courses may be used for publication in scientific journals.

Prerequisites: BIOL 294; BIOL 554 preferred

BIOL 557 General Virology (3 Credit Hours)

A basic course covering the history of virology, viral taxonomy, genetics, and the molecular biology and host responses to the major mammalian virus groups. Examples of recent impacts of viruses on human health such as influenza pandemics will also be covered.

Prerequisites: courses in cell biology and genetics

BIOL 560 Frontiers in Nanoscience and Nanotechnology (1 Credit Hour)

Review of the structure, synthesis and properties of key nano-materials and their impact on living systems.

Prerequisites: graduate standing

BIOL 561 Human Cadaver Dissection (5 Credit Hours)

Students will dissect a human cadaver fully and learn all of the major structures. The course will be divided into three sections: backs and limbs, TAP (thorax, abdomen and pelvis), and head and neck. Instructor demonstrations include brain removal and dissection.

Prerequisites: BIOL 241 or BIOL 251, or its equivalent, must be passed with a grade of C (2.0) or higher

BIOL 562 Microbial Genetics (3 Credit Hours)

This course emphasizes the fundamental concepts of microbial genetics including the study of gene structure, gene regulation, operons, DNA replication, RNA biology, protein synthesis, plasmid biology, mobile genetic elements, and recombinant DNA technology.

Prerequisites: Courses in cell biology, genetics and general microbiology

BIOL 563 Cell Signaling in Host Pathogen Interactions (3 Credit Hours)

This course will emphasize cell dynamics including host and pathogen induced cellular signaling, the regulation of actin cytoskeleton rearrangement, and the modulation of host transcription and translation by different pathogens.

Prerequisites: A cell biology course

BIOL 564 Biomedical Applications of Low Temperature Plasmas (3 Credit Hours)

This course is cross listed between ECE and Biology. It is intended for senior undergraduate students and first year graduate students. The course contents are multidisciplinary, combining materials from engineering and the biological sciences. The course covers an introduction to the fundamentals of non-equilibrium plasmas, low temperature plasma sources, and cell biology. This is followed by a detailed discussion of the interaction of low temperature plasma with biological cells, both prokaryotes and eukaryotes. Potential applications in medicine such as wound healing, blood coagulation, sterilization, and the killing of various types of cancer cells will be covered.

BIOL 565 Biotechnology (3 Credit Hours)

This course provides an overview of how microbes are manipulated to solve practical problems through biotechnology. Topics to be covered include basic concepts in microbial technology, industrial microbiology, microbes in drug development, food microbiology, microbial interactions, gut microbiota, and metagenomics.

BIOL 566 Introduction to Mitigation and Adaptation (3 Credit Hours)

Students will be introduced to the science underpinning mitigation of human-induced changes in the Earth system, including but not limited to climate change and sea level rise, and adaptation to the impacts of these changes. The course will cover the environmental hazards and the opportunities and limitations for conservation, mitigation and adaptation. Cross listed with OEAS 566.

BIOL 567 Sustainability Leadership (3 Credit Hours)

In this class, students will discover what makes a leader for sustainability. They will consider a range of global and local crises from a leadership point of view in the context of sustainability science, which addresses the development of communities in a rapidly changing social, economic, and environmental system-of-systems environment. The course will be based on taking a problem-motivated and solution-focused approach to the challenges considered. The course includes a service learning project focusing on a leadership experience in solving a real-world environmental problem.

Prerequisites: BIOL 566 or OEAS 566

BIOL 570 Diseases that Changed our World (3 Credit Hours)

Despite advancements in the development of antimicrobials and vaccines and in securing clear water and food supplies, modern civilizations are not immune to epidemic diseases. This course will provide insight into the role of different technologies in the struggle to attain disease control and eradication and explore the challenge of forecasting emerging plagues, describing the nature and evolution of diseases and conveying their significance in shaping Western culture and civilization, their impact, their consequences, their costs, and the lessons learned.

BIOL 571 Marine Vertebrate Ecology, Management & Conservation (3 Credit Hours)

Course will explore the biology, diversity and major life history patterns of a suite of marine megafauna, including sea turtles, marine mammals, seabirds and sharks. Students will determine the major drivers behind large-scale declines of many marine megafauna species and be challenged to understand and attempt to solve conservation and management issues.

Prerequisites: A Marine Biology course

BIOL 575 Neurobiology (3 Credit Hours)

This course will focus on understanding brain structure as well as the morphology and function of the central nervous system in general. Fundamental processes such as neuron morphogenesis, guidance, polarity, migration, and growth cone motility will be emphasized. The cellular and molecular basis of neurological disorders also will be discussed.

Prerequisites: BIOL 250 or BIOL 293 must be passed with a grade of "C" or higher or permission of instructor

BIOL 576 Cancer Immunology and Immunotherapy (3 Credit Hours)

Introduction to the immune system, tumor antigens, immunosuppressive cells and molecules, and cancer immunotherapy treatment approaches.

Prerequisites: BIOL 123N, BIOL 124N, and BIOL 293 (Cell Biology), or equivalent undergraduate coursework or permission of the instructor

BIOL 578 Microbial Ecology (3 Credit Hours)

Study of the interactions between microorganisms, particularly bacteria, and their environment. Emphasis is placed on nutrient cycling and the influence of microbes on global mineral dynamics. The effects of physical and chemical factors on distribution and activity of microbes in their environments and applications of these interactions are studied (biotechnology).

Prerequisites: a general microbiology course

BIOL 579 Microbial Ecology Laboratory (1 Credit Hour)

A laboratory for measurement of microbial numbers and activity in natural environments.

Pre- or corequisite: BIOL 578

BIOL 581 Forensic and Medical Entomology (5 Credit Hours)

This course provides a comprehensive survey of the insects used in legal investigations and medically important insects. Topics covered include the taxonomy, morphology, physiology, reproductive and developmental biology, and ecology of these insects along with the diseases they may vector. Research techniques in forensic and medical entomology will be learned through both field and laboratory activities.

BIOL 582 Human and Veterinary Parasitology (3 Credit Hours)

The course will emphasize the principles of parasitism, including biology, physiology, genetics, morphology, and phylogeny of the major parasitic groups with a specific focus on the significant parasites of humans and animals of veterinary importance. The general biology of parasites including their life cycles, diagnosis, and treatment will be included as well.

Pre- or corequisite: A cell biology course

BIOL 590 Advanced Human Physiology (4 Credit Hours)

All major physiological systems with emphasis on normal physiology. Some clinical applications made but not stressed.

BIOL 596 Topics in Biological Sciences (1-4 Credit Hours)

A structured specialty course for students at the senior level. Courses may include lecture and laboratory components.

Prerequisites: Permission of the instructor

BIOL 598 Independent Study in Biology (1-3 Credit Hours)

Supervised (non-lab/field) project selected to suit the needs of the individual student. Requires completion of formal scientific paper documented with appropriate primary technical literature (see GPD for details). Unstructured course.

Prerequisites: permission of the GPD and permission of instructor

BIOL 609 Special Readings in Biology (3 Credit Hours)

Reading and discussion course designed to explore a field of specific interest.

BIOL 640 Microbial Toxins (3 Credit Hours)

This course will focus on the mechanisms of action of microbial toxins, including those affecting the host's nervous system, immune function, metabolism, protein synthesis, and homeostasis. The structure and function of representatives of several toxin types will be analyzed for their potential applications to biotechnology and medicine.

Prerequisites: A general microbiology course required and a microbial pathogenesis course recommended

BIOL 661 Topics in Biology (1-3 Credit Hours)

Supervised projects and practica selected to meet the specific objectives of the student.

BIOL 669 Internship in Biology (3 Credit Hours)

With approval of Advisory Committee.

BIOL 671 Molecular and Immunological Techniques (4 Credit Hours)

A lab-intensive course emphasizing current methods in molecular biology.

BIOL 695 Topics in Biology (1-3 Credit Hours)

A specially designed course concerning specific topics in the biological, environmental or allied health fields.

BIOL 698 Research in Biology (1-9 Credit Hours)

Supervised research.

BIOL 699 Thesis (1-3 Credit Hours)

This course is selected with the recommendation of the faculty advisor.

BIOL 700 Cardiovascular Physiology (4 Credit Hours)

This physiology course will focus solely on cardiovascular physiology. Lectures will focus on basic and advance cardiovascular principles. The laboratory will focus on the use of current cardiovascular research.

BIOL 701 Practical Computing for Biology (3 Credit Hours)

This hands-on training course emphasizes the use of general computing tools to work more effectively in the biological sciences. It integrates a broad range of powerful and flexible tools that are applicable to ecologists, molecular biologists, physiologists, and anyone who has struggled analyzing large or complex data sets. Text file manipulation with regular expressions, basic shell scripting, programming in Python and R, interaction with remote devices, and basic graphical concepts will be reviewed.

BIOL 702 Biomedical Sciences Journal Club (1 Credit Hour)

Review and discussion of current papers in the areas of biomedical sciences. Student presentation, discussions and readings in this field required.

BIOL 703 Advanced Genomics Data Analysis (3 Credit Hours)

This course is designed to teach students the various steps involved in analyzing next-generation sequencing data for gene expression profiling and polymorphism identification and analyses. The class will follow a workshop setting with a combination of lectures, paper discussions, and instructor and student led programming sessions.

BIOL 704 Animal Ecophysiology (3 Credit Hours)

This course integrates the physiological and biochemical function of wild animals with population-scale and community-scale ecological patterns. Both organismal mechanisms and comprehensive theories will be included. The course primarily draws on peer-reviewed literature and includes lecture and discussion.

BIOL 705 Advanced Microbiology (3 Credit Hours)

Investigate microbiology from historical perspectives to modern molecular microbiology; ecological and biomedical components; bacteria and viruses. Discussions will include how to design experiments and evaluate results.

Prerequisites: A microbiology course

BIOL 706 Core Concepts in Biology (3 Credit Hours)

This course is designed to equip students with core concepts and fundamental skill sets for all sub-disciplines in the biological sciences. Major topics will include evolutionary and ecological processes, foundational concepts in comparative physiology, cellular biology, microbiology, immunology, genetics, advanced molecular biology, and the interrelatedness of the human, animal, and environmental domains. The course emphasizes the integration of topics and builds the analytical skills and conceptual framework that prepares students for advanced study and research in the biological sciences.

BIOL 707 Ecosystem Ecology (5 Credit Hours)

Ecological principles at ecosystem level of biological organization. Discussion of energy flow, nutrient cycling, ecosystem stability and ecosystem modeling. Laboratory involves field trips and methods of measuring ecosystem parameters.

Prerequisites: a general ecology course

BIOL 708 Biology Seminar (1 Credit Hour)

This graduate seminar offers a dynamic exploration of the biological sciences through a rotating roster of faculty presenting diverse topics. Participants will engage in discussions of contemporary research papers, receive training in science communication and career development, and/or analyze seminal texts that have shaped the field.

BIOL 709 Current Issues in Biology (1 Credit Hour)

The course is a weekly lecture series of invited external and internal experts in Biology that will highlight the broad nature of biology research. Students will achieve a comprehensive understanding of biology through reinforcement of key fundamental concepts and exposure to a wide range of sub-disciplines.

BIOL 710 Advanced Cell Biology (3 Credit Hours)

This course will cover selected current topics in cell biology that reflect recent advances in the field. Major topics include membranes and transport, signal transduction, cell adhesion and motility, cell cycle, apoptosis, and specialized cell functions. Students will read current research papers that describe the latest innovations in microscopic and molecular analysis of cellular function. This course is built on previous coursework in cell biology by reinforcing key fundamental concepts and performing a more in-depth examination of cellular mechanisms.

Prerequisites: Course background in cell biology recommended

BIOL 711 Advanced Skills in Biology (2 Credit Hours)

This course provides hands-on training in cutting-edge methodologies for biological sciences research. Students will engage in supervised laboratory or field exercises, depending on their disciplinary focus, mastering advanced techniques, instrumentation, and data collection methodologies. By applying these methods to real research problems, this course aims to bridge theoretical knowledge with practical application, preparing students to contribute effectively to the advancement of biological research.

BIOL 712 Biological Microscopy (4 Credit Hours)

Lectures will cover theory and concepts of specimen preparation and operation of various microscopes used in the biological sciences. The laboratory experience will include specimen preparation to viewing.

Prerequisites: permission of the instructor

BIOL 713 Biology Education and Teaching (1 Credit Hour)

This graduate-level course is designed to prepare future faculty for effective teaching in the biological sciences at the university level. Students will explore pedagogical theories and practices specifically tailored for higher education, focusing on instructional strategies, assessment methods, and curricular design principles that foster student engagement and success. Through a combination of theory and hands-on applications, participants will critically examine the integration of technology, inclusivity, and active learning techniques in university classrooms. Emphasis will be placed on developing reflective teaching practices that empower future faculty to inspire and mentor the next generation of scientists

BIOL 714 Biomedical Sciences Laboratory (2 Credit Hours)

Three laboratory rotations (6 credits) are required by the curriculum.

Prerequisites: approval of the program director

BIOL 715 Biomedical Sciences Laboratory (2 Credit Hours)

BIOL 716 Endocrinology (5 Credit Hours)

The biochemical integration of hormones and related agents on vertebrate physiology with emphasis on human endocrinology. Recent literature will be stressed.

BIOL 720 Systematic Ichthyology (3 Credit Hours)

A systematic survey of fishes emphasizing life history, anatomy, identification and classification.

Prerequisites: BIOL 520

BIOL 724 Neuromuscular Physiology (3 Credit Hours)

This course will provide a comprehensive discussion of the physiological and chemical properties of nerve and muscle cells.

BIOL 730 Emerging Infectious Diseases (3 Credit Hours)

Discussion on current studies into new and reemerging infectious diseases with an examination of the infectious agent and factors involved in disease emergence, prevention and elimination.

Prerequisites: A microbiology course

BIOL 731 Systematics and Speciation (3 Credit Hours)

Principles of systematic biology and discussion of speciation theory, with emphasis on generation, analysis, and interpretation of taxonomic data and application of these data to a better understanding of classification and speciation processes. Modern theories of evolutionary biology and phylogenetics will be stressed. A research paper is required.

BIOL 732 GIS in the Life Sciences (3 Credit Hours)

This course is designed to introduce students to geographic information systems through examples and applications in the life sciences.

BIOL 737 Advanced One Health (3 Credit Hours)

One Health is a concept that stresses the interconnectedness of human, animal, and environmental/ecosystem health and seeks an integrative approach to human and animal health issues. The concept provides a framework for examining complex health issues such as vector-borne and emerging infectious diseases, antimicrobial resistance, and food safety and security. In our globalized world, new approaches to preventing, treating, and controlling diseases are urgently needed as emerging diseases are increasing in frequency due to interconnected ecosystems and the close connections between humans and animals.

Prerequisites: An introductory One Health course (BIOL 437W or BIOL 537 or equivalent)

BIOL 740 Vaccinology (3 Credit Hours)

This course will explore a broad range of concepts important to the field of vaccinology. Primary literature will be used to discuss vaccine development topics such as vaccine design and production, delivery methods, adjuvants, One Health, and zoonotic vaccines. HIV, TB, malaria, influenza, and parasite vaccines will be included.

BIOL 745 Advanced Immunology (3 Credit Hours)

Current concepts in cellular and molecular immunology and host defense based on critical review of the primary literature.

BIOL 747 Responsible and Ethical Conduct of Research (3 Credit Hours)

Required of all graduate students admitted to Biology programs. The course will introduce students to the responsible conduct of science and scientific research.

BIOL 748 Functional Genomics and Proteomics in Animal Models (3 Credit Hours)

The purpose of this course is to show how animal models of human diseases can be created and analyzed using genomic and proteomic technologies. The course will overview high throughput methods of generating disease models in mice and describe ongoing efforts in this field. Attempts to identify molecular mechanisms of the disease will be presented with particular emphasis on drug target discovery.

Pre- or corequisite: An immunology course

BIOL 749 Biogeography (3 Credit Hours)

Emphasis on historical biogeography, utilizing both dispersal and vicariance models for explanations of the geographic distribution of organisms. Ecological explanations are also considered. Useful techniques for biogeographic analyses, such as comparison of area cladograms are discussed at length.

BIOL 750 Marine Benthic Ecology (4 Credit Hours)

Application of ecological principles at the community level to marine benthic environments. Discussion of community structure, animal-sediment relationships, roles of benthic communities in marine ecosystems.

Prerequisites: BIOL 515 or equivalent

BIOL 754 Phylogeny and Molecular Lecture and Laboratory (5 Credit Hours)

This course is intended to be an introduction to the processes and procedures used to reconstruct the evolutionary history of living organisms. Topics include project planning, sampling strategies, molecular techniques, and analytical and tree-building programs used to infer phylogeny. Lab provides computer experience in multiple phylogenetic software packages.

Prerequisites: Instructor approval required

BIOL 755 Molecular Genetics (3 Credit Hours)

Current molecular understanding of genetic processes will be reviewed. Applications to areas such as development and evolution will also be covered.

BIOL 756 Phylogeny and Molecular Systematics (5 Credit Hours)

This course is intended to be an introduction to the processes and procedures used to reconstruct the evolutionary history of living organisms. Topics include project planning, sampling strategies, molecular techniques, and analytical and tree-building programs used to infer phylogeny. Lab provides computer experience in multiple phylogenetic software packages.

BIOL 757 Statistics in Biology (4 Credit Hours)

Both a refresher course and an introduction to commonly used modern statistical methods for graduate students in Biology. The focus is on application and hypothesis testing with examples drawn from the field of biology. The course requires a substantial amount of homework and self-initiative outside the classroom.

Prerequisites: course background in statistics

BIOL 758 Molecular Ecology (4 Credit Hours)

Scientists are increasingly using molecular methods to help them address fundamental questions in the population ecology and evolution of biological species. This class will introduce graduate students to the basic concepts and methods in molecular evolution, phylogenetics and methods into their research. Theory and concepts from lecture will be illustrated through reading and discussion of current scientific literature. Students will also directly apply the course material to a class project investigating population structure of marine species from the tropical Indo-Pacific, for which they will be trained in methods of DNA extraction, PCR and sequencing. They will present their results orally in a mini-symposium at the end of the course.

Prerequisites: BIOL 671

BIOL 759 Foundations and Principles in Ecology (3 Credit Hours)

A survey of the seminal ideas and perspectives in historical and contemporary ecology. The course is designed to provide a broad overview of the important theoretical and conceptual paradigms in ecology.

BIOL 762 Restoration Ecology (3 Credit Hours)

This course will cover the field of environmental restoration guided by ecological theory and empirical research and connects with many broad themes in ecology, including physiology, genomics, biodiversity, conservation, species dispersal and migration, and population dynamics. This course will cover underlying principles guiding successful restoration, foundational and recent empirical research in this field, and restoration policies and practice.

BIOL 770 Advanced Study in Biology (3 Credit Hours)

Under the guidance of members of the graduate faculty and with the approval of the program track coordinator, the student will carry out in-depth studies of selected topics relevant to the area of specialization. Extensive surveys and analyses of the literature. Written reviews, comprehensive and synoptic, and oral presentations are required of each student.

BIOL 771 Vector-Borne Diseases (3 Credit Hours)

Study of the role of insects, ticks and other invertebrates in the transmission of disease. Different areas of disease transmission will be examined, including physiological and biochemical aspects of microbial survival in the vector and transmission to vertebrate hosts, as well as ecological aspects.

BIOL 772 Modeling and Simulation in the Life Sciences (4 Credit Hours)

Course is designed to introduce students to modeling and simulation techniques using examples and applications in the life sciences.

BIOL 775 Grant Writing in Biology (3 Credit Hours)

Provides students with the skills to write competitive grant proposals to both private and federal funding sources (emphasis on NIH and NSF). Students will learn how to find the most appropriate funding mechanisms and how to position themselves to be competitive. Different grant writing formats will be illustrated through proposal development projects.

BIOL 781 Autoimmunity and Transplantation (3 Credit Hours)

Major research advances in immunology have resulted in substantially increasing the understanding of the molecular and cellular basis of autoimmune diseases and transplantation. The course will focus on these new advances to improve the understanding of these diseases. Topics will include a brief review of the immune system; multiple sclerosis, arthritis and other immune diseases; and the molecular and cellular basis of transplantation and chronic rejection of organ grafts.

Prerequisites: course background in cell biology and immunology recommended

BIOL 789 Gross Anatomy (6 Credit Hours)

An intense study of all systems from a regional approach. Extensive dissections required in lab. Clinical applications utilized.

Prerequisites: An anatomy course recommended

BIOL 795 Special Topics in Biology (1-4 Credit Hours)

Study of special topics.

Prerequisites: permission of the instructor

BIOL 800 Cardiovascular Physiology (4 Credit Hours)

This physiology course will focus solely on cardiovascular physiology. Lectures will focus on basic and advance cardiovascular principles. The laboratory will focus on the use of current cardiovascular research.

BIOL 801 Practical Computing for Biology (3 Credit Hours)

This hands-on training course emphasizes the use of general computing tools to work more effectively in the biological sciences. It integrates a broad range of powerful and flexible tools that are applicable to ecologists, molecular biologists, physiologists, and anyone who has struggled analyzing large or complex data sets. Text file manipulation with regular expressions, basic shell scripting, programming in Python and R, interaction with remote devices, and basic graphical concepts will be reviewed.

BIOL 802 Biomedical Sciences Journal Club (1 Credit Hour)

Review and discussion of current papers in the areas of biomedical sciences. Student presentation, discussions and readings in this field required.

BIOL 803 Advanced Genomics Data Analysis (3 Credit Hours)

This course is designed to teach students the various steps involved in analyzing next-generation sequencing data for gene expression profiling and polymorphism identification and analyses. The class will follow a workshop setting with a combination of lectures, paper discussions, and instructor and student led programming sessions.

BIOL 804 Animal Ecophysiology (3 Credit Hours)

This course integrates the physiological and biochemical function of wild animals with population-scale and community-scale ecological patterns. Both organismal mechanisms and comprehensive theories will be included. The course primarily draws on peer-reviewed literature and includes lecture and discussion.

BIOL 805 Advanced Microbiology (3 Credit Hours)

Investigate microbiology from historical perspectives to modern molecular microbiology; ecological and biomedical components; bacteria and viruses. Discussions will include how to design experiments and evaluate results.

Prerequisites: A microbiology course

BIOL 806 Core Concepts in Biology (3 Credit Hours)

This course is designed to equip students with core concepts and fundamental skill sets for all sub-disciplines in the biological sciences. Major topics will include evolutionary and ecological processes, foundational concepts in comparative physiology, cellular biology, microbiology, immunology, genetics, advanced molecular biology, and the interrelatedness of the human, animal, and environmental domains. The course emphasizes the integration of topics and builds the analytical skills and conceptual framework that prepares students for advanced study and research in the biological sciences.

BIOL 807 Ecosystem Ecology (5 Credit Hours)

Ecological principles at ecosystem level of biological organization. Discussion of energy flow, nutrient cycling, ecosystem stability and ecosystem modeling. Laboratory involves field trips and methods of measuring ecosystem parameters.

Prerequisites: a general ecology course

BIOL 808 Biology Seminar (1 Credit Hour)

This graduate seminar offers a dynamic exploration of the biological sciences through a rotating roster of faculty presenting diverse topics. Participants will engage in discussions of contemporary research papers, receive training in science communication and career development, and/or analyze seminal texts that have shaped the field.

BIOL 809 Current Issues in Biology (1 Credit Hour)

The course is a weekly lecture series of invited external and internal experts in Biology that will highlight the broad nature of biology research. Students will achieve a comprehensive understanding of biology through reinforcement of key fundamental concepts and exposure to a wide range of sub-disciplines.

BIOL 810 Advanced Cell Biology (3 Credit Hours)

This course will cover selected current topics in cell biology that reflect recent advances in the field. Major topics include membranes and transport, signal transduction, cell adhesion and motility, cell cycle, apoptosis, and specialized cell functions. Students will read current research papers that describe the latest innovations in microscopic and molecular analysis of cellular function. This course is built on previous coursework in cell biology by reinforcing key fundamental concepts and performing a more in-depth examination of cellular mechanisms.

Prerequisites: Course background in cell biology is recommended

BIOL 811 Advanced Skills in Biology (2 Credit Hours)

This course provides hands-on training in cutting-edge methodologies for biological sciences research. Students will engage in supervised laboratory or field exercises, depending on their disciplinary focus, mastering advanced techniques, instrumentation, and data collection methodologies. By applying these methods to real research problems, this course aims to bridge theoretical knowledge with practical application, preparing students to contribute effectively to the advancement of biological research.

BIOL 812 Biological Microscopy (4 Credit Hours)

Lectures will cover theory and concepts of specimen preparation and operation of various microscopes used in the biological sciences. The laboratory experience will include specimen preparation to viewing.

Prerequisites: permission of the instructor

BIOL 813 Biology Education and Teaching (1 Credit Hour)

This graduate-level course is designed to prepare future faculty for effective teaching in the biological sciences at the university level. Students will explore pedagogical theories and practices specifically tailored for higher education, focusing on instructional strategies, assessment methods, and curricular design principles that foster student engagement and success. Through a combination of theory and hands-on applications, participants will critically examine the integration of technology, inclusivity, and active learning techniques in university classrooms. Emphasis will be placed on developing reflective teaching practices that empower future faculty to inspire and mentor the next generation of scientists.

BIOL 814 Biomedical Sciences Laboratory (2 Credit Hours)

Three laboratory rotations (6 credits) are required by the curriculum.

Prerequisites: approval of the program director

BIOL 816 Endocrinology (5 Credit Hours)

The biochemical integration of hormones and related agents on vertebrate physiology with emphasis on human endocrinology. Recent literature will be stressed.

BIOL 820 Systematic Ichthyology (3 Credit Hours)

A systematic survey of fishes emphasizing life history, anatomy, identification and classification.

Prerequisites: BIOL 520

BIOL 824 Neuromuscular Physiology (3 Credit Hours)

This course will provide a comprehensive discussion of the physiological and chemical properties of nerve and muscle cells.

BIOL 830 Emerging Infectious Diseases (3 Credit Hours)

Discussion on current studies into new and reemerging infectious diseases with an examination of the infectious agent and factors involved in disease emergence, prevention and elimination.

Prerequisites: A microbiology course

BIOL 831 Systematics and Speciation (3 Credit Hours)

Principles of systematic biology and discussion of speciation theory, with emphasis on generation, analysis, and interpretation of taxonomic data and application of these data to a better understanding of classification and speciation processes. Modern theories of evolutionary biology and phylogenetics will be stressed. A research paper is required.

BIOL 832 GIS in the Life Sciences (3 Credit Hours)

This course is designed to introduce students to geographic information systems through examples and applications in the life sciences.

BIOL 837 Advanced One Health (3 Credit Hours)

One Health is a concept that stresses the interconnectedness of human, animal, and environmental/ecosystem health and seeks an integrative approach to human and animal health issues. The concept provides a framework for examining complex health issues such as vector-borne and emerging infectious diseases, antimicrobial resistance, and food safety and security. In our globalized world, new approaches to preventing, treating, and controlling diseases are urgently needed as emerging diseases are increasing in frequency due to interconnected ecosystems and the close connections between humans and animals.

Prerequisites: An introductory One Health course (BIOL 437W or BIOL 537 or equivalent)

BIOL 840 Vaccinology (3 Credit Hours)

This course will explore a broad range of concepts important to the field of vaccinology. Primary literature will be used to discuss vaccine development topics such as vaccine design and production, delivery methods, adjuvants, One Health, and zoonotic vaccines. HIV, TB, malaria, influenza, and parasite vaccines will be included.

BIOL 845 Advanced Immunology (3 Credit Hours)

Current concepts in cellular and molecular immunology and host defense based on critical review of the primary literature.

BIOL 847 Responsible and Ethical Conduct of Research (3 Credit Hours)

The course will introduce students to the responsible conduct of science and scientific research.

BIOL 848 Functional Genomics and Proteomics in Animal Models (3 Credit Hours)

The purpose of this course is to show how animal models of human diseases can be created and analyzed using genomic and proteomic technologies. The course will overview high throughput methods of generating disease models in mice and describe ongoing efforts in this field. Attempts to identify molecular mechanisms of the disease will be presented with particular emphasis on drug target discovery.

Pre- or corequisite: An immunology course

BIOL 849 Biogeography (3 Credit Hours)

Emphasis on historical biogeography, utilizing both dispersal and vicariance models for explanations of the geographic distribution of organisms. Ecological explanations are also considered. Useful techniques for biogeographic analyses, such as comparison of area cladograms are discussed at length.

BIOL 850 Marine Benthic Ecology (4 Credit Hours)

Application of ecological principles at the community level to marine benthic environments. Discussion of community structure, animal-sediment relationships, roles of benthic communities in marine ecosystems.

Prerequisites: BIOL 515 or equivalent

BIOL 854 Phylogeny and Molecular Lecture and Laboratory (5 Credit Hours)

This course is intended to be an introduction to the processes and procedures used to reconstruct the evolutionary history of living organisms. Topics include project planning, sampling strategies, molecular techniques, and analytical and tree-building programs used to infer phylogeny. Lab provides computer experience in multiple phylogenetic software packages.

Prerequisites: Instructor approval required

BIOL 855 Molecular Genetics (3 Credit Hours)

Current molecular understanding of genetic processes will be reviewed. Applications to areas such as development and evolution will also be covered.

BIOL 856 Phylogeny and Molecular Systematics (5 Credit Hours)

This course is intended to be an introduction to the processes and procedures used to reconstruct the evolutionary history of living organisms. Topics include project planning, sampling strategies, molecular techniques, and analytical and tree-building programs used to infer phylogeny. Lab provides computer experience in multiple phylogenetic software packages.

BIOL 857 Statistics in Biology (4 Credit Hours)

Both a refresher course and an introduction to commonly used modern statistical methods for graduate students in Biology. The focus is on application and hypothesis testing with examples drawn from the field of biology. The course requires a substantial amount of homework and self-initiative outside the classroom.

Prerequisites: course background in statistics

BIOL 858 Molecular Ecology (4 Credit Hours)

Scientists are increasingly using molecular methods to help them address fundamental questions in the population ecology and evolution of biological species. This class will introduce graduate students to the basic concepts and methods in molecular evolution, phylogenetics and methods into their research. Theory and concepts from lecture will be illustrated through reading and discussion of current scientific literature. Students will also directly apply the course material to a class project investigating population structure of marine species from the tropical Indo-Pacific, for which they will be trained in methods of DNA extraction, PCR and sequencing. They will present their results orally in a mini-symposium at the end of the course.

Prerequisites: BIOL 671

BIOL 859 Foundations and Principles in Ecology (3 Credit Hours)

A survey of the seminal ideas and perspectives in historical and contemporary ecology. The course is designed to provide a broad overview of the important theoretical and conceptual paradigms in ecology.

BIOL 861 Ecological Sciences Internship (3-6 Credit Hours)

Internship experience.

Prerequisites: approval of advisory committee

BIOL 862 Restoration Ecology (3 Credit Hours)

This course will cover the field of environmental restoration guided by ecological theory and empirical research and connects with many broad themes in ecology, including physiology, genomics, biodiversity, conservation, species dispersal and migration, and population dynamics. This course will cover underlying principles guiding successful restoration, foundational and recent empirical research in this field, and restoration policies and practice.

BIOL 871 Vector-Borne Diseases (3 Credit Hours)

Study of the role of insects, ticks and other invertebrates in the transmission of disease. Different areas of disease transmission will be examined, including physiological and biochemical aspects of microbial survival in the vector and transmission to vertebrate hosts, as well as ecological aspects.

BIOL 872 Modeling and Simulation in Life Sciences (4 Credit Hours)

Course is designed to introduce students to modeling and simulation techniques using examples and applications in the life sciences.

BIOL 875 Grant Writing in Biology (3 Credit Hours)

Provides students with the skills to write competitive grant proposals to both private and federal funding sources (emphasis on NIH and NSF). Students will learn how to find the most appropriate funding mechanisms and how to position themselves to be competitive. Different grant writing formats will be illustrated through proposal development projects.

BIOL 880 Advanced Study in Biology (3 Credit Hours)

Under the guidance of members of the graduate faculty and with the approval of the program track coordinator, the student will carry out in-depth studies of selected topics relevant to the area of specialization. Extensive surveys and analyses of the literature. Written reviews, comprehensive and synoptic, and oral presentations are required of each student.

BIOL 881 Autoimmunity and Transplantation (3 Credit Hours)

Major research advances in immunology have resulted in substantially increasing the understanding of the molecular and cellular basis of autoimmune diseases and transplantation. The course will focus on these new advances to improve the understanding of these diseases. Topics will include a brief review of the immune system; multiple sclerosis, arthritis and other immune diseases; and the molecular and cellular basis of transplantation and chronic rejection of organ grafts.

Prerequisites: course background in cell biology and immunology recommended

BIOL 889 Gross Anatomy (6 Credit Hours)

An intense study of all systems from a regional approach. Extensive dissections required in lab. Clinical applications utilized.

Prerequisites: Anatomy and Physiology course

BIOL 890 Biomedical Doctoral Seminar (2 Credit Hours)

Doctoral students in the Biomedical Sciences program will attend seminars, learn how to properly give a seminar, and present a seminar on their own research.

BIOL 895 Special Topics in Biology (1-4 Credit Hours)

Study of special topics.

Prerequisites: permission of the instructor

BIOL 898 Research in Biology (1-9 Credit Hours)

Supervised research.

BIOL 899 Dissertation (1-6 Credit Hours)**BIOL 998 Master's Graduate Credit (1 Credit Hour)**

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

BIOL 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

BM - Biomedical Sciences (Medical Masters)

BM 501 Foundations of Disease (10 Credit Hours)

Foundations of Disease teaches foundational knowledge that provides the fundamental building blocks necessary to progress to subsequent organ system modules within the curriculum. This course covers molecular cell biology and biochemistry, the interaction of cells with their environment, including the structure and function of tissues, electrical activity in cellular function, autonomic physiology, and the basic principles of pharmacology.

BM 502 Introduction to Organ Systems (8 Credit Hours)

Introduction to Organ Systems represents the transition to organ system courses in the Care Forward Curriculum. Students will explore the histology, immunology, microbiology, pathology, physiology/pathophysiology, and pharmacology of the following – heme, musculoskeletal (muscle/bone), skin, and gastrointestinal organ systems. Integration is achieved across all major medical basic science disciplines, from normal anatomic and physiologic functions to abnormal disease states to relevant pharmacotherapy.

BM 503 Hormones (4 Credit Hours)

The Hormones course will enable students to acquire and apply knowledge of internal homeostasis/metabolism from basic science to clinical situations. Students will review the embryological and anatomical development of the endocrine system; they will acquire and apply physiological, pharmacological, and pathological knowledge necessary to prevent, evaluate, and treat metabolic, and endocrine disorders.

BM 519 Medical School Preparation 2.0 (3 Credit Hours)

This course will explore non-academic aspects of preparing for admission to and success in medical school. The students will develop communication skills by engaging in team-based activities and mock interviews. They will be introduced to clinical skills by participating in standardized patient encounters. Group activities will help students develop their professionalism and professional identity. Guest physician lecturers will enhance the students' knowledge of the practice of medicine.

BM 524 Medical School Preparation 1.0 (1 Credit Hour)

Medical School Prep will discuss the expectations of a medical student/physician, on overview of community engaged learning opportunities, and application preparation guidance. The 15 AAMC Core Competencies for medical school students will be reviewed, why they are important in a future career as a physician, and how one might display them through application materials. Students will also be instructed on how to participate in Community Engaged Learning, and an average of 40 hours each semester of engagement will be required. Finally, the MD and DO medical school applications will be reviewed, including personal statements and topics such as how to decide where to apply and budgeting for the application cycle will be discussed. Twice a semester reflections will be due covering topics such as characteristics of a good medical student/physician and resilience and wellness.

BM 525 Medical School Preparation 1.5 (1 Credit Hour)

Medical School Prep will discuss the expectations of a medical student/physician, on overview of community engaged learning opportunities, and application preparation guidance. The 15 AAMC Core Competencies for medical school students will be reviewed, why they are important in a future career as a physician, and how one might display them through application materials. Students will also be instructed on how to participate in Community Engaged Learning, and an average of 40 hours each semester of engagement will be required. Finally, the MD and DO medical school applications will be reviewed, including personal statements and topics such as how to decide where to apply and budgeting for the application cycle will be discussed. Twice a semester reflections will be due covering topics such as characteristics of a good medical student/physician and resilience and wellness.

BM 530 Foundational Science II (8 Credit Hours)

Foundational Science II is a 17-week module divided into four blocks. In the first block, molecular and cell biology will be reviewed. In block two, metabolism and cell signaling will be covered. In the third block, the interaction of cells with their environment will be explored, including the structure and function of tissues, electrical activity in cellular function, autonomic physiology and the basic principles of biostatistics and pharmacology will be introduced. In the final block of the module, a brief introduction to microorganisms will be provided and then learning the foundations of immunology. Together, the module will provide the foundational building blocks necessary to progress to subsequent modules in the curriculum.

BM 534 MCAT Preparation (4 Credit Hours)

The students will take an MCAT preparation course taught by Kaplan Test Prep during the spring of year 1. The faculty advisors and academic counselors will monitor students' progress in the course.

BM 536 Human Structure (7 Credit Hours)

The Human Structure course provides a comprehensive overview of clinically relevant human anatomy through a case-based, collaborative approach. The module describes the human body's form, structure, function, and development by recognizing typical variations and using these variations to describe and explain clinically relevant abnormalities. Students utilize critical thinking skills and then learn to integrate the anatomical sciences, and medical imaging while engaging with content that strongly emphasizes cultural humility, professionalism, and ethical behavior.

BME - Biomedical Engineering

BME 503 Introduction to Mathematical Modeling in Physiology (3 Credit Hours)

This course introduces model development and model formulation with differential equations in physiology. Students will learn how to use Matlab to solve differential equations and visualize their results. The physiological focus will be on cellular physiology, particularly ion channel dynamics and homeostasis.

Prerequisites: BIOL 240 or BIOL 250 and MATH 200 or MATH 205 or MATH 211

BME 504 Introduction to Biomaterials (3 Credit Hours)

This course will introduce the properties of biomedical materials used as implants, prostheses, orthosis, and tissue-engineered materials as medical devices in contact with tissues and organs. Biocompatibility, immunological responses, wound healing, clotting cascade, surface compatibility and characterization of materials used for implantable medical devices will be introduced. Other topics such as ethical considerations and medical device regulatory mechanisms will be presented.

Prerequisites: BIOL 240 or BIOL 250 and MATH 200 or MATH 205 or MATH 211

BME 505 Biomechanics (3 Credit Hours)

The purpose of this course is to achieve a broad overview of biomechanics, focused on the musculoskeletal system. Students will explore multiscale mechanics, including whole-body movement and mechanical properties of the structures in the musculoskeletal system. Additionally, students will survey the experimental methods and computational modeling techniques used in biomechanics research.

Prerequisites: BIOL 240 or BIOL 250, and MATH 212

BME 509 Introduction to Regenerative Medicine (3 Credit Hours)

This course will introduce fundamental knowledge in regenerative medicine including therapeutic applications of biomaterials, tissue and stem cell engineering, gene therapy and bioelectronics, with emphasis on structure-function relationships of biologic systems. In addition to lecture, students will have opportunities for group discussions and presentations on milestone work related to tissue regeneration. Students will leave with a thorough understanding of true mammalian regeneration, wound healing/repair processes, and medical device milestones as related to human tissue regeneration and repair.

Prerequisites: BIOL 240 or BIOL 250 and MATH 200 or MATH 205 or MATH 211

BME 530 Therapy and Function Models for Medical Simulation (3 Credit Hours)

This course introduces students to the main Modeling & Simulation models. (1) Anatomical modeling based on robust medical image segmentation and meshing methodologies. (2) A therapy model to determine the impact of a medical intervention by synthesizing the effect of a therapy on the patient's tissues. (3) A collision model, which interacts with anatomy and therapy models, is used for haptics-driven simulations. This course will also explore physiological simulation and the use of finite elements to model biomechanics.

Prerequisites: ECE 250 or CS 250 or CS 251 and CS 260 or equivalent

BME 554 Introduction to Bioelectronics (3 Credit Hours)

This course covers the electrical properties of cells and tissues as well as the use of electrical and magnetic signals and stimuli in the diagnosis and treatment of disease. Typical topics to be covered include basic cell physiology, endogenous electric fields in the body, electrocardiography, cardiac pacing defibrillation, electrotherapy, electroporation, electrotherapy in wound healing. In addition ultra-short electrical pulses for intracellular manipulation and the application of plasmas to biological systems will be covered.

BME 562 Introduction to Medical Image Analysis (3 Credit Hours)

Introduction to basic concepts in medical image analysis. Medical image registration, segmentation, feature extraction, and classification are discussed. Basic psychophysics, fundamental ROC analysis and FROC methodologies are covered. Cross-listed with ECE 562/MSIM 562.

BME 564 Biomedical Applications of Low Temperature Plasmas (3 Credit Hours)

This course is cross listed with ECE and Biology. It is designed to be taken by senior undergraduate students and first year graduate students. The course contents are multidisciplinary, combining materials from engineering and the biological sciences. The course covers an introduction to the fundamentals of non-equilibrium plasmas, low temperature plasma sources, and cell biology. This is followed by a detailed discussion of the interaction of low temperature plasma with biological cells, both prokaryotes and eukaryotes. Potential applications in medicine such as wound healing, blood coagulation, sterilization, and the killing of various types of cancer cells will be covered.

Prerequisites: Senior standing

BME 595 Topics in Biomedical Engineering (1-3 Credit Hours)

This course explores specialized topics in biomedical engineering, providing an in-depth study of emerging trends, technologies, and applications in the field. Topics may vary by semester and are designed to enhance students' understanding of cutting-edge developments in biomedical engineering.

Prerequisites: Departmental approval

BME 597 Independent Study in Biomedical Engineering (1-3 Credit Hours)

This course allows students to pursue independent research or study in biomedical engineering under the guidance of a faculty mentor. Students will explore specific areas of interest, develop problem-solving skills, and gain hands-on experience in a focused topic. A written report or presentation may be required as part of the course. Supervised and approved by the advisor.

Prerequisites: Departmental approval

BME 612 Digital Signal Processing I (3 Credit Hours)

This course covers fundamentals of digital signal processing. Topics include frequency domain analysis of discrete-time signals and linear systems, sampling and reconstruction of signals, the Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), and digital filter design and implementations. Practical applications and examples will be discussed. Problem solving using MATLAB is required. Cross-listed with ECE 612.

Prerequisites: ECE 381 or equivalent

BME 695 Topics in Biomedical Engineering (3 Credit Hours)

This course will be offered as needed, depending upon the need to introduce special subjects to target specific areas of master's-level specializations in biomedical engineering.

BME 698 Master's Project (1-3 Credit Hours)

Individual project directed by the student's professor in major area of study.

BME 699 Master's Thesis (1-9 Credit Hours)

Directed research for the master's thesis.

Prerequisites: departmental approval

BME 700 Cardiovascular Physiology (4 Credit Hours)

This physiology course will focus solely on cardiovascular physiology. Lectures will focus on basic and advance cardiovascular principles. The laboratory will focus on the use of current cardiovascular research.

BME 702 Biomedical Sciences Journal Club (1 Credit Hour)

Review and discussion of current papers in the areas of biomedical sciences. Student presentation, discussions and readings in this field required.

BME 710 Advanced Cell Biology (3 Credit Hours)

This course will cover selected current topics in cell biology that reflect recent advances in the field. Major topics include membranes and transport, signal transduction, cell adhesion and motility, cell cycle, apoptosis, and specialized cell functions. Students will read current research papers that describe the latest innovations in microscopic and molecular analysis of cellular function. This course is built on previous coursework in cell biology by reinforcing key fundamental concepts and performing a more in-depth examination of cellular mechanisms.

Prerequisites: Course background in cell biology recommended

BME 711 Biological Mechanisms for Biomedical Engineers (3 Credit Hours)

This course is designed for students without a sufficient background in biology and physiology, providing them with the essential biological foundations needed for biomedical engineering. It equips students with a comprehensive understanding of biological and physiological systems, chemical building blocks of life (proteins, lipids, carbohydrates, nucleic acids), the structure and function of various human organs, cell structure and function, key concepts in cellular and molecular biology, molecular genetics and genetic engineering, human physiology relevant to biomedical applications, as well as pathophysiology and disease mechanisms. The course also introduces biological characterization techniques, such as cellular and molecular analyses and immunohistological characterization of tissues.

BME 712 Engineering Fundamentals in Biomedicine (3 Credit Hours)

This course introduces students without a sufficient engineering background to the essential mathematical and engineering principles needed for biomedical engineering. Students will build foundational knowledge in mathematical concepts and core engineering areas, such as mechanical and electrical engineering. This foundation will enable them to analyze, design, and implement engineering solutions to biomedical challenges. Emphasis is placed on problem-solving, critical thinking, and understanding the integration of engineering concepts within biological systems, equipping students with the insights needed for interdisciplinary work in biomedical engineering.

BME 714 Biomedical Sciences Laboratory (2 Credit Hours)

Three laboratory rotations (6 credits) are required by the curriculum.

Prerequisites: Approval of the Program Director

BME 720 Modern Biomedical Instrumentation (3 Credit Hours)

This course covers the design of modern biomedical instruments including select diagnostic, assistive, therapeutic, prosthetic, imaging, and virtual devices and systems. Techniques for mechanical, electrical, and chemical sensor and transducer design; stimulation and measurement; data acquisition; digital signal processing; and data visualization will be examined.

BME 721 Mathematical Modeling in Physiology (3 Credit Hours)

This course on mathematical modeling in human physiology emphasizes the development of mathematical models, their implementation, and the interpretation of simulation data. The course focuses on cellular physiology, including membrane channels, excitability, and calcium dynamics; it also covers intercellular communication and spatially distributed systems.

BME 726 Biomaterials (3 Credit Hours)

This course covers fundamental principles and properties of biomedical materials used as implants, prostheses, orthosis, and tissue-engineered materials as medical devices in contact with tissues and organs. Advanced concepts of biocompatibility and material characterization will be discussed. Physiological response factors associated with materials and implanted devices used in the human body will be presented, including immunological responses, wound healing, clotting cascade and surface compatibility. Other topics such as ethical considerations and medical device regulatory mechanisms will be discussed.

BME 730 Predoctoral Fellowship Grant Writing (1 Credit Hour)

This course is designed to guide predoctoral students through the process of developing and writing competitive fellowship grant applications. Students will work one-on-one with a mutually agreeable faculty mentor to identify funding opportunities, refine research proposals, and draft key components of their applications. Emphasis will be placed on understanding the expectations of funding agencies, writing clear and compelling narratives, and addressing reviewer criteria. By the end of the course, students may have a polished grant proposal.

BME 731 Finite Element Analysis (3 Credit Hours)

This course provides an understanding of the finite element method (FEM) as derived from an integral formulation perspective. It demonstrates the solutions of (1-D and 2-D) continuum mechanics problems such as solid mechanics, fluid mechanics and heat transfer. It also provides insight into the theoretical formulation and numerical implementation of finite element methods.

BME 740 Regenerative Medicine (3 Credit Hours)

This course explores the engineering principles and techniques applied to regenerative medicine. Topics include advanced engineering methods for scaffold development, material characterization techniques, and the evaluation of tissue-engineered constructs through in vitro and in vivo analysis. Students will gain a comprehensive understanding of how engineering tools are utilized to address challenges in regenerating tissues and organs, bridging the gap between biology and engineering in regenerative medicine.

Prerequisites: Either BIOL 240 or BIOL 250 and one of MATH 200 or MATH 205 or MATH 211

BME 741 Principles of Visualization (3 Credit Hours)

Well-designed graphical media capitalizes on human facilities for processing visual information and thereby improves comprehension, memory, inference, and decision making. This course teaches techniques and algorithms for creating effective visualizations based on principles and techniques from graphic design, visual art, perceptual psychology and cognitive science. Both users and developers of visualization tools and systems will benefit from this course.

BME 747 Responsible Conduct of Research (2 Credit Hours)

The course will introduce students to the responsible conduct of science and scientific research.

BME 751 Computational and Statistical Methods in Biomedical Engineering (3 Credit Hours)

This course covers the theoretical foundation and application of commonly used techniques in biomedical engineering. Topics include linear algebra, partial differential equations, regression analysis, applied probabilities, multivariate distributions, Bayesian statistics, hypothesis tests, multiple comparisons, ANOVA, solution of non-linear equations, numerical methods and optimization. Programming software will be used to perform simulations and analyze biomedical data.

Prerequisites: Graduate status

BME 754 Advanced Bioelectrics (3 Credit Hours)

Bioelectrics is a new field encompassing both the science and technology of applying electrical stimuli to biological systems. This course covers the pulsed power technology that is required to generate electrical stimuli as well as the biological responses they evoke in cells and tissues. Particular emphasis is placed on the medical applications of bioelectrics, including tumor ablation, gene electrotransfer, wound healing, decontamination with cold plasma, and treatment of cardiac arrhythmias.

Prerequisites: ECE 454 or ECE 554 or BIOE 454 or BIOE 554

BME 755 Biomembranes and Ion Channels (3 Credit Hours)

This course will give an overview of the structure and dynamics of biomembranes, the ion channels that are embedded in them, and the electrical properties of biomembranes. Topics include molecular dynamics modeling of biomembranes, membrane damage and repair, ion channel dynamics and their experimental assessment using patch clamping, and excitability in neurons and cardiomyocytes.

Prerequisites: ECE 454 or ECE 554 or BIOL 523

BME 760 Autonomous and Robotic Systems Analysis and Control (3 Credit Hours)

Kinematics, dynamics and control of complex non-linear electro-mechanical systems, particularly robotic manipulators.

BME 762 Applied Medical Image Analysis (3 Credit Hours)

Course explores hands-on exposure to state-of-the-art algorithms in medical image analysis, which builds on open-source software (Insight Segmentation and Registration Toolkit - ITK), as well as the principles of medical image acquisition in the modalities of clinical interest. Medical imaging modalities - X-rays, CT, and MRI/ITK image pipeline; image enhancement, feature detection; segmentation - basic techniques, feature-based classification and clustering, graph cuts, active contour and surface models; surface and volume meshing; registration - transformations, similarity criteria; shape and appearance models are all explored and discussed in this course.

Prerequisites: Knowledge of C++ and object-oriented programming

BME 770 Advanced Study in Biology (3 Credit Hours)

Under the guidance of members of the graduate faculty and with the approval of the program track coordinator, the student will carry out in-depth studies of selected topics relevant to the area of specialization. Extensive surveys and analyses of the literature. Written reviews, comprehensive and synoptic, and oral presentations are required of each student.

BME 775 Grant Writing in Biology (3 Credit Hours)

Provides students with the skills to write competitive grant proposals to both private and federal funding sources (emphasis on NIH and NSF). Students will learn how to find the most appropriate funding mechanisms and how to position themselves to be competitive. Different grant writing formats will be illustrated through proposal development projects.

BME 783 Digital Image Processing (3 Credit Hours)

Principles and techniques of two-dimensional processing of images. Concepts of scale and spatial frequency. Image filtering in spatial and transform domains. Applications include image enhancement and restoration, image compressing, biomedical imaging for diagnosis of disease, and image segmentation for computer vision.

Prerequisites: ECE 782 or ECE 882

BME 785 Advanced Manufacturing Technology (3 Credit Hours)

Treatment of the next generation of manufacturing technology. Topics include additive manufacturing; rapid prototyping; electronic manufacturing; micro and nanofabrication; process simulation; product life cycle management; and sustainable design and manufacturing.

Prerequisites: MAE 682 or permission of Program Director

BME 792 Biomechanics (3 Credit Hours)

The purpose of this course is to achieve a broad overview of biomechanics, focused on the musculoskeletal system. Students will explore multiscale mechanics, including whole-body movement and mechanical properties of the structures in the musculoskeletal system. Additionally, students will survey the experimental methods and computational modeling techniques used in biomechanics research.

Prerequisites: MATH 212 or equivalent

BME 794 Cellular Biomechanics (3 Credit Hours)

A broad introduction to the field of cellular biomechanics. Topics include overview of cell architecture, cytoskeleton, adhesion and molecular motors, biomolecular/biopolymer dynamics and mechanics, techniques to measure cell mechanical properties, techniques to mechanically stimulate cells, models of cell mechanical behavior, mechanobiology and mechanotransduction. Will include discussion of classic and current research articles. Course content will aim to cater to students with diverse backgrounds – students with biological science background will be exposed to physical science concepts and analysis; students with engineering/physical science background will be exposed to biological phenomena and concepts.

Pre- or corequisite: MATH 212

BME 795 Special Topics in Biomedical Engineering (1-3 Credit Hours)

Special courses covering selected graduate-level topics in biomedical engineering.

BME 797 Independent Study (1-3 Credit Hours)

This course allows students to develop specialized expertise by independent study (supervised by a faculty member).

Prerequisites: departmental approval

BME 800 Cardiovascular Physiology (4 Credit Hours)

This physiology course will focus solely on cardiovascular physiology. Lectures will focus on basic and advance cardiovascular principles. The laboratory will focus on the use of current cardiovascular research.

BME 802 Biomedical Sciences Journal Club (1 Credit Hour)

Review and discussion of current papers in the areas of biomedical sciences. Student presentation, discussions and readings in this field required.

BME 810 Advanced Cell Biology (3 Credit Hours)

This course will cover selected current topics in cell biology that reflect recent advances in the field. Major topics include membranes and transport, signal transduction, cell adhesion and motility, cell cycle, apoptosis, and specialized cell functions. Students will read current research papers that describe the latest innovations in microscopic and molecular analysis of cellular function. This course is built on previous coursework in cell biology by reinforcing key fundamental concepts and performing a more in-depth examination of cellular mechanisms.

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Three laboratory rotations (6 credits) are required by the curriculum.

Prerequisites: Approval of the Program Director

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Prerequisites: Either BIOL 240 or BIOL 250 and one of MATH 200 or MATH 205 or MATH 211

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Prerequisites: ECE 454 or ECE 554 or BIOE 454 or BIOE 554

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Prerequisites: ECE 454 or ECE 554 or BIOL 523

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Kinematics, dynamics and control of complex non-linear electro-mechanical systems, particularly robotic manipulators.

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Prerequisites: Knowledge of C++ and object-oriented programming

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Principles and techniques of two-dimensional processing of images. Concepts of scale and spatial frequency. Image filtering in spatial and transform domains. Applications include image enhancement and restoration, image compressing, biomedical imaging for diagnosis of disease, and image segmentation for computer vision.

Prerequisites: ECE 783 and ECE 883

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Treatment of the next generation of manufacturing technology. Topics include additive manufacturing; rapid prototyping; electronic manufacturing; micro and nanofabrication; process simulation; product life cycle management; and sustainable design and manufacturing.

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Prerequisites: MATH 212 or equivalent

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A broad introduction to the field of cellular biomechanics. Topics include overview of cell architecture, cytoskeleton, adhesion and molecular motors, biomolecular/biopolymer dynamics and mechanics, techniques to measure cell mechanical properties, techniques to mechanically stimulate cells, models of cell mechanical behavior, mechanobiology and mechanotransduction. Will include discussion of classic and current research articles. Course content will aim to cater to students with diverse backgrounds – students with biological science background will be exposed to physical science concepts and analysis; students with engineering/physical science background will be exposed to biological phenomena and concepts.

Pre- or corequisite: MATH 212

BME 895 Special Topics in Biomedical Engineering (1-3 Credit Hours)

Special courses covering selected graduate-level topics in biomedical engineering.

BME 897 Independent Study (1-3 Credit Hours)

This course allows students to develop specialized expertise by independent study (supervised by a faculty member).

Prerequisites: departmental approval

BME 899 PHD Dissertation Research (1-9 Credit Hours)

Directed research for the doctoral dissertation.

BME 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

BMS - Biomedical Sciences

BMS 898 Doctoral Research (1-9 Credit Hours)

Supervised doctoral research.

Prerequisites: Instructor approval required

BMS 899 Dissertation Research (1-6 Credit Hours)

Directed research for the doctoral dissertation.

BMS 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

BNAL - Business Analytics

BNAL 503 Data Visualization and Exploration (3 Credit Hours)

This course introduces students to concepts and processes, technologies, and methodologies that are commonly used in data visualization that an organization may use to enhance its descriptive, predictive, and prescriptive methods for making fact-based decisions.

Prerequisites: A grade of C or better in BNAL 306 or an equivalent course or instructor's permission

BNAL 507 Prescriptive Analytics of Management Science (3 Credit Hours)

Students are introduced to prescriptive analytics through formulation and solution of mathematical models, with a particular focus on optimization models. The business use of the models, as well as their limitations, is emphasized. Topics include linear, integer, non-linear programming, network models, genetic algorithms, decision analysis, and project management models.

Prerequisites: A grade of C or better in BNAL 306 or an equivalent course or permission of the instructor

BNAL 515 Advanced Business Analytics/Big Data Applications (3 Credit Hours)

This course addresses advanced business analytics techniques and the application of such techniques to large data sets. Some alternative business analytics strategies are introduced. Descriptive, predictive, and prescriptive models are included. Topics covered in this course include data visualization and exploration, cluster analysis, and developing and calibrating predictive models for big data. Applications of multivariate, logistic, and probit regression to business analytics are discussed. Software packages such as SAS/JMP/SPSS may be used.

Prerequisites: A grade of C or better in BNAL 306 or BNAL 606 or an equivalent course or instructor's permission

BNAL 530 Probability and Statistics (3 Credit Hours)

This course provides a foundational understanding of probability and statistics in a business context. Students learn to analyze data, make informed decisions, and solve business problems using statistical techniques. Topics include sampling distributions, confidence intervals, hypothesis testing, simple and multiple regressions, and time series forecasting. Emphasis is placed on the application of the tools to business problems.

Prerequisites: Admission to the MBA program OR approval by the MBA program office

BNAL 532 Predictive Analytics for Business (3 Credit Hours)

Predictive analytics techniques for business. Applications include both shorter term forecasting for sales and operations management as well as forecasting for long term planning. Emphasis is on statistical methods to obtain and evaluate forecasts. Statistical models are implemented using standard software such as MINITAB, EXCEL, R, and/or Python.

Prerequisites: BNAL 306 or an equivalent course or permission of the instructor

BNAL 576 Simulation Modeling and Analysis for Business Systems (3 Credit Hours)

Simulation modeling is an integral part of the analytics revolution, enabling the creation of models that can represent the variability that exists in many real business systems. This course covers the theory and application of simulation modeling, with an emphasis on how simulation provides predictive and prescriptive analytics to support business decision-making. Topics include simulation fundamentals, the project life-cycle, model development, input and output analysis, verification and validation, and the presentation of a simulation study. We utilize a major commercial simulation software package for assignments and class projects.

BNAL 630 Intelligent Systems & Business Analytics (3 Credit Hours)

This course explores the intersection of intelligent systems and business analytics. Students gain insights into leveraging artificial intelligence and data analysis techniques to drive informed decision-making and solve complex business problems. Topics include descriptive analytics, predictive analytics, prescriptive analytics, AI, machine learning, and real-world case studies in various industries.

Prerequisites: BNAL 530 OR MBA 600 and BNAL 606

BNAL 667 Cooperative Education (1-3 Credit Hours)

Approval for enrollment and allowable credits are determined by the department. Additional support may be provided by the Monarch Internship and Co-Op Office in the semester prior to enrollment.

BNAL 668 Internship in Business Analytics (1-3 Credit Hours)

Approval for enrollment and allowable credits are determined by the department. Additional support may be provided by the Monarch Internship and Co-Op Office in the semester prior to enrollment.

BNAL 695 Selected Topics in Business Analytics (3 Credit Hours)

Advanced topics in business analytics offered periodically.

Prerequisites: Permission of the department chair and graduate program director

BNAL 697 Independent Study (3 Credit Hours)

Affords students the opportunity to undertake independent study under the direction of a faculty member.

Prerequisites: Permission of the instructor

BNAL 711 Multivariate Statistical Methods for Business (3 Credit Hours)

An applied study of statistical methods including analysis of variance, cross-sectional multiple regression, time series regression, panel data methods, discriminant analysis, and generalized linear models. Data analyzed using a computerized statistical package. Emphasizes development of the student's ability to use statistics for independent research.

Prerequisites: BNAL 606 or equivalent

BNAL 712 Advanced Statistical Models in Business Research (3 Credit Hours)

Advanced statistical models that are commonly encountered in business research. Topics include confirmatory factor analysis as well as structural equation modeling. Emphasis is on model development as well as use of statistical software in analyzing realistic business-oriented data sets.

Prerequisites: BNAL 711

BNAL 715 Multilevel Modeling in Business Research (1 Credit Hour)

This course introduces the fundamentals of multilevel modeling. Alternative methods of analysis are discussed and critiqued. Use of specialized multilevel modeling software is demonstrated. Topics include a detailed discussion of the issues associated with variable centering. Applications to business research investigations are emphasized.

Prerequisites: BNAL 711 or permission of the instructor

BNAL 721 Simulation Modeling for Business and Supply Chain Systems (3 Credit Hours)

This course covers both the theory and application of simulation modeling and analysis to business, supply chain, and logistics systems. Both discrete-event and continuous simulation modeling approaches are covered, using a major commercial simulation package. Emphasis will be on the use of simulation as a tool to support business, supply chain, and logistics decision making.

Prerequisites: BNAL 606 or STAT 330 or MSIM 601 or BNAL 476 or BNAL 576 or BNAL 722, or BNAL 822, or instructor's permission

BNAL 722 Agent-Based Simulation and Modeling (3 Credit Hours)

This course will explore both the conceptual and technical aspects of agent-based simulation, particularly as utilized for modeling of business systems. Students will explore the roots and literature of agent-based modeling and related fields. Students will also learn to develop agent-based simulation models using a major commercial simulation package.

Prerequisites: MBA 600 or BNAL 606 or MSIM 601 or BNAL 476 or BNAL 576 or BNAL 721 or BNAL 821

BNAL 796 Selected Topics in Business Analytics (1-3 Credit Hours)

The advanced study of selected topics not offered on a regular basis.

BNAL 821 Simulation Modeling for Business and Supply Chain Systems (3 Credit Hours)

This course covers both the theory and application of simulation modeling and analysis to business, supply chain, and logistics systems. Both discrete-event and continuous simulation modeling approaches are covered, using a major commercial simulation package. Emphasis will be on the use of simulation as a tool to support business, supply chain, and logistics decision making.

Prerequisites: BNAL 606 or STAT 330 or MSIM 601 or BNAL 476 or BNAL 576 or BNAL 722 or BNAL 822, or permission of the instructor or department

BNAL 822 Agent-Based Simulation and Modeling (3 Credit Hours)

This course will explore both the conceptual and technical aspects of agent-based simulation, particularly as utilized for modeling of business systems. Students will explore the roots and literature of agent-based modeling and related fields. Students will also learn to develop agent-based simulation models using a major commercial simulation package.

Prerequisites: MBA 600 or BNAL 606 or MSIM 601 or BNAL 476 or BNAL 576 or BNAL 721 or BNAL 821

BP - Biomedical Research (MS & PhD)

BP 700 Molecules to Cells (2 Credit Hours)

This course presents the basic cellular functions and processes. The course is divided into three modules which study genome and gene expression, biochemistry of the cell, cell organelles, the cytoskeleton and protein trafficking.

BP 701 Molecular and Cellular Techniques (2 Credit Hours)

This course provides an understanding of research techniques commonly employed in biomedical science research laboratories. Lectures cover molecular cloning and analysis, detection systems including PCR and real time PCR, working with proteins, basics of cell culture, and additional cutting-edge topics. Select techniques will be covered in the complementary hands-on laboratory component of this course.

BP 703 Cell Communication and Signaling (3 Credit Hours)

This is a foundational course covering basic cell membrane function, major cell signaling pathways, signaling pathway/network interaction, cell specialization, tissue histology and immunology.

BP 704 Molecular Genetics (2 Credit Hours)

This course covers key aspects of molecular genetics including the important concept of genetic screens as well as mutational analysis of gene and pathway function. Students learn the basic principles of Mendelian genetics, patterns of inheritance and human genetics; learn how model organisms (yeast, nematodes, flies, fish, mice) are utilized in the lab to study cellular pathways; and discuss the ethical considerations of genetic research.

BP 706 Cell Energetics & Organ Function (3 Credit Hours)

This course integrates elements of cellular metabolism with organ system physiology. Students will gain an understanding of and critically discuss the cellular metabolic pathways required for normal function and the systemic organ function with a focus on human physiology.

BP 708 Oral Communication Forum (1 Credit Hour)

This course is designed to equip students with the essential skills and knowledge required for delivering effective oral presentations of scientific papers and personal research projects. Through a combination of interactive exercises, didactic lectures, and personalized mentoring, students will gain confidence in their communication abilities and learn how to deliver impactful presentations. The course will also cover specialized topics such as elevator pitch-style and poster presentations.

BP 709 Scientific Writing & Research Design (1 Credit Hour)

Students learn how to design and write a realistic research proposal (R21 NIH grant format), and gain a general understanding of how different techniques can be used to address a wide range of research questions. The final version of the proposals are peer-reviewed and discussed in the format of an NIH grant study section.

BP 710 Oral Communication Forum (1 Credit Hour)

This course is designed to equip students with the essential skills and knowledge required for delivering effective oral presentations of scientific papers and personal research projects. Through a combination of interactive exercises, didactic lectures, and personalized mentoring, students will gain confidence in their communication abilities and learn how to deliver impactful presentations. The course will also cover specialized topics such as elevator pitch-style and poster presentations.

BP 719 Biomedical Sciences Lab Rotation I (2 Credit Hours)

Students get hands-on laboratory experience in these lab rotations, with help from a pre-designated faculty member. These courses are designed for students to sample different types of research models, techniques and subject matter.

BP 720 Biomedical Sciences Lab Rotation II (2 Credit Hours)

Students get hands-on laboratory experience in these lab rotations, with help from a pre-designated faculty member. These courses are designed for students to sample different types of research models, techniques and subject matter.

BP 721 Biomedical Sciences Lab Rotation III (2 Credit Hours)

Students get hands-on laboratory experience in these lab rotations, with help from a pre-designated faculty member. These courses are designed for students to sample different types of research models, techniques and subject matter.

BP 771 Methods & Logic in Translational Biology (3 Credit Hours)

This is an advanced course that emphasizes the key elements required to successfully design and conduct translational projects. The course serves as a bridge between basic research and the clinical manifestations of disease, and covers therapies of the future that are still under development.

BP 773 Responsible Conduct in Science (1 Credit Hour)

Series of lectures expose graduate students to moral and ethical dilemmas in biomedical sciences. The course will also expose students to peer review processes related to the submission of grants and manuscripts.

BP 781 Applied Biostatistics & Bioinformatics (3 Credit Hours)

This course is structured into three independent modules: biostatistics, bioinformatics and structural bioinformatics. The biostatistics module provides an introductory overview of the concepts behind and practical use of statistical analysis as it relates to the life sciences. The bioinformatics module provides an overview of basic bioinformatics concepts and commonly used tools, to include databases and genomic/proteomic resources, sequence analysis and genetic mapping, gene expression concepts, IPA and omic data analysis. The structural bioinformatics module provides students with fundamental knowledge of structural bioinformatics and computer-based approaches for protein structure visualization, comparison and classification.

BP 795 Special Topics: (2 Credit Hours)

Guided readings and discussions of current research topics in a specialized area.

Prerequisites: instructor approval

BP 798 Research (1-6 Credit Hours)

Students conduct research in the laboratory. This course is repeatable for credit.

BP 799 Thesis (1 Credit Hour)

A review of the literature and written presentation of the research as the MS thesis.

BP 819 Lab Rotation I (2 Credit Hours)

Students get hands-on laboratory experience in these lab rotations, with help from a pre-designated faculty member. These courses are designed for students to sample different types of research models, techniques and subject matter.

BP 820 Lab Rotation II (2 Credit Hours)

Students get hands-on laboratory experience in these lab rotations, with help from a pre-designated faculty member. These courses are designed for students to sample different types of research models, techniques and subject matter.

BP 821 Lab Rotation III (2 Credit Hours)

Students get hands-on laboratory experience in these lab rotations, with help from a pre-designated faculty member. These courses are designed for students to sample different types of research models, techniques and subject matter.

BP 873 Responsible Conduct in Science (1 Credit Hour)

This course features a series of lectures that expose graduate students to moral and ethical dilemmas in biomedical sciences. The course will also expose students to peer review processes related to submission of grants and manuscripts.

BP 883 Responsible Conduct in Science (1 Credit Hour)

Series of lectures exposes graduate students to moral and ethical dilemmas in biomedical sciences. The course also exposes students to peer review processes related to the submission of grants and manuscripts.

BP 895 Special Topics (2 Credit Hours)

Guided readings and discussions of current research topics in a specialized area.

Prerequisites: approval of instructor

BP 898 Research (1-9 Credit Hours)

Students conduct research in the laboratory. This course is repeatable for credit.

BP 899 Dissertation (1-9 Credit Hours)

A review of the literature and written presentation of research as the PhD thesis.

BUSN - Business Administration

BUSN 501 Business Planning for Entrepreneurs I (2 Credit Hours)

Students are introduced to readily available resources to research and analyze a comprehensive feasibility process including a clear statement of the business idea/model, selection of the North American Industry Classification System (NAICS) codes, and research and analysis of the applicable industry, market and competitors. A marketing strategy, to include pricing, is developed, with emphases on social media and similar outreach tools.

BUSN 551 Business Planning for Entrepreneur (2 Credit Hours)

Students are introduced to readily available resources to research and analyze a comprehensive feasibility process including a clear statement of the business idea/model, selection of the North American Industry Classification System (NAICS) codes, and research and analysis of the applicable industry, market and competitors. A marketing strategy, to include pricing, is developed, with emphases on social media and similar outreach tools.

BUSN 610 Strategic Artificial Intelligence (AI) Leadership (3 Credit Hours)

This course examines the leadership and organizational challenges of successfully integrating AI into business strategy and operations. Students will explore AI's impact on organizational structure, culture, and decision-making processes, and develop the skills to lead AI-driven transformations while considering ethical implications and societal impact.

BUSN 800 Seminar in International Business (3 Credit Hours)

This course will provide students with a comprehensive understanding of the environmental issues, institutions, opportunities, challenges, problems and managerial processes that are unique to international business. Both the micro and macro contexts in which international business is conducted will be examined.

BUSN 801 Research/Teaching Colloquium (1 Credit Hour)

The one-hour Research/Teaching Colloquium is mainly intended to promote research/teaching competencies of doctoral students through their exposure to presentations on and discussions of various topics dealing with research, writing, publishing and effective teaching. The presentations may be by faculty members, outside speakers or doctoral students.

BUSN 999 Doctoral Graduate Credit (1-10 Credit Hours)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

CAT - Counseling and Art Therapy

CAT 600 Basic Counseling Skills (3 Credit Hours)

Students will learn and develop basic counseling and art psychotherapy skills through didactic lectures, readings, in class role plays, and practical fieldwork to experience therapeutic and client relationships. Students will facilitate intake, risk assessment, art therapy assessment, and basic counseling and art psychotherapy skills with Standardized Patients. Students will experience the client role through process groups. Students will attend clinical case presentations and additional preparatory trainings. Open only to counseling & art therapy students.

CAT 601 Advanced Counseling Skills I (1 Credit Hour)

This course combines academic discussion and in-class practical applications of advanced counseling and art psychotherapy skills. Students will develop advanced counseling and art therapy skills through exploration and application of theoretical orientation, case formulation, implementation of the Expressive Therapies Continuum, and advanced counseling skills. Students will demonstrate the ability to integrate theory with advanced counseling and psychotherapy skills via weekly in-class practical applications and three reflective papers. Open only to counseling & art therapy students.

CAT 602 Advanced Counseling Skills II (1 Credit Hour)

This course combines academic discussion and in-class practical applications of advanced clinical mental health counseling and art psychotherapy skills. Students will demonstrate knowledge in micro-skills: self-disclosure, challenge and confrontation, accurate empathy, and immediacy, client selection, crisis intervention, case management, case formulation, and theoretical orientation. Students will demonstrate the ability to integrate theory with advanced clinical mental health counseling and psychotherapy skills. Open only to counseling & art therapy students.

CAT 603 Group Counseling (3 Credit Hours)

This course includes the study of group counseling and psychotherapy techniques and practice. Emphasis is on use of group dynamics, process illumination, and stages of group development. Cultural and ethical considerations are explored. Open only to counseling & art therapy students.

CAT 604 Individual Counseling (3 Credit Hours)

This course provides students with the opportunity to integrate various theoretical approaches to individual counseling and psychotherapy and their relation to art psychotherapy approaches. The therapist's values and ethics are addressed. Principles of dynamics, therapeutic factors, therapist and client roles and behaviors, leadership styles and approaches, selection criteria, art-based communication, and short- and long-term individual clinical mental health counseling and art therapy will be reviewed. The goal of the course is to provide the student with an opportunity to continue the development of an approach to individual clinical mental health counseling, psychotherapy, and art therapy. Open only to counseling & art therapy students.

CAT 605 Processes & Materials I (3 Credit Hours)

This course is designed so that the student will directly experience the therapeutic usefulness and understand the psychological implications of a variety of materials and processes grounded in the Expressive Therapies Continuum (ETC) and clinical mental health counseling theories. Students apply basic understanding of the language of art and the range of possible therapeutic responses for skills in creativity in counseling/mental health and art psychotherapy. Open only to counseling & art therapy students.

CAT 606 Processes & Materials II (3 Credit Hours)

This course is designed so that the student will directly experience the therapeutic usefulness and understand the psychological implications of a variety of materials and processes grounded in the Expressive Therapies Continuum (ETC) and clinical mental health counseling theories. Students apply advanced understanding of the language of art and the range of possible therapeutic responses for creativity in counseling/mental health and art psychotherapy. Open only to counseling & art therapy students.

CAT 607 Case Presentation Skills (1 Credit Hour)

This course is designed so that the student will directly experience the therapeutic usefulness and understand the psychological implications of a variety of materials and processes grounded in the Expressive Therapies Continuum (ETC) and clinical mental health counseling theories. Students apply advanced understanding of the language of art and the range of possible therapeutic responses for creativity in counseling/mental health and art psychotherapy. Open only to counseling & art therapy students.

CAT 608 Psychopathology (3 Credit Hours)

Students learn descriptive criteria for psychiatric diagnoses, the use of the DSM 5-TR, and theories of psychopathology. A goal of the course is for students to develop an ability to recognize symptoms, conditions, behaviors, verbalizations, and art expressions of functional and organic disorders. Open only to counseling & art therapy students.

CAT 609 Assessment (3 Credit Hours)

Students explore the fundamentals of assessment in clinical mental health counseling using a variety of assessment techniques including and not limited to intake interviews, psychological testing, risk assessments, and art-based assessments of psychosocial, cognitive, and emotional functioning. Students are introduced to principles of case formulation for developing treatment plans from assessment results. Student develop skills to administer and document in progress notes and reports a variety of specific instruments and procedures used in appraisal and evaluation in psychotherapy, clinical mental health counseling, and art therapy. Open only to counseling & art therapy students.

CAT 610 Theories of Development (3 Credit Hours)

Following a family life cycle perspective, students explore human psychological development from birth to death. Students are exposed to various theories of personality development. Cultural and environmental influences are addressed. Open only to counseling & art therapy students.

CAT 611 Introduction to Art Therapy (1 Credit Hour)

This course offers an overview of the history and growth of art therapy as a profession, along with an overview of theoretical approaches that have evolved from the founding practitioners in the field. Students develop a specific definition of art therapy that conveys a personal approach, as well as a clear understanding of the role of art therapists in various work settings. Current developments and future directions within the field are also explored. Open only to counseling & art therapy students.

CAT 612 Medical Art Therapy (1 Credit Hour)

This course reviews the clinical implications for clinical mental health counseling and art therapy in medical settings to include diagnoses, management and treatment of various medical disorders, overviews of practice settings, and psychological impacts of medical illness. This course provides foundational concepts and experiences related to ethical practice of clinical mental health counseling and art therapy in medical settings. Open only to counseling & art therapy students.

CAT 614 Clinical Case Conference (1 Credit Hour)

Students demonstrate the ability to effectively communicate clinical material and integrate theory and counseling practice through structured case presentations. Students integrate case assessment, case formulation, treatment planning knowledge with counseling and art therapy theories applied to clients. Open only to counseling & art therapy students.

CAT 615 Research Methods & Program Evaluation (3 Credit Hours)

This course provides students with the opportunity to understand the purposes, methods, and the ethical, legal, and cultural considerations of research. Students will demonstrate the necessary skills to design and prepare to conduct a research study and/or program evaluation. Students will learn how to use research, research skills, and findings to assess effectiveness of clinical mental health counseling, art therapy, and mental health services by becoming an informed consumer of mental health, counseling, and art therapy research. Open only to counseling & art therapy students.

CAT 616 Cultural Humility (3 Credit Hours)

This course supports the development of culturally humble counselors and art therapists through multicultural orientation with regard to intersecting identities including age, gender, sexual orientation, ethnicity, nationality, socio-economic status, developmental ability, physical ability, education, family values, and religious and spiritual values. Through review of the current literature, application to clinical practice, and self-assessment, students will explore culture and their own unintentional biases, develop strategies for working with diverse individuals, groups, and communities, foster critical thinking skills, and explore the role of the counselor and art therapist in culturally alert and responsive practices for clinical mental health counseling, art therapy, social justice, and advocacy. Open only to counseling & art therapy students.

CAT 617 Family Counseling (3 Credit Hours)

This course provides students with a foundation in the basic concepts of family and couples clinical mental health counseling and art therapy. Students learn about family counseling theories, techniques, genograms, family assessments, and documentation. Open only to counseling & art therapy students.

CAT 618 Ethics & Professionalism (3 Credit Hours)

This course addresses professional identity, professional ethics, and the ethical practices of counseling and art therapy. Students prepare to enter the job market and review the requirements for professional licensure and credentials for counselors and art therapists. Open only to counseling & art therapy students.

CAT 619 Creativity Symbolism Metaphor (3 Credit Hours)

This course reviews various theories and models of creativity, symbolism, metaphor, and artistic language. The types, formation, and roles of symbolism and its relation to psychopathology and mental health, and the role of metaphor in therapy are explored. Students explore the function and interpretation of symbols in dreams, artwork, world religions, myths and fairy tales, and daily life and examine the role of symbolism in assessment, clinical mental health counseling, and therapy. Students develop a deeper understanding of symbolic language to enhance their understanding of their own inner experiences and those of their clients. Open only to counseling & art therapy students.

CAT 620 Addictions (3 Credit Hours)

This course provides an overview of Addiction Counseling. Topics that will be covered include drugs and society, substance and process addictions, evidence-based best practices for the substance abuse counselor, assessment, the recovery process, addiction and the family, and prevention strategies. This course covers diagnosis and treatment of addictive disorders and includes an overview of the philosophies and evidenced-based best practices, policies, and outcomes of the most generally accepted models of treatment, recovery, relapse prevention, and continuing care for addictions and other substance abuse related problems. Students also gain awareness of the impact of drug abuse on society and an appreciation of the cultural context within which addiction and recovery occurs. Open only to counseling & art therapy students.

CAT 621 Career Counseling (3 Credit Hours)

This course includes the study of theory and process of career counseling. Students will acquire skills to incorporate career development theory into the practice of counseling. Students will be introduced to career assessment tools and occupational methods. Open only to counseling & art therapy students.

CAT 622 Trauma & Neuroscience Informed Counseling (3 Credit Hours)

The course will review and engage students in the current literature of Trauma Informed Counseling Practices. The objective is for the student to build skills in understanding how to treat survivors of trauma, understand the etiology of behaviors, emotions, and functioning related to trauma, and develop age-appropriate treatment plans based in best counseling practice. Open only to counseling & art therapy students.

CAT 623 Trauma & Neuroscience Informed Art Therapy (2 Credit Hours)

The course will review and engage students in the current literature of neuroscience as it applies to trauma work in counseling and art psychotherapy. The objective is for the student to build advanced skills in understanding of neuroscience concepts applied to treat survivors of trauma, understand the etiology of behaviors, emotions, and functioning related to trauma, and develop treatment plans based in best practices. Open only to counseling & art therapy students.

CAT 624 Trauma & Neuroscience Informed Art Therapy & Counseling (3 Credit Hours)

This elective course will engage students in cultural immersion to learn about cultural similarities and differences in art, the arts, and art psychotherapy, and varied aspects of the impacts of trauma (war trauma, trauma experiences of families, combat trauma, survivors of sex trafficking, and historical trauma). Students will engage in content and experientials that explore art expression, role of art, artists, therapists, and art therapists in society, art/crafts processes, preferences or prohibitions to various art processes or media, and conventional/cultural symbolism; cultural appropriation in art therapy; and cultural sensitivity to the use of art processes and materials in art therapy for trauma informed approaches integrated into art psychotherapy and counseling in various community settings. Open only to counseling & art therapy students.

CAT 625 Community Art (1 Credit Hour)

This course introduces students to philosophies, theories, and practices of community art and socially engaged art in various community settings and projects. Open only to counseling & art therapy students.

CAT 627 Countertransference/Jung (1 Credit Hour)

This elective course facilitates through reading and discussion the exploration of the impact of transference and countertransference in work with patients. The impact on the therapist is explored with depth and implications for informing work with patients is explored. Open only to counseling & art therapy students.

CAT 628 Exploration of the Psyche (1 Credit Hour)

This course aims to enliven the students' understanding of the psyche and its processes, and to increase their understanding of the psychic processes both in the therapeutic process and in their own lives. Open only to counseling & art therapy students.

CAT 630 Art Therapy in the Schools (1 Credit Hour)

This elective course introduces principles underlying comprehensive school art therapy service delivery. Topics explored include special and alternative education settings, program development, and research supporting art therapy in schools.

CAT 631 Applied Cultural Sensitivity (4 Credit Hours)

Applied Cultural Sensitivity in Counseling & Art Psychotherapy will engage students in cultural immersion to learn about cultural similarities and differences in mental health services, counseling, and art psychotherapy, and varied aspects of the impacts of trauma related to culture. Students will engage in content and experientials that explore art expression, role of art, artists, therapists, and art therapists in society, art/crafts processes, preferences or prohibitions to various art processes or media, and conventional/cultural symbolism; cultural appropriation in art therapy; and cultural sensitivity to the use of art processes and materials in art therapy for trauma informed approaches integrated into art psychotherapy and counseling in various community settings. Open only to counseling & art therapy students.

CAT 636 Individual Supervision III (1 Credit Hour)

The student receives one hour of individual faculty clinical site supervision per week from a licensed professional counselor and registered art therapist to discuss clinical topics related to the clinical mental health counseling and art therapy treatment of children/adolescents/adults and couples and their families in various settings. Through supervision and presentation of case materials, students explore assessment, case formulations, treatment planning and implementation, and developing basic and advanced skills in response to observations of clients' verbal, behavioral, and artistic communications. Supervision provides opportunities for integration of didactic information with clinical mental health counseling experiences and art therapy. Open only to counseling & art therapy students.

CAT 639 Art Therapy in the Schools (1 Credit Hour)

This elective course introduces principles underlying comprehensive school art therapy service delivery. Topics explored include special and alternative education settings, program development, and research supporting art therapy in schools. Open only to counseling & art therapy students.

CAT 641 Group Supervision with Adolescents (1.5 Credit Hours)

Students meet in a supervision group (no more than 1:8 for min 1.5 hours per week) with a faculty clinical site supervisor who is a licensed professional counselor and a registered art therapist, to discuss clinical topics related to the clinical mental health counseling and art therapy treatment of children/adolescents/adults and couples and their families in various settings. Through supervision and presentation of case materials, students explore assessment, case formulations, treatment planning and implementation, and developing basic and advanced skills in response to observations of clients' verbal, behavioral, and artistic communications. Supervision provides opportunities for integration of didactic information with clinical mental health counseling experiences and art therapy. Open only to counseling & art therapy students.

CAT 653 Trauma & Neuroscience Informed Therapy (3 Credit Hours)

The course will review and engage students in the current literature of Trauma Informed Practices, neuroscience as it applies to trauma work in counseling, and resources of trauma informed care (assessments, workbooks, & practices). The objective is for the student to build skills in understanding trauma informed care and of neuroscience concepts applied to the treatment of survivors of trauma, understand the etiology of behaviors, emotions, and functioning related to trauma, and develop treatment plans based in practice. Open only to counseling & art therapy students.

CAT 668 Internship (1-3 Credit Hours)

Students attend internship experience for 300 hours over the semester to engage and learn about the treatment setting. Students work with clients for a minimum of 120 direct client contact hours each semester in clinical practice. Students provide counseling, counseling interventions, Assessments, individual, group and/or family counseling and art therapy for an average minimum of 9 hours per week. The other hours on site are for students to attend team meetings, in-service conferences, and all related milieu activities, and to complete documentation. Students rotate through one site per semester to obtain experience with children, adolescents, and adults. Students attend individual supervision with a faculty clinical site supervisor for 1 hour per week minimum. Students attend group supervision with a faculty clinical group site supervisor for a minimum of 1.5 hours per week. Open only to counseling & art therapy students.

CAT 669 Practicum (3 Credit Hours)

Students attend practicum experience for 100 hours during their first practicum semester to engage and learn about the treatment setting and develop basic clinical mental health counseling skills. Students work with clients for 40 hours of direct contact over the 100 hours. Students attend practicum up to 18 hours per week up to 16 weeks. Students earn up to 120 direct client contact hours each semester. Students provide counseling, counseling interventions, art-based assessments, individual, group and/or family clinical mental health counseling and art therapy for an average minimum of 9 hours per week. The other hours on site are for students to attend team meetings, in-service conferences, and all related milieu activities, and to complete documentation. Students attend individual supervision with a faculty clinical site supervisor for 1 hour per week minimum. Students attend group supervision with a faculty clinical group site supervisor for a minimum of 1.5 hours per week. Open only to counseling & art therapy students.

CAT 670 Practica Fieldwork (1 Credit Hour)

Students attend practicum fieldwork to complete 40 direct client contact hours and a minimum of 100 total hours to experience the therapeutic and client relationships. Students will facilitate intake, risk assessment, art therapy assessment, basic counseling skills with Standardized Patients, and direct client contact at assigned sites under the supervision of faculty who are licensed professional counselors and registered art therapists. Student will experience the client role through process groups. Students attend individual supervision with a faculty clinical site supervisor for 1 hour per week minimum. Students attend group supervision with a faculty clinical group site supervisor for a minimum of 1.5 hours per week. Open only to counseling & art therapy students.

CAT 690 Capstone Project (1 Credit Hour)

The student develops and executes a project of excellence based on the literature in counseling and art therapy. The student documents the Capstone Project through a professional paper, poster brief, and/or presentation. Open only to counseling & art therapy students.

CAT 698 Independent Study Research Methods (1 Credit Hour)

This course provides students with the opportunity to understand the purposes, methods, and the ethical considerations of research and to apply and demonstrate the necessary skills to design and conduct research. Students will develop skills in collaboration and working on a research team. Open only to counseling & art therapy students.

CCL - Community College Leadership

CCL 766 Seminar on the Modern Community College: Foundations, Philosophy, and Vision (3 Credit Hours)

A critical examination of the future of the community college, considering the current strengths and weaknesses within the higher education community. Ultimately, the course strives to prepare students to understand, assess, and contribute to the betterment of community college education. Students develop and articulate thoughts, ideas, and opinions on how to re-imagine the community college in order to improve institutional performance and to more effectively serve all students.

CCL 809 Seminar on Doctoral Research and the Dissertation (3 Credit Hours)

This course is designed to prepare students for dissertation research on the community college and higher education. It provides information on the dissertation process to help students be successful in a doctoral program. The course is designed to help doctoral students enhance their abilities to search the scholarly literature, narrow their research topic, and improve their skills in areas such as critical reading and inquiry, critical thinking, and scholarly writing. Students will become familiar with the important events in the dissertation process, begin to develop a literature review on their topic, become familiar with the components of a dissertation proposal, and develop an initial dissertation prospectus.

CCL 820 Community College Leadership (3 Credit Hours)

Provides students with the theory, knowledge and skills needed to be an effective leader within the community college system. Course assignments take a practical approach to identifying and applying theoretical principles and personal leadership style.

Prerequisites: Acceptance into the doctoral program or permission of the instructor

CCL 824 Community College Finance, Fundraising, and Resource Management (3 Credit Hours)

An examination of the necessary financial knowledge and skills required for community college leaders through the exploration of how the mission and goals of the community college are directly connected to financial considerations. Course activities help prepare students to take leadership roles in budget decisions, development of state and local government appropriations, fundraising, resource management, and financial decisions that are based on data and realistic institutional goals.

Prerequisites: Acceptance into the doctoral program or permission of the instructor

CCL 826 Community College Curriculum, Program Development, and Quality Assurance (3 Credit Hours)

A critical examination of community college curricula and program development. Students will develop the knowledge to understand and defend curricular issues related to developmental education, transfer education, career, technical and vocational education, continuing education, and general education.

Prerequisites: Acceptance into the doctoral program or permission of the instructor

CCL 830 Community College Politics, Policy, and Advocacy (3 Credit Hours)

An analysis of the political factors that influence educational policy decisions at community colleges and other higher education institutions. The course will examine policy-in-action in order to help students understand the relationships community college leaders build with community college boards of trustees, county commissioners, state legislators, and federal representatives.

Prerequisites: Acceptance into the doctoral program or permission of the instructor

CCL 866 Seminar on the Modern Community College: Foundations, Philosophy, and Vision (3 Credit Hours)

A critical examination of the future of the community college, considering the current strengths and weaknesses within the higher education community. Ultimately, the course strives to prepare students to understand, assess, and contribute to the betterment of community college education. Students develop and articulate thoughts, ideas, and opinions on how to re-imagine the community college in order to improve institutional performance and to more effectively serve all students.

CCL 868 Internship in Community College Leadership (3-6 Credit Hours)

Provides students an opportunity to obtain hands-on experience in a leadership role at a community college setting. The students learn about leadership skills at the community college by observing a mentor/site supervisor and by being given leadership tasks associated with the site chosen.

Prerequisites: acceptance into the doctoral program or permission of the instructor

CCL 881 Dissertation Seminar (3 Credit Hours)

A seminar that focuses on the design, implementation, and evaluation of community colleges under real-life conditions in the field. Students and faculty work with community college decision makers utilizing problem solving skills and analysis.

CCL 895 Topics in Community College Leadership (1-3 Credit Hours)

Study of selected topics in community college leadership.

Prerequisites: permission of the instructor

CCL 897 Independent Study (1-3 Credit Hours)

Independent study of special topics in community college leadership for doctoral students.

Prerequisites: Permission of the instructor

CCL 899 Dissertation (1-12 Credit Hours)

Directed research for the doctoral dissertation.

Prerequisites: Permission of faculty advisor

CCL 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after advancement to candidacy. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

CDSE - Communication Disorders and Special Education

CDSE 597 Independent Study in Special Topics in Education (1-4 Credit Hours)

Independent study of selected topics in education.

CDSE 695 Topics in Education (1-3 Credit Hours)

This course offers selected topics designed to permit small groups of qualified students to work on subjects of mutual interest in the special education field.

Prerequisites: permission of the instructor

CDSE 697 Independent Study in Special Education (1-3 Credit Hours)

Independent study of special topics in special education.

Prerequisites: permission of the instructor

CDSE 795 Topics in Education (1-3 Credit Hours)

The advanced study of selected topics and emergent research related issues that permits small groups of qualified students to study subjects of mutual interest, which, due to their specialized nature, may not be offered regularly.

Prerequisites: permission of instructor

CDSE 797 Independent Study in Special Education (1-3 Credit Hours)

Independent study of special topics in special education for advanced graduate students.

Prerequisites: permission of the instructor

CDSE 895 Topics in Education (1-3 Credit Hours)

The advanced study of selected topics and emergent research related issues that permits small groups of qualified students to study subjects of mutual interest, which, due to their specialized nature, may not be offered regularly.

Prerequisites: permission of instructor

CDSE 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

CEE - Civil and Environmental Engineering

CEE 512 Computational Methods in Structures (3 Credit Hours)

Analysis of 2-D and 3-D determinate and indeterminate truss/beam/frame structures by the unified direct stiffness matrix method, for both hand-calculation and computer implementation. Popular commercialized (NASTRAN) software will also be discussed.

Prerequisites: CEE 310

CEE 514 Masonry Structures Design (3 Credit Hours)

Masonry materials, reinforced beams and lintels, walls, columns and pilasters, shear walls, and buildings.

Prerequisites: CEE 310

CEE 515 Steel Structures Design (3 Credit Hours)

Load and resistance factor design methods for steel structures.

Prerequisites: CEE 310

CEE 516 Wood Structures Design (3 Credit Hours)

Design of wood structures based on national design specification and load and resistance factor design.

Prerequisites: CEE 310

CEE 530 Foundation Engineering (3 Credit Hours)

Subsurface exploration, site preparation, design of shallow and deep foundations, and retaining structures.

Prerequisites: CEE 323 with a grade of C or better

CEE 531 Slope Stability and Earth Structures Design (3 Credit Hours)

Slope stability analysis, including limit equilibrium procedures, finite element method, seepage analysis, and advanced topics such as rapid drawdown, construction of embankments on soft soil, and seismic slope stability. Lateral earth retention systems, including gravity walls, excavation support systems, and applications of geosynthetic material, will be covered.

Prerequisites: CEE 323

CEE 532 Introduction to Earthquake Engineering (3 Credit Hours)

An overview of earthquake processes and details of the characteristics of destructive ground motion; the effects of such motion on civil engineering structures; reviews of current design practice in mitigating earthquake hazards for various civil engineering structures such as buildings, bridges, dams, lifelines, ports and harbors.

Prerequisites: permission of the instructor

CEE 533 Geomaterials Stabilization (3 Credit Hours)

This course studies soil and aggregate's physical, chemical and biological stabilization procedures. Students are introduced to chemical stabilization analysis and design using materials such as cement, lime, and fly ash. Physical ground modification, compaction methods and mechanical stabilization application and design are also studied.

Prerequisites: CEE 323

CEE 540 Hydraulic Engineering (3 Credit Hours)

Hydraulic transients; flow control structures; computer analysis of hydraulic systems; design of pipelines, open channels and culverts.

Prerequisites: CEE 340

CEE 546 Urban Stormwater Hydrology (3 Credit Hours)

Storm rainfall analysis, design rainfall hyetographs, runoff calculation procedures, detention basins, use of mathematical models to analyze and design urban storm drainage systems.

Prerequisites: CEE 340

CEE 547 Groundwater Hydraulics (3 Credit Hours)

Description of well hydraulics in single and multiple well systems. Determination of aquifer parameters from pumping tests. Use of computer models to determine drawdowns due to multiple well systems.

Prerequisites: CEE 340

CEE 550 Water Distribution and Wastewater Collection System Design (3 Credit Hours)

Design of water distribution systems, sanitary sewer systems and appurtenances.

Prerequisites: CEE 330

Pre- or corequisite: CEE 340

CEE 552 Air Quality (3 Credit Hours)

Study of air quality management standards and regulations and pollutant dynamics. Design and operation of emission control equipment for mobile and stationary sources of air pollution.

Prerequisites: CEE 350

CEE 554 Hazardous Waste Treatment (3 Credit Hours)

Study of sources, generation rates and characteristics of hazardous wastes and their regulation, handling, and design of treatment and disposal facilities.

Prerequisites: CEE 350

CEE 555 Pollution Prevention and Green Engineering (3 Credit Hours)

Application of engineering methods for the prevention of pollution. Review of the pollution prevention related regulations. Study of source reduction methods, analysis of environmentally conscious manufacturing methods, process changes, life cycle analysis, and water/energy conservation methods. Evaluation of pollution prevention case studies.

CEE 557 Adaptation to Sea Level Rise (3 Credit Hours)

Investigation of complex relationships between humans and coastlines and study of how humans adapt and develop adaptation measures and solutions to tackle flooding caused by rising sea levels and subsequent heavy storm events. This course also evaluates natural and nature-based systems, engineered systems, different flood-proofing methods, and impacts of sea level rise on coastal water quality and the potential impacts on disease transmission.

Prerequisites: CEE 340 or CET 332

CEE 558 Sustainable Development (3 Credit Hours)

Overview of social, economical, technical environmental aspects of regional, national and international efforts to achieve sustainable development. Discussion of the integration of industrial activity and ecological concerns utilizing principles of zero emissions, pollution prevention and design for the environment.

Prerequisites: permission of instructor

CEE 559 Biofuels Engineering (3 Credit Hours)

Course covers the overview of renewable energy sources; fundamentals of biofuels; biomass and types of biomass (e.g., woody biomass, forest residues, agricultural residues, energy crops); composition of lignocelluloses (cellulose, hemicellulose, and lignin); biomass conversion technologies; thermochemical, supercritical water, and biochemical conversion processes; types of biofuels from biomass; liquid fuels (bioethanol, bio-oil, biocrude, and hydrocarbons); gaseous fuels (synthesis gas, hydrogen, biodiesel); solid fuels (biochar, torrefied biomass); biodiesel from vegetable oils, algae to biofuels; value-added processing of biofuel residues; economic and environmental assessments; policies and future R&D.

Prerequisites: permission of the instructor

CEE 571 Transportation Operations I (3 Credit Hours)

This is the first course in transportation operations and traffic flow theory. Topics include traffic engineering studies, capacity analysis, intersection control, traffic flow models, shockwave analysis, signal warrant analysis, and safety analysis. Course includes applications of modeling and simulation to isolated intersections.

Prerequisites: CEE 370

CEE 574 Transportation Data Analytics (3 Credit Hours)

This course presents the basic techniques for transportation data analytics. It will discuss statistical modeling, prominent algorithms, and visualization approaches to analyze both small- and large-scale data sets generated from transportation systems. Practices of using different data for various real-world traffic/transportation applications and decision making will also be discussed., STAT 330); any programming language such as C, Python or Java is beneficial but not required.

Prerequisites: Basic probability and statistics (e.g

CEE 575 Geometric Design of Highways (3 Credit Hours)

This course provides students with an understanding of basic principles and techniques in order to develop skills in the highway geometric design process. It introduces design methods for three-dimensional layout for roadways, considering cross section (lanes and shoulders, curbs, medians, roadside slopes and ditches, sidewalks), horizontal alignment (tangents and curves), and vertical alignment (grades and vertical curves).

CEE 582 Introduction to Coastal Engineering (3 Credit Hours)

Classical small amplitude wave theory, wave transformations in shallow water, shoaling, refraction, diffraction, reflection, breaking. Wave induced near shore currents and sediment transport processes. Alternatives to mitigate coastal erosion processes. Introduction to coastal structures.

Prerequisites: permission of the instructor

CEE 595 Topics in Civil and Environmental Engineering (1-3 Credit Hours)

Special topics of interest with emphasis placed on recent developments in civil and/or environmental engineering.

Prerequisites: Permission of the instructor

CEE 667 Cooperative Education (1-3 Credit Hours)

Available for pass/fail grading only. May be repeated for credit. Student participation for credit based on the academic relevance of the work experience, criteria, and evaluative procedures as formally determined by the department prior to the semester in which the work experience is to take place.

Prerequisites: Approval by department is required; Additional support may be provided by the Monarch Internship and Co-Op Office in the semester prior to enrollment

CEE 668 Internship (1-3 Credit Hours)

Academic requirements will be established by the department and will vary with the amount of credit desired. Allows students an opportunity to gain short duration career-related experience.

Prerequisites: Approval by department is required; Additional support may be provided by the Monarch Internship and Co-Op Office in the semester prior to enrollment

CEE 669 Practicum (1-3 Credit Hours)

Academic requirements will be established by the department and will vary with the amount of credit desired. Allows students an opportunity to gain short duration career-related experience.

Prerequisites: Approval by department is required; Additional support may be provided by the Monarch Internship and Co-Op Office in the semester prior to enrollment

CEE 695 Topics in Civil and Environmental Engineering (1-3 Credit Hours)

Special topics of interest with emphasis placed on recent developments in civil and/or environmental engineering.

Prerequisites: Permission of the instructor

CEE 697 Independent Study in Civil and Environmental Engineering (1-3 Credit Hours)

Individual analytical, experimental and/or design study selected by the student. Approved and supervised by the advisor.

Prerequisites: permission of the instructor

CEE 698 Master's Project (1-3 Credit Hours)

Individual project, investigation under the direction of the student's major professor.

CEE 699 Thesis (1-6 Credit Hours)

Research leading to the Master of Science thesis.

CEE 700 Civil and Environmental Engineering Experimental Design (3 Credit Hours)

Graduate-level overview of engineering experimental design and analysis with emphasis on statistical methods; practical and proper statistical methods applicable to multidisciplinary, real-world civil and environmental engineering problems.

CEE 701 Applied Mathematics for Civil and Environmental Engineers (3 Credit Hours)

An examination of numerical and approximate mathematical methods for civil and environmental engineers with applications; finite-difference and finite-integral techniques for single and simultaneous ordinary differential equations; classical and finite-difference solutions of partial differential equations such as heat, wave, Laplace, and plate equation; and finite element applications selected from geotechnical, environmental, hydraulics/water resources, ocean, transportation, and structural engineering.

CEE 710 Structural Dynamics (3 Credit Hours)

Free and forced vibration of discrete and continuous systems; elastic and inelastic response of structures under dynamic loads.

CEE 711 Finite Element Analysis (3 Credit Hours)

To provide an understanding of the finite element method (FEM) as derived from an integral formulation perspective. To demonstrate the solutions of (1-D and 2-D) continuum mechanics problems such as solid mechanics, fluid mechanics and heat transfer.

CEE 712 Advanced Reinforced Concrete (3 Credit Hours)

Ultimate-strength theory, yield line methods, limit design, and other relevant advanced topics in the theory and design of concrete structures.

CEE 713 Prestressed Concrete (3 Credit Hours)

Analysis and design of prestressed concrete members and structures. Shrinkage, creep and losses, shear, bond and anchorages are discussed.

CEE 714 Advanced Structural Analysis (3 Credit Hours)

Elastic analysis of framed structures using matrix and numerical techniques.

CEE 715 Engineering Optimization I (3 Credit Hours)

Formulation and solution algorithms for Linear Programming (LP) problems. Unconstrained and constrained nonlinear programming (NLP) problems. Optimum solution for practical engineering systems. (Cross-listed with MAE 715 and MAE 815)

CEE 717 Bridge Structures Design (3 Credit Hours)

Design of steel, concrete, and composite bridges using modern techniques and current specifications.

Prerequisites: CEE 410 and CEE 415/CEE 515 or equivalent

CEE 718 Flood Resistant Structural Design (3 Credit Hours)

Analysis and design of flood protective shields for residential and commercial buildings, floodwalls and gates under hydrostatic, hydrodynamic, and floating debris impact forces, safety of dams and levees, sea-level rise issues for buildings and bridges, ASCE, IBC, and FEMA guidelines for flood resistant structural design, case histories.

CEE 719 Inelastic Structures (3 Credit Hours)

Inelastic analysis and behavior of framed structures.

CEE 720 Structural Stability (3 Credit Hours)

Fundamentals of elastic and inelastic stability of beams, columns and frames.

CEE 721 Plates (3 Credit Hours)

Classical and modern methods for the solution of plates of various shapes and boundary conditions, continuous and axially loaded plates and plates on elastic supports. Design examples.

CEE 722 Cluster Parallel Computing (3 Credit Hours)

Detailed numerical step-by-step procedures to exploit parallel and sparse computation under MPI (Message, Passing, Interface) computer environments are explained. Large-scale engineering/science applications are emphasized. Simultaneous linear equations are discussed.

CEE 723 Seismic Design of Steel Structures (3 Credit Hours)

Analysis and design of steel structures under seismic loading conditions, introduction to design specifications for steel structures.

Prerequisites: CEE 310 or equivalent

CEE 724 Retrofitting Methods for Bridges and Buildings (3 Credit Hours)

Retrofitting methods for bridges and buildings combined with related advanced structural analysis and design techniques.

Prerequisites: CEE 310 or equivalent

CEE 725 Smart Structures (3 Credit Hours)

This course covers structural systems integrated with sensing, data processing, and control devices, which control and reduce the vibration of structures. Students will learn about basic theories of smart structures, smart materials, sensors, structural health monitoring (SHM) as well as their application to civil infrastructures.

CEE 730 Advanced Foundation Engineering (3 Credit Hours)

Advanced analysis and design of shallow and deep foundations and retaining structures.

Prerequisites: CEE 430/CEE 530

CEE 731 Advanced Soil Mechanics (3 Credit Hours)

Detailed study of shear strength of soils and its application to slope stability and embankment design and analysis. Advanced laboratory shear tests are included.

Prerequisites: CEE 323

CEE 732 Engineering Behavior of Soils (3 Credit Hours)

Detailed study of physiochemical behavior of soils, fabric, rheology, effective stress path, and their applications to various geotechnical engineering problems.

Prerequisites: CEE 323

CEE 733 Soil Dynamics (3 Credit Hours)

Study of soil behavior under dynamic loadings. Laboratory and field techniques for determining soil properties and liquefaction potential. Design examples.

Prerequisites: CEE 323

CEE 741 Open Channel Flow (3 Credit Hours)

Momentum and energy principles, design of open channels, use of mathematical models for flow calculations in rivers, introduction to unsteady open channel flow.

Prerequisites: CEE 340

CEE 747 Groundwater Flow (3 Credit Hours)

Mathematical formulations of laws governing groundwater flow and contaminant transport. Unsaturated flow. Use of computer models for modeling groundwater aquifers.

Prerequisites: CEE 340

CEE 751 Physicochemical Treatment Processes (3 Credit Hours)

Physical and chemical processes used in the treatment of water and waste water are covered. Separation, isolation and reaction processes are characterized as well as reactor engineering.

Prerequisites: CEE 350

CEE 752 Biological Wastewater Treatment (3 Credit Hours)

The use of microorganisms to treat domestic and industrial waste waters for organics and nutrient removal are studied. Characteristics of individual waste water components and the appropriate treatment processes to remove these components are covered.

Prerequisites: CEE 350

CEE 753 Advanced Processes for Water and Wastewater Treatment (3 Credit Hours)

Theory, operation and application of advanced water and waste water treatment systems, including land application, dissolved solids, organic contaminant and nutrient removal processes. Emphasis on system development for waste water reclamation/recycling.

Prerequisites: CEE 751 and CEE 752

CEE 754 Environmental Engineering Microbiology (3 Credit Hours)

A lecture and laboratory course dealing with the study of the principles and applications of microbiology in waste water treatment, water treatment, stream self-purification and their effects in environmental engineering.

Prerequisites: CEE 350

CEE 755 Water Quality Management (3 Credit Hours)

Characterization of water quality in natural systems and the human activities that result in contaminant input to these systems are studied. Management practices for minimizing contaminant input and for restoring contaminated waters are discussed.

CEE 756 Water Quality Modeling (3 Credit Hours)

Formulation of mathematical equations to describe the fate and transport of aqueous contaminants in dynamic surface water systems. Use of water quality computer models to predict various contamination scenarios.

Prerequisites: MATH 307, CEE 340, CEE 350 or permission of the instructor

CEE 759 Carbon-Free Clean Energy (3 Credit Hours)

The course presents an overview of carbon-free energy sources (nuclear, wind, solar, hydropower, and geothermal). The current status, conversion processes, economics, and environmental issues of these forms of energy will be discussed.

CEE 760 Managing Phosphorous in Circular Economy (3 Credit Hours)

This course is focused on the importance of management of phosphorous in preserving sustainable environments. The objectives of the course are to provide an overview of different phosphorous management/recovering/recycling strategies; basics of circular economy; role of microalgae in recovery and recycling of phosphorous; phosphorous recovery from wastewater; and application of the principles of circular economy towards global and regional phosphorous management.

CEE 761 Water Resources Processes and Analysis Methods (3 Credit Hours)

This course examines interactive hydrologic processes in water resource; modifications of climate change to these processes; and modern simulation and systematic analysis methods incorporating the modifications into practices of water resource planning, utilization, protection, and engineering.

CEE 762 Aquatic Chemistry in Environmental Engineering (3 Credit Hours)

Chemical reactions in natural and engineered systems are studied with emphasis placed on developing kinetic expressions and assessing chemical equilibrium. Kinetic and equilibrium expressions are applied to engineering problems to predict the reaction time and products of specific reactions.

Prerequisites: CHEM 123N

CEE 770 Transportation Safety (3 Credit Hours)

This course focuses on major transportation safety issues including transportation safety goals, safety of various transportation modes, identification of problematic locations, selection of safety countermeasures and their evaluation, safety data and modeling issues.

Prerequisites: CEE 471/CEE 571

CEE 771 Transportation Operations II (3 Credit Hours)

This is the second course in transportation operations and traffic flow theory. Topics covered include design of progressive signal systems, queuing theory, car following models, and applications of microscopic traffic simulation to corridor studies.

Prerequisites: CEE 471/CEE 571

CEE 772 Intelligent Transportation Systems (3 Credit Hours)

This course examines how ITS can be used to enhance mobility and safety. The topics covered in the course include systems engineering approach to ITS, traveler response to technologies and information, ITS planning and evaluation, and ITS deployment and operational performance.

Prerequisites: CEE 370

CEE 773 Transportation Planning (3 Credit Hours)

This course covers transportation planning processes that include policy direction, transportation data, travel demand forecasting models, and decision-making/stakeholders issues.

CEE 774 Transportation Network Flow Models (3 Credit Hours)

This course provides a rigorous introduction to transportation network modeling, with special emphasis on network equilibrium problems. Topics include: elementary graph theory, shortest path problem nonlinear optimization, optimization of univariate functions, deterministic and stochastic user equilibrium.

Prerequisites: CEE 370 or equivalent

CEE 775 Transportation Network Algorithms (3 Credit Hours)

Fundamental models and algorithms in optimization, stochastic modeling and parallel computing will be discussed and illustrated with transportation applications.

CEE 776 Simulation in Transportation Networks (3 Credit Hours)

Principles of simulation modeling. Microscopic, mesoscopic and macroscopic traffic simulation models. Driver behavior in networks. Calibration and validation of traffic simulation models. Traffic simulation software.

CEE 777 Econometric Modeling in Transportation (3 Credit Hours)

The class focuses on the development of econometric modeling and its application in the field of transportation engineering. Topics to be covered include statistical inference, linear regression, count data models, discrete choice models, survival analysis, time series modeling, spatial modeling, panel data analysis, and structural equation modeling. Students will have a better understanding of the concepts and theories of econometrics and will be equipped with well-suited modeling and analysis techniques.

Prerequisites: Graduate student status

CEE 782 Design of Coastal Structures (3 Credit Hours)

Nonlinear wave theories; wave forces on slender piles and seawalls; design of rubblemound structures; design philosophy, initial costs, maintenance costs, optimized design using stochastic methods; design of renourished beaches. Advanced alternative solutions for shore protection.

Prerequisites: CEE 482/CEE 582

CEE 787 Dredging and Beach Engineering (3 Credit Hours)

Types of dredges, factors affecting dredge performance; hydraulic dredges (cutter, hopper) and mechanical dredges systems (bucket, clamshell, etc.); shoaling rate determination; inlet sand bypassing systems; beach renourishment schemes. Design of beach renourishment/projects.

Prerequisites: CEE 330

CEE 788 Coastal Hydrodynamics and Sediment Processes (3 Credit Hours)

This course discusses the hydrodynamics of the coastal environment and reviews waves, low-frequency motions, and coastal responses, including sediment processes and beach evolution. Specific topics to be covered include: review of linear wave theory; introduction to nonlinear waves; wave-averaged motions and radiation stresses; wave and current boundary layers; wave setup, longshore current, rip current, undertow, and nearshore circulation; wave dissipation mechanisms; and fluid-sediment interaction. An introduction to cohesive sediments, sediment concentration and transport models, and beach morphology will also be addressed.

Prerequisites: CEE 482/CEE 582

CEE 789 Computational Environmental Fluid Dynamics (3 Credit Hours)

Fluid dynamics conservation laws as transport phenomena. Classical, finite-difference models for advection, diffusion and combined fluid flows. Explicit and implicit schemes to solve unsteady, free-surface fluid flow and diffusion (dispersion) problems in one and multi-dimensions. Turbulence models.

Prerequisites: CEE 330

CEE 795 Topics in Civil and Environmental Engineering (1-3 Credit Hours)

Special topics of interest with emphasis placed on recent developments in civil and/or environmental engineering.

Prerequisites: Permission of the instructor

CEE 797 Independent Study (1-3 Credit Hours)**CEE 800 Civil and Environmental Engineering Experimental Design (3 Credit Hours)**

Graduate-level overview of engineering experimental design and analysis with emphasis on statistical methods; practical and proper statistical methods applicable to multidisciplinary, real-world civil and environmental engineering problems.

CEE 801 Applied Mathematics for Civil and Environmental Engineers (3 Credit Hours)

An examination of numerical and approximate mathematical methods for civil and environmental engineers with applications; finite-difference and finite-integral techniques for single and simultaneous ordinary differential equations; classical and finite-difference solutions of partial differential equations such as heat, wave, Laplace, and plate equation; and finite element applications selected from geotechnical, environmental, hydraulics/water resources, ocean, transportation, and structural engineering.

CEE 810 Structural Dynamics (3 Credit Hours)

Free and forced vibration of discrete and continuous systems; elastic and inelastic response of structures under dynamic loads.

CEE 811 Finite Element Analysis (3 Credit Hours)

To provide an understanding of the finite element method (FEM) as derived from an integral formulation perspective. To demonstrate the solutions of (1-D and 2-D) continuum mechanics problems such as solid mechanics, fluid mechanics and heat transfer.

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CEE 819 Inelastic Structures (3 Credit Hours)

Inelastic analysis and behavior of framed structures.

CEE 820 Structural Stability (3 Credit Hours)

Fundamentals of elastic and inelastic stability of beams, columns and frames.

CEE 821 Plates (3 Credit Hours)

Classical and modern methods for the solution of plates of various shapes and boundary conditions, continuous and axially loaded plates and plates on elastic supports. Design examples.

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Detailed numerical step-by-step procedures to exploit parallel and sparse computation under MPI (Message, Passing, Interface) computer environments are explained. Large-scale engineering/science applications are emphasized. Simultaneous linear equations are discussed.

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Analysis and design of steel structures under seismic loading conditions, introduction to design specifications for steel structures.

Prerequisites: CEE 310 or equivalent

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Retrofitting methods for bridges and buildings combined with related advanced structural analysis and design techniques.

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Advanced analysis and design of shallow and deep foundations and retaining structures.

Prerequisites: CEE 430/CEE 530

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Detailed study of shear strength of soils and its application to slope stability and embankment design and analysis. Advanced laboratory shear tests are included.

Prerequisites: CEE 323

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Detailed study of physiochemical behavior of soils, fabric, rheology, effective stress path, and their applications to various geotechnical engineering problems.

Prerequisites: CEE 323

CEE 833 Soil Dynamics (3 Credit Hours)

Study of soil behavior under dynamic loadings. Laboratory and field techniques for determining soil properties and liquefaction potential. Design examples.

Prerequisites: CEE 323

CEE 841 Open Channel Flow (3 Credit Hours)

Momentum and energy principles, design of open channels, use of mathematical models for flow calculations in rivers, introduction to unsteady open channel flow.

Prerequisites: CEE 340

CEE 847 Groundwater Flow (3 Credit Hours)

Mathematical formulations of laws governing groundwater flow and contaminant transport. Unsaturated flow. Use of computer models for modeling groundwater aquifers.

Prerequisites: CEE 340

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Physical and chemical processes used in the treatment of water and waste water are covered. Separation, isolation and reaction processes are characterized as well as reactor engineering.

Prerequisites: CEE 350

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Prerequisites: CEE 350

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Prerequisites: CEE 751 and CEE 752

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Prerequisites: CEE 350

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Characterization of water quality in natural systems and the human activities that result in contaminant input to these systems are studied. Management practices for minimizing contaminant input and for restoring contaminated waters are discussed.

CEE 856 Water Quality Modeling (3 Credit Hours)

Formulation of mathematical equations to describe the fate and transport of aqueous contaminants in dynamic surface water systems. Use of water quality computer models to predict various contamination scenarios.

Prerequisites: MATH 307, CEE 340, CEE 350 or permission of the instructor

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The course presents an overview of carbon-free energy sources (nuclear, wind, solar, hydropower, and geothermal). The current status, conversion processes, economics, and environmental issues of these forms of energy will be discussed.

CEE 860 Managing Phosphorous in Circular Economy (3 Credit Hours)

This course is focused on the importance of management of phosphorous in preserving sustainable environments. The objectives of the course are to provide an overview of different phosphorous management/recovering/recycling strategies; basics of circular economy; role of microalgae in recovery and recycling of phosphorous; phosphorous recovery from wastewater; and application of the principles of circular economy towards global and regional phosphorous management.

CEE 861 Water Resources Processes and Analysis Methods (3 Credit Hours)

This course examines interactive hydrologic processes in water resource; modifications of climate change to these processes; and modern simulation and systematic analysis methods incorporating the modifications into practices of water resource planning, utilization, protection, and engineering.

CEE 862 Aquatic Chemistry in Environmental Engineering (3 Credit Hours)

Chemical reactions in natural and engineered systems are studied with emphasis placed on developing kinetic expressions and assessing chemical equilibrium. Kinetic and equilibrium expressions are applied to engineering problems to predict the reaction time and products of specific reactions.

Prerequisites: CHEM 123N

CEE 870 Transportation Safety (3 Credit Hours)

This course focuses on major transportation safety issues including transportation safety goals, safety of various transportation modes, identification of problematic locations, selection of safety countermeasures and their evaluation, safety data and modeling issues.

Prerequisites: CEE 471/CEE 571

CEE 871 Transportation Operations II (3 Credit Hours)

This is the second course in transportation operations and traffic flow theory. Topics covered include design of progressive signal systems, queuing theory, car following models, and applications of microscopic traffic simulation to corridor studies.

Prerequisites: CEE 471/CEE 571

CEE 872 Intelligent Transportation Systems (3 Credit Hours)

This course examines how ITS can be used to enhance mobility and safety. The topics covered in the course include systems engineering approach to ITS, traveler response to technologies and information, ITS planning and evaluation, and ITS deployment and operational performance.

Prerequisites: CEE 370

CEE 873 Transportation Planning (3 Credit Hours)

This course covers transportation planning processes that include policy direction, transportation data, travel demand forecasting models, and decision-making/stakeholders issues.

CEE 874 Transportation Network Flow Models (3 Credit Hours)

This course provides a rigorous introduction to transportation network modeling, with special emphasis on network equilibrium problems. Topics include: elementary graph theory, shortest path problem nonlinear optimization, optimization of univariate functions, deterministic and stochastic user equilibrium.

CEE 875 Transportation Network Algorithms (3 Credit Hours)

Fundamental models and algorithms in optimization, stochastic modeling and parallel computing will be discussed and illustrated with transportation applications.

CEE 876 Simulation in Transportation Networks (3 Credit Hours)

Principles of simulation modeling. Microscopic, mesoscopic and macroscopic traffic simulation models. Driver behavior in networks. Calibration and validation of traffic simulation models. Traffic simulation software.

CEE 877 Econometric Modeling in Transportation (3 Credit Hours)

The class focuses on the development of econometric modeling and its application in the field of transportation engineering. Topics to be covered include statistical inference, linear regression, count data models, discrete choice models, survival analysis, time series modeling, spatial modeling, panel data analysis, and structural equation modeling. Students will have a better understanding of the concepts and theories of econometrics and will be equipped with well-suited modeling and analysis techniques.

Prerequisites: Graduate student status

CEE 882 Design of Coastal Structures (3 Credit Hours)

Nonlinear wave theories; wave forces on slender piles and seawalls; design of rubblemound structures; design philosophy, initial costs, maintenance costs, optimized design using stochastic methods; design of renourished beaches. Advanced alternative solutions for shore protection.

Prerequisites: CEE 482/CEE 582

CEE 887 Dredging and Beach Engineering (3 Credit Hours)

Types of dredges, factors affecting dredge performance; hydraulic dredges (cutter, hopper) and mechanical dredges systems (bucket, clamshell, etc.); shoaling rate determination; inlet sand bypassing systems; beach renourishment schemes. Design of beach renourishment/projects.

Prerequisites: CEE 330

CEE 888 Coastal Hydrodynamics and Sediment Processes (3 Credit Hours)

This course discusses the hydrodynamics of the coastal environment and reviews waves, low-frequency motions, and coastal responses, including sediment processes and beach evolution. Specific topics to be covered include: review of linear wave theory; introduction to nonlinear waves; wave-averaged motions and radiation stresses; wave and current boundary layers; wave setup, longshore current, rip current, undertow, and nearshore circulation; wave dissipation mechanisms; and fluid-sediment interaction. An introduction to cohesive sediments, sediment concentration and transport models, and beach morphology will also be addressed.

Prerequisites: CEE 482/CEE 582

CEE 889 Computational Environmental Fluid Dynamics (3 Credit Hours)

Fluid dynamics conservation laws as transport phenomena. Classical, finite-difference models for advection, diffusion and combined fluid flows. Explicit and implicit schemes to solve unsteady, free-surface fluid flow and diffusion (dispersion) problems in one and multi-dimensions. Turbulence models.

Prerequisites: CEE 330

CEE 892 Doctor of Engineering Project (1-12 Credit Hours)

Directed individual study applying advanced level technical knowledge to identify, formulate, and solve a complex, novel problem in Civil and Environmental Engineering.

CEE 895 Topics in Civil and Environmental Engineering (1-3 Credit Hours)

Special topics of interest with emphasis placed on recent developments in civil and/or environmental engineering.

Prerequisites: Permission of the instructor

CEE 897 Independent Study (1-3 Credit Hours)

Individual analytical, experimental and/or design study selected by the student. Approved and supervised by the advisor.

Prerequisites: permission of the instructor

CEE 899 Dissertation Research (1-9 Credit Hours)

Research for the dissertation.

CEE 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

CEE 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

CGE - Center for Global Engagement

CGE 549 Linguistics for Working with Multilingual Populations (3 Credit Hours)

This course introduces fundamental concepts in linguistics essential for working with multilingual populations. Students examine core structural components of language including sound systems, word formation, sentence structure, and meaning, developing skills to analyze linguistic data across diverse languages and global English varieties. The course examines the intricate relationships between language, culture, and society through topics such as linguistic worldviews, regional and social variation, multilingualism, writing systems, and language-based discrimination. This course includes a service-learning component which involves working directly with local multilingual learners at ODU and within the community.

CGE 550 Social Justice & Literacy for Immigrant and Refugee Learners (3 Credit Hours)

This course provides an introduction to issues critical to the education of immigrant- and refugee-background learners. Students will learn to actively participate in refugee and immigrant communities, acquire an awareness of this population's experiences and needs, and explore issues related to social justice, education, language, and access. Language development theories and pedagogical strategies to engage collaboratively and compassionately with multilingual and multicultural newcomers are explored and practiced.

CGE 596 Topics in Language, Culture, and Society (3 Credit Hours)

The advanced study of selected topics in language, culture, and society designed to permit small groups of qualified students to work on subjects of mutual interest, which because of their specialized nature, may not be offered regularly. These courses will appear in the course schedule and will be more fully described by academic advisors.

CGE 650 Graduate Oral Communication (3 Credit Hours)

This course is designed for multilingual and/or international graduate and professional students who are preparing to engage in scholarly activity in their academic disciplines. Students will develop the speaking skills needed to prepare and deliver academic presentations as well as effectively participate in seminar-style discussions and other formal group settings. Students are expected to tailor the opportunities provided by the course to their respective disciplines. A variety of areas of pronunciation will be covered while paying special attention to comprehensibility and individual students' needs. Graduate Monarch English Transition (MET) Program Exit Criteria: Earn a grade point average of 3.0 in academic courses and grades of B or higher and 85% attendance or higher in the MET courses.

CGE 652 Graduate Academic Writing (3 Credit Hours)

This course is designed for graduate multilingual and/or international graduate and professional students who are preparing to engage in scholarly activity in their academic disciplines. In this course, students learn writing practices required in order to write cohesive, coherent, and convincing academic papers. Writing skills are developed through guided examination and analysis of discipline-specific authors and texts. Students are expected to tailor the opportunities provided by the course to their respective disciplines. Problems with sentence structure, lexical grammar, and diction are addressed individually. Graduate Monarch English Transition (MET) Program Exit Criteria: Earn a grade point average of 3.0 in academic courses and grades of B or higher and 85% attendance or higher in the MET courses.

CGE 695 Topics in Graduate Communication (1-3 Credit Hours)

The study of selected topics designed to permit qualified students to work on subjects of mutual interest in a seminar format which may not be offered regularly due to their specialized nature.

CHAE - Contemporary Human Anatomy Education

CHAE 800 Advanced Anatomical Sciences (3 Credit Hours)

This course will provide exposure to the four cardinal anatomical sciences. Gross Anatomy, Micro Anatomy, Embryology & Neuroanatomy. The course will include anatomy, histology and embryology, and multiple neuroanatomy online lectures and labs to ensure students are well versed in each of the specialties.

CHAE 801 Advanced Medical Imaging (3 Credit Hours)

This course provides the principles and applications of medical imaging and clinical-case scenarios using evidence-based approaches and peer-reviewed materials that contribute to the integration of concepts relating to the major medical diagnostic techniques used to examine the different regions of the human body. The learning experience in this course fosters self-directed and independent study and builds clinical problem-solving skills. This educational approach will also help students to develop skills such as recognition and interpretation of human structures and the variations presented in medical imaging. Students will learn to apply these skills in an educational and/or scientific research environment. The format of this course is aligned with the educational framework established in CHAE 800.

CHAE 803 Contemporary Teaching Anatomy (3 Credit Hours)

Anatomy is one of the oldest disciplines in human history. From Hippocrates and Galen to da Vinci and Vesalius and into the Enlightenment and modern age, knowledge of anatomy has evolved, experiencing many paradigm shifts in the way it is learned and taught. In this course, students will examine the culture-history of anatomy instruction and place this heritage in context with contemporary needs, issues, and best practices relating to course development, course management, dissection, grading, and integration of content in diverse academic settings.

CHAE 813 Stewards of Anatomy Education (3 Credit Hours)

This course will address what it means to be a steward of teaching anatomy, preparing students for a variety of settings and tasks associated with leadership in anatomy education. Topics include a cross-section of various classroom settings and teaching anatomy to the public. It further discusses the role of teaching assistants, sessional teachers, and engaging clinical faculty in anatomy education. The course ends with lessons on research and scholarship within the anatomical sciences, potentially suitable for students to share with professionals in their discipline, advancing anatomy education knowledge.

CHAE 814 Anatomy Education Foundations (3 Credit Hours)

The purpose of this course is to prepare future anatomy educators to analyze instructional situations and determine appropriate methods to support student learning. This is achieved by exploring foundational human anatomy education approaches, discussing pedagogical strategies, and developing assessments aligned with theories of adult learning.

CHAE 815 Teaching & Tech for Anatomy (3 Credit Hours)

This course provides a comparison of traditional and contemporary teaching modalities such as the use of body donations and medical imaging. Course topics will include ethics and donor acquisition, variations in lab experiences, and technology in teaching modalities. Various emergent teaching methods will be discussed and learners will place them into their professional contexts.

CHAE 900 Research (2-6 Credit Hours)

The goal of this course is submission of the doctoral candidate's research proposal to Institution Review Board and receiving approval to collect data. Prerequisites Advisor approval required.

CHEM - Chemistry and Biochemistry

CHEM 511 Natural Products Chemistry in the Carribean (4 Credit Hours)

A bioinorganic and natural products course that entails the chemistry of the use of chromium, vanadium, and herbs in medicine and the use of tunicates as biomonitors of heavy metal pollution in Jamaica. This is a study abroad course intended for the Maymester term.

Prerequisites: CHEM 211 and CHEM 212 with a C or better

CHEM 515 Intermediate Organic Chemistry (3 Credit Hours)

An in-depth look at organic reaction mechanisms, including polar, pericyclic, radical and organometallic reactions.

CHEM 521 Instrumental Analysis Lecture (3 Credit Hours)

Designed to be taken concurrently with CHEM 522. A study of the basic principles of spectroscopic, chromatographic, and electrochemical methods of quantitative chemical analysis. Methods of chemical instrumentation are also included.

CHEM 522 Instrumental Analysis Laboratory (3 Credit Hours)

An intensive laboratory study of the principles of analytical chemistry. Experiments in spectroscopic, chromatographic, and electrochemical methods are conducted to illustrate fundamental principles and to provide the opportunity to develop skills in the use of instrumentation for chemical measurement.

Pre- or corequisite: CHEM 521 with a grade of C or better

CHEM 539 Introduction to Pharmaceutical Chemistry (3 Credit Hours)

An introduction to the fundamental concepts of drug action including pharmacodynamics (effect of drugs on the body) and pharmacokinetics (ADME: absorption, distribution, metabolism and elimination) of drugs; an introduction to the process of new drug discovery and synthesis will also be taught.

Prerequisites: CHEM 213 and CHEM 214 with a grade of "C" or better; CHEM 321 and CHEM 441 recommended

CHEM 541 Biochemistry Lecture (3 Credit Hours)

This course is a one-semester survey of the major molecular constituents, bioenergetics, enzymes, nucleic acid structure, and genetic information transfer pathways fundamental to biochemistry.

CHEM 542 Biochemistry Laboratory (4 Credit Hours)

Principles and techniques of biochemical and immunological procedures involving protein characterization and isolation, enzymology, bioinformatics, and common molecular biology techniques for nucleic acids will be presented. (This is a writing intensive course.)

Pre- or corequisite: CHEM 541 with a grade of C or better

CHEM 543 Intermediate Biochemistry (3 Credit Hours)

This course presents and in-depth study of protein structure, folding, and synthesis. The major metabolic pathways will be studied in detail regarding thermodynamics and mechanism of regulation or control of individual enzymes and entire metabolic pathways. Concepts of metabolic disease will be introduced and effects on integrated metabolism will be presented.

Prerequisites: CHEM 541 with a grade of C or better or equivalent

CHEM 549 Environmental Chemistry (3 Credit Hours)

An overview of the natural chemical systems operating in the atmosphere, in the terrestrial environment (both water and soils), and in the oceans, and the potential effects that human activities may have on them. Specific topics include the origin and evolution of the earth and life, the chemistry of the atmosphere (including the ozone layer and greenhouse effect), the organic and inorganic components of soil and water, chemical weathering of rocks, metal complexation, biological processes in soil and water, and global-scale chemical processes.

CHEM 551 Advanced Inorganic Chemistry (3 Credit Hours)

Theoretical aspects of modern inorganic chemistry: bonding theories, stereochemistry, acid-base theories, coordination compounds, organometallic and bioinorganic compounds.

CHEM 552 Advanced Inorganic Chemistry Laboratory (2 Credit Hours)

Advanced topics in inorganic synthesis.

Prerequisites: CHEM 551 with a grade of C or better

CHEM 553 Essentials of Toxicology (3 Credit Hours)

Fundamental principles of toxicology: dose-response relationship, toxicologic testing, chemical and biological factors influencing toxicity, organ toxicology, carcinogenesis, mutagenesis, teratogenesis.

CHEM 560 Frontiers in Nanoscience and Nanotechnology (1 Credit Hour)

Nanotechnology presents unparalleled opportunities for advances in technology and medicine. Simultaneously, nanotechnology presents new challenges to organisms and to our environment. These undefined risk factors threaten to slow the development of new technologies and novel medical therapies. This course will review: structure, synthesis and properties of key nanomaterials; key applications of nanomaterials in technology and medicine; and impacts of nanomaterials on plant and animal physiology and the environment more generally. This course will be team-taught by faculty members in Biological Sciences, Chemistry and Biochemistry, and Engineering.

CHEM 595 Selected Topics (1-3 Credit Hours)

Study of selected topics.

Prerequisites: permission of the instructor

CHEM 669 In-Service Practicum (3-6 Credit Hours)

6 credits; 50 hours per credit. One semester of work experience in local hospital, forensic, or industrial laboratory. Available for pass/fail grading only.

Prerequisites: CHEM 631 632

CHEM 670 Graduate Orientation (3 Credit Hours)

An introduction to graduate studies in chemistry. Topics include responsible conduct of research (RCR), grant writing skills, oral presentation of chemical research and methods for searching the chemical literature. Attendance at departmental seminars is required. Limited to first-year chemistry doctoral students.

CHEM 685 Frontiers in Chemistry (1-3 Credit Hours)

Topics representing the most recent advances in various fields of chemistry or ones which represent an interdisciplinary advancement.

Prerequisites: permission of the department chair

CHEM 695 Topics in Chemistry (1-3 Credit Hours)

Study of selected topics in chemistry.

Prerequisites: permission of the department chair

CHEM 698 Master's Research (1-9 Credit Hours)**CHEM 699 Master's Thesis (3 Credit Hours)**

Master's Thesis.

Prerequisites: Departmental permission required

CHEM 701 Advanced Analytical Chemistry (3 Credit Hours)

The theoretical and practical foundation of analysis with emphasis on recent analytical developments and current literature; topics may include figures of merit and data treatment, sampling and extraction, HPLC, electrochemistry, circular dichroism, FT-IR, Raman, MS, electrophoresis and NMR. Lectures are given by experts in those techniques.

CHEM 702 Advanced Analytical Chemistry II (3 Credit Hours)

This course will review the most cutting-edge advanced analytical chemistry instrumentation and methods, spanning three core areas of analytical chemistry (spectroscopy, separation, and electrochemistry) and offering an in-depth understanding of objectives, motivations, and future directions. The course will focus on advanced instrumentation and methodologies that can achieve ultra-sensitive analysis and detection, including single molecular spectroscopy, nanoparticle probes, high-speed separation in microfluidic devices, and ultramicroelectrodes for sensing and imaging.

Prerequisites: Instrumental Analysis (or its equivalent)

CHEM 703 Chromatographic Separations by HPLC and GC (3 Credit Hours)

This course covers basic principles of chromatography emphasizing high performance liquid chromatography (HPLC) and gas chromatography (GC), as well as separation modes, instrumentation, detection methods, quantification, and sample preparation including solid phase extraction. Examples from environmental sciences, biosciences and industry will be stressed.

CHEM 704 HPLC and GC Laboratory (2-3 Credit Hours)

This lab course consists of six to seven independent HPLC and GC exercises based on examples from environmental, bioscience, and industrial applications.

CHEM 715 Automation and Management of the Clinical Chemistry Laboratory (1 Credit Hour)

The basic principles of management of the clinical chemistry laboratory and regulatory issues in laboratory management are presented.

Prerequisites: permission of the instructor

CHEM 716 Electrochemical Methods of Analysis (1-2 Credit Hours)

This course presents the fundamental principals and practical applications of modern electrochemical methods of analysis. Lectures and text readings cover the basic concepts and fundamental principals of this division of analytical techniques. Detailed descriptions and demonstrations of modern electrochemical research instrumentation will be provided. Students will obtain hands-on experience with this instrumentation by performing a required chemical determination using an electroanalytical method, and by undertaking a special analytical project. Research applications of other electroanalytical techniques and instrumentation, in addition to those actually used by the students in this course, will be discussed and/or demonstrated.

CHEM 720 Experimental Design and Data Treatment (3 Credit Hours)

A hands-on approach to experimental design and multivariate data analysis. Modern computer-based chemometric theories will be presented.

CHEM 723 Modern Synthetic Organic Chemistry (3 Credit Hours)

An examination of the design of complex organic molecules and natural products. Topics covered will include: retrosynthetic analysis; stereochemical control; application of fundamental organic reactions to develop synthetic strategies; implementation of protecting groups in organic synthesis; construction of carbocyclic and heterocyclic ring systems, organometallic coupling reactions, and contemporary methods.

Prerequisites: CHEM 728 or CHEM 828 or permission of the instructor

CHEM 724 Bioinorganic Chemistry (3 Credit Hours)

This course is a survey of the mechanisms of biochemical activity of the trace elements. Topics include oxygen uptake, oxidation-reduction, metabolism, and toxicity.

CHEM 725 Physical Organic Chemistry (3 Credit Hours)

Approaches to the study of reaction mechanisms, including molecular orbital theory, thermochemistry, kinetics, isotope effects, solvent and substituent effects (including linear free energy relationships), acidity, acid catalysis, and detection of reactive intermediates.

CHEM 726 Medicinal Chemistry (3 Credit Hours)

Study of the chemistry and mode of action of various medicinal and physiologically active compounds.

Prerequisites: CHEM 211 and CHEM 213 or one-year equivalent organic chemistry courses; CHEM 415/CHEM 515 and CHEM 441/CHEM 541 are helpful

CHEM 728 Organic Reactions (3 Credit Hours)

A comprehensive evaluation of modern organic transformations with emphasis on the fundamentals of each reaction, their utility and applications. Topics covered will include: nomenclature, classes of compounds, functional group exchanges (oxidation and reduction reactions), bond forming reactions (carbon-carbon, carbon-oxygen, and carbon-nitrogen), introduction to protecting groups, and reaction control by steric, electronic and topological considerations.

Prerequisites: CHEM 415 or CHEM 515 or equivalent or permission of the instructor

CHEM 734 Organic Spectroscopy (3 Credit Hours)

Organic functional group and structure analysis with ultraviolet, infrared, nuclear magnetic resonance, mass, and other spectroscopic techniques.

CHEM 736 Introduction to Organic Synthesis (3 Credit Hours)

Detailed coverage of fundamental organic transformations with emphasis on reduction, oxidation, carbon-carbon bond formation, and protecting group strategy.

CHEM 738 Organometallics (3 Credit Hours)

This course examines important transformations of organotransition-metal species. There is an emphasis on basic mechanism, structure-reactivity relationships, and applications in organic synthesis with applications of organotransition-metal catalysis towards industrial applications.

CHEM 740 Coordination and Transition Metal Chemistry (3 Credit Hours)

This course is based on the coordination and transition metal chemistry of first row, second row, and third row transition metals.

Prerequisites: CHEM 351

CHEM 742 Advanced Mass Spectroscopy (3 Credit Hours)

This course trains students in the theory and application of advanced mass spectrometric methods as used in all subdisciplines of chemistry and biochemistry.

CHEM 743 Organic Geochemistry (3 Credit Hours)

Organic geochemistry is the study of organic compounds originally produced by photosynthesis and altered as they cycle through the soils, atmosphere, rivers, oceans, and crustal rocks. This course will include the carbon/oxygen cycles, biomarkers, organic matter diagenesis/catagenesis, analytical techniques used in organic geochemistry, and an introduction to carbon isotopes.

CHEM 744 NMR Spectroscopy (3 Credit Hours)

NMR is a highly specific spectroscopic technique. It can probe the individual atoms in molecules via a limitless array of distinct experiments tailored to nearly every need. While NMR experiments can contain up to several hundred magnetic pulses, the effect of the pulses and therefore the utility of each experiment can be understood via a primarily visual approach. This course offers a visual-based approach to discuss spectrometer hardware, basic NMR theory, and a series of one, two and three-dimensional NMR experiments, with applications to small molecules, proteins, nucleic acids and their interactions.

CHEM 747 Medical Biochemistry (3 Credit Hours)

This course focuses on the applied biochemistry associated with human biological systems. Topics to be covered include the hormonal control of metabolism, vitamins, minerals, diagnostic tests; the biochemistry of the digestive system; connective tissue and bone; the immune system; the urinary system; and the nervous systems, among others. Exams involve answering United States Medical Licensing Exam type questions in some instances. Medical biochemistry case studies are presented and discussed in class that relate to the biochemical basis of disease to enhance the learning experience. Students will also write a research paper and give an in-class presentation on selected topics.

Prerequisites: CHEM 541 and CHEM 543 (or) CHEM 765

CHEM 748 Environmental Chemistry Laboratory (3 Credit Hours)

Study of the basic principles and methods of trace chemical analysis of environmental systems, including spectroscopic, chromatographic, and electrochemical instrumental methods, in addition to wet chemical methods.

CHEM 749 Environmental Chemistry (3 Credit Hours)

An overview of the natural chemistry systems operating in the atmosphere, in the terrestrial environment (both water and soils), and in the oceans, and the potential effects that human activities may have on them. Specific topics include the origin and evolution of the earth and life, the chemistry of the atmosphere (including the ozone layer and greenhouse effect), the organic and inorganic components of soil and water, chemical weathering of rocks, metal complexation, biological processes in soil and water, and global-scale chemical processes.

CHEM 754 Quantum Chemistry (3 Credit Hours)

Overview of the development and application of quantum mechanics from a chemical perspective.

CHEM 755 Computational Chemistry (3 Credit Hours)

Comprehensive overview of ab initio (quantum) calculations and molecular dynamic simulations, the two most widely used computational methods. Plus a brief overview of other computational applications in chemistry and biology.

Prerequisites: CHEM 754 or permission of the instructor

CHEM 756 Inorganic Reaction Mechanisms (3 Credit Hours)

This course is a survey of the major mechanisms of inorganic and organometallic chemistry. Topics include kinetics, ligand substitution, electron transfer, and photochemistry.

CHEM 758 Atmospheric Chemistry (3 Credit Hours)

An introductory survey of atmospheric chemistry and physics. Topics to be covered include atmospheric composition, atmospheric pressure, simple models, atmospheric transport, geochemical cycles, the greenhouse effect, aerosols, stratospheric ozone, the oxidizing power of the troposphere, ozone air pollution, satellite orbits, and radiative transfer. The course will also provide a survey of satellite remote sensing. It will conclude with the basics of satellite remote sensing, including a brief survey of satellite instruments.

CHEM 760 Molecular Spectroscopy (3 Credit Hours)

An introductory survey of the rotational, vibrational and electronic spectroscopy of molecules from the perspective of quantum mechanics and group theory.

Prerequisites: CHEM 333

CHEM 763 Mechanisms of Sensing and Signal Transduction (3 Credit Hours)

Living organisms must sense and respond to changes in their environment, which requires perceiving extracellular stimuli and converting this information into tangible changes to intracellular function. Sensory and metabolic pathways must integrate stimuli from multiple signals to coordinate cell-wide or organism-wide responses, and signal transduction pathways must be considered in the context of the networks they comprise. Signal transduction networks are the very definition of ‘wholes’ that are greater and more complex than the sums of their parts. This course will have a dual focus on mechanisms of signal transduction, with an emphasis on macromolecular structure, and on network modeling.

CHEM 765 Advanced Biochemistry (3 Credit Hours)

This course will cover macromolecular structure, function, thermodynamic stability and folding kinetics; protein chemistry; molecular biology; and molecular mechanisms of disease and bioinformatics.

CHEM 769 Nucleic Acids Biochemistry (3 Credit Hours)

A comprehensive presentation of the chemistry of RNA and DNA, including modern concepts of gene regulation, the control over transcription, RNA processing and translation, cell cycle control and molecular carcinogenesis.

CHEM 775 Physical Biochemistry (3 Credit Hours)

This course will examine the physical characterization of macromolecules, polarized light, absorption and fluorescence, sedimentation and transport hydrodynamics, electrophoretic mobility, light scattering, and structural x-ray crystallography of proteins and nucleic acids.

CHEM 779 Kinetics and Thermodynamics (3 Credit Hours)

A survey of modern theories of reaction rates and mechanisms, classic thermodynamic functions, and an introduction to statistical thermodynamics.

CHEM 781 Protein Bioinformatics and Functional Genomics (3 Credit Hours)

Students will learn cutting-edge bioinformatics and genomics approaches to gain an in depth understanding of genetic and protein evolution as it relates to genetic mutation and adaption and to protein structure, folding and function. The theory and computational skills needed to analyze protein, DNA and non-coding RNA sequences as well as protein structures will be taught and applied. Comparative genomics studies will be conducted, focusing on current topics such as viral outbreaks where students will elucidate functional variations leading to enhanced virulence in isolates during a pandemic such as Zika.

CHEM 790 Master's Seminar (1 Credit Hour)

Master's students attend seminars given by researchers from across the country in order to expose them to additional areas of research in chemistry and biochemistry.

CHEM 791 Master's Seminar (2 Credit Hours)

Master's students attend seminars, attend a class on giving seminars, and present a seminar on their own research.

CHEM 795 Selected Topics in Chemistry and Biochemistry (3 Credit Hours)

Thorough coverage of areas selected to meet special needs and interests.

Prerequisites: permission of the instructor

CHEM 801 Advanced Analytical Chemistry (3 Credit Hours)

The theoretical and practical foundation of analysis with emphasis on recent analytical developments and current literature; topics may include figures of merit and data treatment, sampling and extraction, HPLC, electrochemistry, circular dichroism, FT-IR, Raman, MS, electrophoresis and NMR. Lectures are given by experts in those techniques.

CHEM 802 Advanced Analytical Chemistry II (3 Credit Hours)

This course will review the most cutting-edge advanced analytical chemistry instrumentation and methods, spanning three core areas of analytical chemistry (spectroscopy, separation, and electrochemistry) and offering an in-depth understanding of objectives, motivations, and future directions. The course will focus on advanced instrumentation and methodologies that can achieve ultra-sensitive analysis and detection, including single molecular spectroscopy, nanoparticle probes, high-speed separation in microfluidic devices, and ultramicroelectrodes for sensing and imaging.

CHEM 816 Electrochemical Methods of Analysis (1-2 Credit Hours)

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An examination of the design of complex organic molecules and natural products. Topics covered will include: retrosynthetic analysis; stereochemical control; application of fundamental organic reactions to develop synthetic strategies; implementation of protecting groups in organic synthesis; construction of carbocyclic and heterocyclic ring systems, organometallic coupling reactions, and contemporary methods

Pre- or corequisite: CHEM 728 or CHEM 828 or permission of the instructor

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A comprehensive evaluation of modern organic transformations with emphasis on the fundamentals of each reaction, their utility and applications. Topics covered will include: nomenclature, classes of compounds, functional group exchanges (oxidation and reduction reactions), bond forming reactions (carbon-carbon, carbon-oxygen, and carbon-nitrogen), introduction to protecting groups, and reaction control by steric, electronic and topological considerations

Prerequisites: CHEM 415 or CHEM 515 or equivalent or permission of the instructor

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Organic functional group and structure analysis with ultraviolet, infrared, nuclear magnetic resonance, mass, and other spectroscopic techniques.

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Detailed coverage of fundamental organic transformations with emphasis on reduction, oxidation, carbon-carbon bond formation, and protecting group strategy.

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This course examines important transformations of organotransition-metal species. There is an emphasis on basic mechanism, structure-reactivity relationships, and applications in organic synthesis with applications of organotransition-metal catalysis towards industrial applications.

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This course examines the coordination and transition metal chemistry of first row, second row, and third row transition metals.

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CHEM 849 Environmental Chemistry (3 Credit Hours)

An overview of the natural chemistry systems operating in the atmosphere, in the terrestrial environment (both water and soils), and in the oceans, and the potential effects that human activities may have on them. Specific topics include the origin and evolution of the earth and life, the chemistry of the atmosphere (including the ozone layer and greenhouse effect), the organic and inorganic components of soil and water, chemical weathering of rocks, metal complexation, biological processes in soil and water, and global-scale chemical processes.

CHEM 854 Quantum Chemistry (3 Credit Hours)

Overview of the development and application of quantum mechanics from a chemical perspective.

CHEM 855 Computational Chemistry (3 Credit Hours)

Comprehensive overview of ab initio (quantum) calculations and molecular dynamic simulations, the two most widely used computational methods. Plus a brief overview of other computational applications in chemistry and biology.

CHEM 856 Inorganic Reaction Mechanisms (3 Credit Hours)

This course is a survey of the major mechanisms of inorganic and organometallic chemistry. Topics include kinetics, ligand substitution, electron transfer, and photochemistry.

CHEM 858 Atmospheric Chemistry (3 Credit Hours)

An introductory survey of atmospheric chemistry and physics. Topics to be covered include atmospheric composition, atmospheric pressure, simple models, atmospheric transport, geochemical cycles, the greenhouse effect, aerosols, stratospheric ozone, the oxidizing power of the troposphere, ozone air pollution, satellite orbits, and radiative transfer. The course will also provide a survey of satellite remote sensing. It will conclude with the basics of satellite remote sensing, including a brief survey of satellite instruments.

CHEM 859 Statistical Thermodynamics in Chemistry (3 Credit Hours)

An introduction to statistical mechanics from a chemical perspective. Topics to be covered include ensembles and postulates and their mathematical background; basic thermodynamics; distinguishable and indistinguishable systems; ideal monatomic gas; monatomic crystals; ideal diatomic gas; ideal polyatomic gas; chemical equilibrium; rates of chemical reactions; and quantum statistics.

Prerequisites: Permission from department chair

CHEM 860 Molecular Spectroscopy (3 Credit Hours)

An introductory survey of the rotational, vibrational and electronic spectroscopy of molecules from the perspective of quantum mechanics and group theory.

CHEM 863 Mechanisms in Sensing and Signal Transduction (3 Credit Hours)

Living organisms must sense and respond to changes in their environment, which requires perceiving extracellular stimuli and converting this information into tangible changes to intracellular function. Sensory and metabolic pathways must integrate stimuli from multiple signals to coordinate cell-wide or organism-wide responses, and signal transduction pathways must be considered in the context of the networks they comprise. Signal transduction networks are the very definition of 'wholes' that are greater and more complex than the sums of their parts. This course will have a dual focus on mechanisms of signal transduction, with an emphasis on macromolecular structure, and on network modeling.

CHEM 865 Advanced Biochemistry (3 Credit Hours)

This course will cover macromolecular structure, function, thermodynamic stability and folding kinetics; protein chemistry; molecular biology; and molecular mechanisms of disease and bioinformatics.

CHEM 868 Internship - Chemistry & Biochemistry (1 Credit Hour)

This course is designed to provide individual students with advanced on-the-job professional experience. Internship assignments must be approved within the student's program of study. Direct supervision is given by an experienced professional at the internship site.

CHEM 869 Nucleic Acids Biochemistry (3 Credit Hours)

A comprehensive presentation of the chemistry of RNA and DNA, including modern concepts of gene regulation, the control over transcription, RNA processing and translation, cell cycle control and molecular carcinogenesis.

CHEM 875 Physical Biochemistry (3 Credit Hours)

This course will examine the physical characterization of macromolecules, polarized light, absorption and fluorescence, sedimentation and transport hydrodynamics, electrophoretic mobility, light scattering, and structural x-ray crystallography of proteins and nucleic acids.

CHEM 879 Kinetics and Thermodynamics (3 Credit Hours)

A survey of modern theories of reaction rates and mechanisms, classic thermodynamic functions, and an introduction to statistical thermodynamics.

CHEM 881 Protein Bioinformatics and Functional Genomics (3 Credit Hours)

Students will learn cutting-edge bioinformatics and genomics approaches to gain an in depth understanding of genetic and protein evolution as it relates to genetic mutation and adaption and to protein structure, folding and function. The theory and computational skills needed to analyze protein, DNA and non-coding RNA sequences as well as protein structures will be taught and applied. Comparative genomics studies will be conducted, focusing on current topics such as viral outbreaks where students will elucidate functional variations leading to enhanced virulence in isolates during a pandemic such as Zika.

CHEM 890 Chemistry Seminar (1 Credit Hour)

Students attend seminars given by researchers from across the country on order to expose them to additional areas of research in chemistry and biochemistry.

CHEM 891 Doctoral Seminar (2 Credit Hours)

Students attend seminars; attend a class on giving seminars; and present a seminar on their own research.

CHEM 895 Selected Topics in Chemistry and Biochemistry (3 Credit Hours)

Thorough coverage of areas selected to meet special needs and interests.

Prerequisites: permission of the instructor

CHEM 898 Doctoral Research (1-9 Credit Hours)**CHEM 899 Dissertation (1-9 Credit Hours)****CHEM 998 Master's Graduate Credit (1 Credit Hour)**

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

CHEM 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

CL - Conservation Leadership

CL 668 Internship in Conservation Leadership (3 Credit Hours)

The internship will focus on a "real-world" issue that constitutes a leadership challenge in conservation. The student is expected to use the concepts of adaptation science to analyze the issue and to develop options of how to address the issue.

Prerequisites: BIOL 467 OR BIOL 567 OR OEAS 467 OR OEAS 567

COMM - Communications

COMM 500 Intercultural Communication (3 Credit Hours)

This course is designed to introduce students to the study of communication in cultural contexts, the purpose of which is to prepare students to live and work within an increasingly multicultural world. This is accomplished by first defining and critically analyzing concepts of culture. Throughout the semester, the course will investigate theories of culture and communication that address the development of cultural identity, intercultural communication competence, the role of verbal and nonverbal communication across cultures, the cultural composition of the U.S., and finally ethical communication and challenges in a globalized era.

COMM 501 Communication Theory (3 Credit Hours)

An overview of general and contextual theories of communication. Focus is on the nature of communication theory, the role of theory in communication inquiry, and the relationships among theory, research, and practice.

COMM 503 Public Information and Crisis Communications (3 Credit Hours)

This course introduces students to the basic elements of public information as it pertains to assisting organizations avoid, mitigate and recover from crisis situations. Students will have the opportunity to both observe and participate in crisis communications situations.

COMM 504 Emergency Management Communication (3 Credit Hours)

This course introduces students to the multi-layered challenges associated with communication in the event of accidents, crises and natural disasters. In addition to incorporating basic elements of public relations as it pertains to assisting organizations avoid, mitigate and recover from external crisis situations, students will have the opportunity to both observe and participate in crafting multi-agency responses to these unplanned events.

COMM 505 Communication and Culture in the Middle East (3 Credit Hours)

The course examines the tensions between modernity and tradition in the context of Middle East culture. Cultural variables for study include myth and religion, family structures and the use of science and technology.

COMM 512 Interpersonal Communication Theory and Research (3 Credit Hours)

A survey of classic and contemporary theories and research of communication in personal and social relationships across the lifespan. Emphasizes communication as a means to facilitate conditions for development of positive relational outcomes.

COMM 521 Communication and Conflict Management (3 Credit Hours)

Focus on theory and research of communication processes in conflict episodes across social and personal relational contexts. Applications of communication approaches to conflict management are emphasized.

COMM 522 Listening to Self, Others, Nature, & the Divine (3 Credit Hours)

The listening course introduces students to: 1) Practices for exploring and developing listening competencies, 2) Theoretical perspectives and models of listening, and 3) Research on listening. Practice, theory, and research are all integrated across the contexts of self, others, nature, and the divine.

Prerequisites: Graduate standing

COMM 523 Nonviolent Communication and Peace (3 Credit Hours)

Perspectives on nonviolent communication and peace are covered from the micro level (e.g., individual beliefs and worldviews) to interpersonal relationships (e.g., conflict management), groups (e.g., tribes, gangs), organizational systems (e.g., businesses, governments), and macro or global level (e.g., political relationships between nations).

COMM 524 Communicating Love (3 Credit Hours)

This course investigates the history, types, characteristics, functions, and applications of love in everyday life, emphasizing the communication of altruistic/compassionate/agape love in four interrelated contexts: self, spirit, others, and creation. Theory, research, and applications of love will be explored within the spiritual, scientific, and dialogic (the conversation between science and spirit) perspectives.

COMM 525 Family Communication Theory and Research (3 Credit Hours)

A survey of classic and contemporary theories and research of communication in family units, family relationships, and family interfacing with society. The course emphasizes communication in the social construction of evolving "family" realities as well as communication as means to facilitate conditions for development of positive domestic outcomes.

COMM 527 Children's Communication Theory and Research (3 Credit Hours)

A survey of theories and research of communication during childhood. Emphasis is on children as developing communicators, their relationships, and their interactions with media. Factors affecting optimal development of children's communication and development of applications to enhance children's communication development are emphasized.

COMM 537 Podcasting (3 Credit Hours)

In today's digital landscape, storytelling is a powerful tool for effective communication. This course explores the intersection of strategic communication and podcasting, equipping students with the skills to craft compelling narratives that engage audiences across various platforms. Through a combination of theoretical insights, practical exercises, and hands-on podcasting projects, students will learn how to develop, produce, and distribute podcasts strategically to achieve communication objectives.

COMM 538 The Advertising Industry (3 Credit Hours)

This course explores the history, theory, industry, and practice of advertising as a communication discipline. This course explores the origins of advertising and its evolution into its contemporary, technologically-driven form while introducing students to skills and concepts necessary for work in the field.

COMM 543 Hispanic Film (3 Credit Hours)

A topical study of the major works of Spanish and Latin American film from Bunuel to the present. The course explores many issues, including those related to gender, race, symbolism, and class struggle.

Prerequisites: COMM 270A or THEA 270A or permission of instructor

COMM 544 German Cinema I (3 Credit Hours)

The first half of the 20th century was the most creative and destructive period in German and European history. Its rich cultural achievements included Viennese psychoanalytical theory of the turn of the century, Art Nouveau, German Expressionism, and the avant garde aesthetics of the Weimar Republic. Conversely, World War I and II exposed the cultural agony and human depravity of modern civilization. This course will trace these various aspects and developments in a variety of exemplary genres. Readings and discussions in German. (Cross-listed with WCS 445/WCS 545 and GER 445/GER 545)

COMM 545 Communication Analysis and Criticism (3 Credit Hours)

A survey of the key methods used in critiquing various forms of human and mediated communication for the purpose of becoming more discerning consumers of public and mass mediated messages. Analysis will include films, television, and radio programs, advertisements, newspapers, public discourses, speeches, and conversations.

COMM 547 Electronic Media Law and Policy (3 Credit Hours)

This course focuses on legal and policy issues related to modern media systems and technologies, with an emphasis on legal considerations of electronic media. Subjects include First Amendment issues concerning news, programming, and advertising; station licensing; and challenges to traditional legal thought brought about by new technologies.

COMM 548 Global Media Industries (3 Credit Hours)

An examination of the rise of broadcast technology and world flow of information and entertainment. Theory and policy issues of systems of broadcast ownership, access, regulation, programming, transborder, broadcasting and cultural imperialism and dominance of Western programming will be addressed.

COMM 555 Critical Analysis of Journalism (3 Credit Hours)

A critical examination of the news industry as practiced in the printed press, network and cable television, magazines, the Internet, and alternative press. Class examines the political economy of journalism, the sociology of journalistic practice, international news flows, ideological/political control of news, and mythological narrative forms within news.

COMM 556 Organizations and Social Influence (3 Credit Hours)

Focuses on theories, research and applications of the social influence function of communication in a variety of organizational contexts. Examines traditional and nontraditional social influence theories and research as applied to organizational change.

COMM 557 Market Research (3 Credit Hours)

The foundation of any successful strategic communications, from marketing to public relations to advertising, is research. This course introduces students to secondary and primary research methods in an applied way, having students actually design and conduct full research studies for a client in the community. Students will discuss and conduct various forms of market research (situation, stakeholder, and competitor), explaining how it is integral to strategic thinking and responsible growth in order to directly prepare them for work in the field.

COMM 560 Social Marketing (3 Credit Hours)

Social marketing, the process through which communications professionals attempt to introduce, reinforce, or augment social change through theories and practices of marketing, is a growing field with implications ranging from social entrepreneurship to international relations to community resiliency. This course will introduce the theories of social marketing, applying them through collaborations with a local organization or cause. Students will focus on a practical approach to constructing a brand through communication strategy and media tactics, and how those relate to constructing and maintaining the identity of a larger organization while also promoting social benefit.

COMM 562 Sport Communication (3 Credit Hours)

A survey of sport media and communications. This course will expose students to the rapidly evolving sport media landscape, analyzing the communication processes involved in both strategic communication and journalism, through the mediums used to convey messages. The internal and external audiences involved in sport communication will be examined, both through an analysis of journalism's impact on sport and an exploration of the strategic communication planning process.

COMM 571 International Film History (3 Credit Hours)

An examination of world cinema as a technology, a business, an institution, and an art form from inception to the present. Emphasis is on the narrative fiction film, its technological and aesthetic development, economic organization, and socio-cultural context. Representative classic and contemporary works will be screened and analyzed.

COMM 572 New Media Topics: Theories and Practices (3 Credit Hours)

This seminar investigates one or two particular emergent new media practices and theories. The topics will be chosen at the discretion of the instructor but may include issues such as 'mobile media,' 'micro media and audiences,' and 'social media.'

COMM 573 Television and Society (3 Credit Hours)

The role of television in the cultural, psychological, and economic life of America. The structure and design of television programs; and the history and function of television in reinforcing or altering public perceptions of ideas, events, and people. Major critical approaches are employed in examining television's social impact and global reach.

COMM 578 Media Marketing and Promotion (3 Credit Hours)

This course introduces students to the ways in which different media forms are used for advertising and marketing purposes. Emphasis is on electronic media, though other approaches, such as direct marketing techniques and the increasing use of new media technologies for marketing, are also examined.

COMM 579 American Film History (3 Credit Hours)

An examination of American motion pictures as an art form, a business and an institution from inception to the present. Primary attention is accorded to the narrative fiction film, its technological and aesthetic development, economic organization and social impact. This course highlights the many connections between film history and American culture.

COMM 580 The Video Documentary II (3 Credit Hours)

Discussion/presentation topics range from production field work to post-production editing. The final third of the semester will be devoted to compiling the rough footage in post production.

COMM 584 Strategic Media Design and Production (3 Credit Hours)

This course is designed to extend students' knowledge of the media elements of strategic communications, from graphics to images to video. Students will discuss how to ground creative production in strategy for a client, how to focus on content and storytelling for a specific stakeholder, and how to create an extended, coherent plan using both creative and organizational goals. This is not intended to make students 'creative' but instead to show students how to design, direct, and manage the work that a media production team might do.

COMM 585 Film and Television Genres (3 Credit Hours)

This course is designed to examine the conventions and meanings of various film and television genres within their broader aesthetic, socio-historical, cultural, and political contexts. Each time the class is offered it will focus in depth on a different genre, such as the gangster, the Western, the musical, the comedy, science fiction, among others. Class may be repeated for credit as long as the genres are different.

COMM 586 Advanced Filmmaking (3 Credit Hours)

This course offers students an opportunity to collaborate on a faculty led project beyond the scope of typical classroom projects. Students will execute an assigned duty for the duration of the semester.

Prerequisites: Permission of the instructor

COMM 589 Health and Interpersonal Communication (3 Credit Hours)

This course is designed to give an overview of contemporary scholarship on phenomena within the scope of interpersonal health communication.

COMM 590 ROAR Communications Agency (3 Credit Hours)

In this course, students gain hands-on experience working in an agency setting. They work directly with clients to create specific materials, and learn new tools and software suitable for each project. We emphasize building students' professional qualifications connected to their interests and the client's needs that bridge the gap between coursework and a career. Students will conduct situation analyses, choose audiences and strategy, and create professional-quality materials for clients. If they take the class for a second semester, students will have more senior roles, where they interface more extensively with the client and become team leaders with bigger projects.

COMM 591 Communication and Activism (3 Credit Hours)

This course will delve into activism and social change from a local and global perspective in order to enhance students' perspectives of social change as it manifests via popular media and community action.

COMM 595 Topics in Communication (1-3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule, and will be more fully described in information distributed to all academic advisors.

COMM 596 Topics in Communication (1-3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule, and will be more fully described in information distributed to all academic advisors.

COMM 597 Tutorial Work in Special Topics in Communication (3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

COMM 598 Tutorial Work in Special Topics in Communication (3 Credit Hours)

Topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

COMM 600 Intercultural Communication: History, Theory and Application (3 Credit Hours)

Students begin with an overview and then cover (1) past intercultural communication research, (2) the philosophical underpinning and ethics behind intercultural communication research, and (3) current developments in intercultural communication theory. They then address the application of intercultural communication theory in specific intercultural communication contexts (e.g. business, education, health and international travel).

COMM 601 Lifespan Communication Research and Theory (3 Credit Hours)

This course takes a developmental approach to the study of communication by exploring the culminating effects of communication as it evolves across our lifetime. It encompasses all phases of life (birth-death) across interactions within family, work, social, health, and spiritual contexts. The focus is on foundational and contemporary lifespan theories and research.

COMM 602 Digital Communication Theory and Research (3 Credit Hours)

This class looks at emerging theories of new media and their transformative effects on industrial practices, news dissemination, cultural production, social interaction, and political engagement across the lifespan. Students engage in ongoing theoretical debates and participate in various online endeavors that offer real world research opportunities.

COMM 603 Social Change and Communication Systems (3 Credit Hours)

Examines the role of various communication systems in enacting social change involving commercial, governmental and not-for-profit contexts. Topics include persuasive techniques, community engagement, mobilizing large-scale social movements, and the political consequences of human and digital communication across the lifespan.

COMM 604 Lifespan Communication Research Methods (3 Credit Hours)

An overview of social scientific and qualitative methods used in lifespan development communication research. Includes survey, experiment, observations, content and conversation analyses with an emphasis on developmental methods. Approaches to studying communication of children, adolescents, and later life are included.

Prerequisites: COMM 601

COMM 605 Critical Methods and Digital Communication (3 Credit Hours)

This class surveys the major methodological approaches available to critical communication researchers, such as semiology, structuralism, post-structuralism, neo-Marxism, and psychoanalysis, among others, within a cultural studies tradition. Special attention is paid to various digital communication technologies and how they are utilized throughout the lifespan.

Prerequisites: COMM 602

COMM 615 Construction of the Gendered Body (3 Credit Hours)

This course will examine: (1) the nature-nurture controversy as reflected in current theories about gender as a significant factor in the transformation of physical bodies into social bodies, (2) cultural objects and institutions that shape our gender roles and expectations, and (3) nonverbal language and power and the status of the sexes.

COMM 623 Relational Communication Across the Lifespan (3 Credit Hours)

This course explores theories and research of communication in everyday relationships across the lifespan from early childhood relationships until relationships at the end of life. Communication in personal and social relationships, within age cohorts (early childhood, adolescence, adulthood) are highlighted.

Prerequisites: Permission of the instructor

COMM 624 Positive Communication Across the Lifespan (3 Credit Hours)

This course examines communication theories and research in light of the theories and research of positive psychology. Topics include: strengths-based communication theorizing, communication and happiness, positive communication functions, creative communication, and positive communication outcomes (health, wellness, peace, hope).

Prerequisites: Permission of the instructor

COMM 626 Lifespan Communication, Geography, and Food (3 Credit Hours)

This course examines the intersections of communication, geography, and food from lifespan and global perspectives. Topics to be covered include communication and cooking; dinner table talk; food and folk culture; virtual rituals; the portrayals of food in media (e.g., film, television, CMC, print); the roles of race, class, and gender in food production/consumption; the commercialization of food; fast food and slow food; globalization vs. the 'locavore' movement; visualization and symbolic communication about food and nutrition; and market and supermarket geographies.

COMM 628 Mediated Human Communication in the Digital Age (3 Credit Hours)

This course conceptualizes the relationship established by the processes of human communication that are mediated by new media technologies. The course examines how such technologies affect social relationships, and how cultural values influence usage patterns of these technologies.

COMM 630 The Information Society (3 Credit Hours)

This course explores the theories, questions, claims and myths that have accompanied the rise of new communication technologies and electronically derived digital information that define the 'Electronic Revolution,' also known as the Information Society.

COMM 650 Religious Communication (3 Credit Hours)

The seminar surveys the relationship between communication and religion with an emphasis on theory, research and applications. Topics may include the communication of religious beliefs/values via story, ritual, ceremony, worship, prayer and mediated communications.

COMM 668 Internship (3 Credit Hours)

A structured work experience providing both a conceptual understanding and on-the-job training in some aspect of lifespan and digital communication. A journal, a final paper, a log of hours, a portfolio of work, and a satisfactory evaluation by work supervisor and cooperating faculty member are required.

Prerequisites: COMM 601 or COMM 602

COMM 678 Race and Television (3 Credit Hours)

This course examines the relationships among race, racial identity, and television. Multiple scholarly traditions are used to examine the interactions among television texts, audiences and institution, and historical and contemporary race relations.

COMM 685 Lifespan and Digital Communication Capstone Course (3 Credit Hours)

A capstone seminar for non-thesis students in their final semester to synthesize the relationships between lifespan and digital communication. Students will develop and complete a research paper or a digital communication project that they will present to a COMM graduate committee.

Prerequisites: COMM 601, COMM 602, COMM 603, COMM 604, and COMM 605; permission of graduate program director

COMM 689 Thesis Preparation (3 Credit Hours)

This course is intended for students in the Master of Arts in Lifespan and Digital Communication program who choose the thesis option. Course topics include: developing a thesis proposal, thesis rules and regulations, the thesis committee, presenting and defending a thesis proposal, and acquiring the essential tools needed to write and successfully defend an MA thesis.

Prerequisites: COMM 601, COMM 602, COMM 603, COMM 604, and COMM 605

COMM 695 Topics in Communication (1-3 Credit Hours)

The study of selected topics designed to permit qualified students to work on subjects of mutual interest in a seminar format which, due to their specialized nature, may not be offered regularly.

COMM 697 Tutorial in Special Topics in Communication (3 Credit Hours)

Independent reading and study of a topic under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: Permission of the department chair

COMM 698 Thesis Research (3 Credit Hours)

This course is intended for students in the Master of Arts in Lifespan and Digital Communication program who choose the thesis option. During the time a student is working on the MA thesis they must be enrolled in COMM 698, followed by COMM 699.

Pre- or corequisite: COMM 689

COMM 699 Thesis (3 Credit Hours)

This course is intended for students in the Master of Arts in Lifespan and Digital Communication program who choose the thesis option. During the time a student is working on the MA thesis they must be enrolled in COMM 698 followed by COMM 699.

COMM 725 Interpersonal Health Communication (3 Credit Hours)

This course is designed to provide an overview of contemporary scholarship on phenomena within the scope of interpersonal health communication. Students will become familiar with fundamental communication processes that are involved in managing physical and mental health. Additionally, they will develop an awareness of how communication among friends, family members, professionals, and others influences people's well-being, and how, in turn, health and illness shape communication and relationship dynamics. Topics to be covered include patient identity and self-disclosure, social support, patient-provider communication, end-of-life care, and health education. Consistent with the goals of graduate education, students are expected to engage with the course content, exercise critical thinking skills, develop advanced reading and writing competencies, and develop a sense of practical applications of theory and research.

COMM 795 Selected Topics in Communication Studies (1-3 Credit Hours)

The advanced study of selected topics in communication studies will be covered in such a way as to permit small groups of qualified students to study subjects of mutual interest which, due to their specialized nature, may not be offered regularly.

Prerequisites: Permission of the instructor

COMM 797 Independent Research in Communication Studies (1-3 Credit Hours)

Independent research directed by professors/faculty members examining communication topics.

Prerequisites: Permission of the instructor

COMM 895 Selected Topics in Communication Studies (1-3 Credit Hours)

The advanced study of selected topics in communication studies are covered in such a way as to permit small groups of qualified students to study subjects of mutual interest which, due to their specialized nature, may not be offered regularly.

Prerequisites: Permission of the instructor

COMM 897 Independent Research in Communication Studies (1-3 Credit Hours)

Independent research directed by professors/faculty members examining communication topics.

Prerequisites: Permission of the instructor

COMM 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

COUN - Counseling

COUN 601 Principles of Professional Counseling and Ethics (3 Credit Hours)

Aligned with a spiral approach to learning, students will be introduced to theory, practice, methods, basic principles, and concepts used by counselors in educational settings and community agencies. In subsequent courses, these topics will be revisited in depth. The course will emphasize professional and ethical issues related to counseling.

COUN 631 Counseling for Lifespan Development (3 Credit Hours)

A study of phase and stage theories of lifespan development with application to counseling. Current research findings on major developmental issues (e.g., gender) will be emphasized.

Prerequisites: Admission to counseling graduate program or graduate program director approval

COUN 633 Counseling and Psychotherapy Techniques (3 Credit Hours)

The course focuses on development of attitudes and skills essential to effective professional counseling. Emphasis is on conducting the helping interview, as well as conducting an intake interview, a mental status evaluation, a biopsychosocial history, a mental health history, and a psychological assessment for treatment planning and caseload management.

Pre- or corequisite: Admission to Counseling Graduate Program or Graduate Program Director approval

COUN 634 Advanced Counseling and Psychotherapy Techniques, Crisis, and Trauma (3 Credit Hours)

This course provides an overview of advanced techniques used by counselors, including crisis and trauma response and the principles of trauma-informed care.

Prerequisites: COUN 601, COUN 650, and COUN 633 with a grade of B or higher

COUN 642 Structured Counseling Groups (3 Credit Hours)

This course is designed to prepare students to facilitate structured counseling groups for children and adolescents primarily in the K-12 school setting. CACREP Required Content: GROUP WORK - studies that provide both theoretical and experiential understandings of group purpose, development, dynamics, theories, methods, skills, and other group approaches in a multicultural society, including all of the following: (a) principles of group dynamics, including group process components, developmental stage theories, group members' roles and behaviors, and therapeutic factors of group work; (b) group leadership or facilitation styles and approaches, including characteristics of various types of group leaders and leadership styles; (c) theories of group counseling, including commonalities, distinguishing characteristics, and pertinent research and literature; and (d) group counseling methods, including group counselor orientations and behaviors, appropriate selection criteria and methods, and methods of evaluation of effectiveness. Students will be required to complete 20 hours of fieldwork with K-12 aged youth, preferably in a school setting.

Prerequisites: Admission to Counseling graduate program or graduate program director approval; COUN 601, COUN 633, COUN 650 and COUN 678

COUN 644 Group Counseling and Psychotherapy (3 Credit Hours)

Developing effective group leadership competencies is the focus for the course. Identification of group dynamics, use of group level process, and the self-development of the leader are some major topics.

Prerequisites: Admission to Counseling graduate program or graduate program director approval; COUN 601, COUN 633, and COUN 650

COUN 645 Testing and Client Assessment (3 Credit Hours)

This course examines individual and group approaches to formal and informal assessment techniques, including diagnosis. It includes an examination of: the history of assessment; basic test statistics; test worthiness (reliability, validity, and cross-cultural issues); the selection, administration, and interpretation of assessment instruments; and ethical and legal issues relative to assessment. The focus of this class is on major concepts and principles of psychological testing and evaluation and use of standardized instruments with differing populations. Pre- or

Corequisites: COUN 633

COUN 647 Addictive Disorders (3 Credit Hours)

Examines the etiology, risk factors, assessment, counseling approaches and treatment of alcoholism and other addictions.

Prerequisites: Admission to Counseling graduate program or graduate program director approval; COUN 601, COUN 633, and COUN 650

COUN 648 Foundations of Career Development (3 Credit Hours)

Principles and theories of career development, occupational and educational information, employment trends, concepts and principles for effective work in educational and career planning and development are considered.

Prerequisites: Admission to Counseling graduate program or graduate program director approval; COUN 601, COUN 645, and COUN 650

COUN 650 Theories of Counseling and Psychotherapy (3 Credit Hours)

A study of major theories of counseling and psychotherapy. The primary focus is on providing students with a theoretical foundation upon which to develop their own approach for providing counseling and psychotherapy.

COUN 655 Social and Cultural Issues in Counseling (3 Credit Hours)

Designed to engage helping professionals in cultural self-awareness and the search for solutions to disparities in society through counseling work. Emphasis on the social identities of gender, race, ethnicity, religion, ability, class, sexual orientation, and age.

Prerequisites: Admission to counseling graduate program or graduate program director approval and COUN 601

COUN 666 Internship in College Counseling (1-6 Credit Hours)

This internship is designed to provide individual students with a planned program of advanced on-the-job professional experience in a college or university setting. A university instructor will coordinate internship assignments. An experienced professional in the college or university setting will provide direct supervision. Available for pass/fail grading only. Completion of a background check is required prior to commencing the field placement.

Prerequisites: Departmental permission and COUN 601, COUN 633, COUN 634, COUN 644, COUN 645, COUN 648, COUN 650, COUN 669, COUN 685, and COUN 686

COUN 667 Internship in Mental Health Counseling (1-9 Credit Hours)

This counselor education experience is designed to provide a planned program of supervised clinical instruction in mental health counseling in an appropriate professional setting, including provision of direct service and performance of indirect professional activities under appropriate clinical supervision of a site supervisor as well as classroom instruction and supervision. This pass/fail course requires successful completion of 300 hours of counseling field placement work and 120 hours of direct service in each of two semesters of enrollment. Completion of a background check is required prior to commencing the field placement.

Prerequisites: Admission to the Counseling Graduate Program or graduate program director approval, approved application; COUN 601, COUN 633, COUN 634, COUN 644, COUN 645, COUN 648, COUN 650, COUN 669, COUN 680, and COUN 685

COUN 668 Internship in School Counseling (1-6 Credit Hours)

This internship is designed to provide individual students with a planned program of advanced on-the-job professional experience in a school setting. A university instructor will coordinate internship assignments. An experienced professional in the school setting will provide direct supervision. Available for pass/fail grading only. Completion of a background check is required prior to commencing the field placement.

Prerequisites: Admission to the Counseling Graduate Program or graduate director approval; approved application; COUN 601, COUN 633, COUN 634, COUN 642, COUN 645, COUN 648, COUN 650, COUN 669, COUN 676, COUN 677 & COUN 678

COUN 669 Practicum in Counseling (3 Credit Hours)

This supervised experience will enable students to practice basic and intermediate individual and group counseling skills with clients while integrating knowledge and skills learned in previous course work. Completion of a background check is required prior to commencing the field placement.

Prerequisites: Admission to the Counseling graduate program or graduate director approval; COUN 601, COUN 633, COUN 642 or COUN 644, COUN 650, and COUN 634 with a grade of B or higher (see Program Handbook for other prerequisites based on specialty area)

COUN 670 Introduction to Counseling Supervision (3 Credit Hours)

This course provides an opportunity to learn one's personal style for supervision, to have supervised field supervision experiences and to gain an understanding of the different models of supervision.

Prerequisites: Admission to the Counseling Graduate Program or graduate director approval; COUN 601, COUN 669

COUN 676 Professional Issues in School Counseling K-12 (3 Credit Hours)

A professional seminar that emphasizes the contemporary role of the school counselor as leader and advocate in delivering school counseling programs to all students. Emphasis is placed on acquiring the awareness, knowledge and skills necessary to negotiate the cultural, educational, and contextual forces that impact the lives and academic achievement of students in a pluralistic society. Twenty hours of observation in a school is required. Completion of a background check is required prior to commencing the field placement. In addition, students are also required to attend a one-day program on a pre-determined date during the semester.

Prerequisites: Admission to the Counseling Graduate Program or graduate director approval

COUN 677 School Culture, Learning, and Classroom Management (3 Credit Hours)

School counselor's role in contributing to a safe, equitable, and culturally responsive school culture; promoting student learning and achievement; and the practice of effective teaching and classroom management. Cultural, political, economic, ethical, and legal issues are addressed. Twenty hours of observation in a school is required. Completion of a background check is required prior to commencing the field placement.

Prerequisites: Admission to the Counseling graduate program or graduate program director approval; COUN 676

COUN 678 Counseling Children and Adolescents in School Settings (3 Credit Hours)

This course will provide an overview of theories and techniques of counseling children and adolescents in school settings. Emphasis will be placed upon the counselor's role as a facilitator of normal developmental processes to promote academic success.

Prerequisites: Admission to the Counseling graduate program or graduate director approval; COUN 601, COUN 633, and COUN 650

COUN 679 School Counseling Program Development K-12 (3 Credit Hours)

This course is designed as a capstone experience that synthesizes graduate course work into a practical school counseling program manual. Emphasis is placed on assessment, data collection and analysis, design and development, implementation and evaluation of systemic school counseling programs K-12. Specific emphasis is given to the integration of assessed needs, the National Standards for School Counseling Programs and the Virginia Standards of Learning.

Prerequisites: Admission to the Counseling Graduate Program or graduate director approval; COUN 601, COUN 642 or COUN 644, COUN 648, and COUN 676

COUN 680 Mental Health Counseling (3 Credit Hours)

This course will examine the broad range of roles and functions of the mental health counselor within contemporary professional practice settings.

Prerequisites: Admission to the counseling graduate program or graduate director approval

COUN 681 Couples Counseling (3 Credit Hours)

Couples counseling focuses on development of effective counseling skills in working with couples.

Prerequisites: Admission to the Counseling graduate program or graduate director approval; COUN 601, COUN 633, and COUN 650

COUN 685 Diagnosis and Treatment Planning in Mental Health Counseling (3 Credit Hours)

A course focused on developing knowledge, attitudes, and skills essential to effective DSM-5 diagnosis, client conceptualization assessment, and clinical treatment planning. Emphasis on the use of client conceptualization models as a basis for treatment planning in mental health counseling.

Prerequisites: Admission to the Counseling graduate program or graduate director approval; COUN 601, COUN 633, COUN 645, and COUN 650

COUN 686 College Counseling (3 Credit Hours)

Overview of counseling services provided on college and university campuses. Topics include wellness of students, multicultural issues, ethical and legal issues, crisis and disaster response, advocacy, and program evaluation.

Prerequisites: Admission to the counseling graduate program or graduate program director approval

COUN 689 Understanding Military Connected Children and Families (4 Credit Hours)

Participants will learn about the unique academic, social, and emotional challenges faced by military connected children and their families. Participants will review, analyze and practice research-based learning and behavioral strategies and interventions to address these needs. This course will also introduce effective practices for supporting children through deployment separation, reunion and reintegration, and grief and trauma, including promoting school connectedness, fostering resiliency, facilitating coping skills, and designing customized academic, social, and behavioral supports. This course is required for completion of the Military Child and Family Education graduate certificate.

Prerequisites: Acceptance into the Military Child and Families Graduate Certificate Program

COUN 691 Family Systems and Family Development (3 Credit Hours)

The course offers a study of the family as a system, family life cycle stages, tasks, and difficulties that families may experience as they move through their developmental stages. Concepts and principles applicable to helping people within a systems perspective will also be discussed.

Prerequisites: Admission to the Counseling graduate program or graduate director approval; COUN 601, COUN 633, and COUN 650

COUN 695 Topics in Counseling (1-3 Credit Hours)

The study of selected topics in counseling.

Prerequisites: Admission to the counseling graduate program or graduate director approval

COUN 697 Independent Study (3-6 Credit Hours)

Individualized study under the supervision of a graduate faculty member.

COUN 698 Research in Counseling (3 Credit Hours)

Research on a topic or project related to counseling.

Prerequisites: Permission of the instructor

COUN 707 Adult and College Student Development (3 Credit Hours)

Exploration of theories informing practice regarding late adolescent, young adult, and adult psychological and cognitive development, adjustment, and learning in the two- and four- year college and university context. Influences of individual differences highlighted. Applications for college counseling, higher education, and community college practitioners, professionals, and leaders.

COUN 742 Advanced Counseling Theory and Practice (3 Credit Hours)

An in-depth study of selected counseling theories through the study of cases.

Prerequisites: COUN 601, COUN 633, COUN 645 and COUN 650

COUN 744 Advanced Group Counseling. (3 Credit Hours)

Development of group leadership skills through group experiences in class and in the field.

Prerequisites: COUN 601, COUN 633, COUN 644, COUN 645, and COUN 650

COUN 783 Complementary and Alternative Therapies (3 Credit Hours)

This course provides an overview of complementary and alternative therapies being used in mental health today, looking at their effectiveness and safety in treating specific client populations and for use in treating specific disorders, including ADHD, addictions, and anxiety. Modalities covered include acupuncture, nutritional medicine, herbal medicine, biofeedback, meditation, hypnotherapy, aromatherapy, and others.

Prerequisites: Admission to the Counseling graduate program or graduate program director approval

COUN 786 Spirituality in Counseling (3 Credit Hours)

An overview of methods for integrating spirituality into counseling as a means of promoting holistic wellness for both clients and counselors. Emphasis will be placed upon theories of spiritual development, beliefs inherent in major wisdom traditions, implicit and explicit strategies for integrating spirituality into counseling, and the counselor's own personal and professional awareness and growth.

COUN 795 Topics in Counseling (1-6 Credit Hours)

The study of selected topics in counseling.

COUN 797 Topics in Counseling (1-6 Credit Hours)

Individual study under the supervision of a graduate faculty member.

COUN 801 Current Issues in Counseling and Counselor Education (3 Credit Hours)

The course will focus on the current issues in counseling to include the role of ethical and legal considerations in counselor education and supervision, theories and skills in leadership, social and cultural issues to include social change theory and advocacy action planning, and developmental counseling.

COUN 807 Adult and College Student Development (3 Credit Hours)

Exploration of theories informing practice regarding late adolescent, young adult, and adult psychological and cognitive development, adjustment, and learning in the two- and four- year college and university context. Influences of individual differences highlighted. Applications for college counseling, higher education, and community college practitioners, professionals, and leaders.

COUN 820 Counselor Education Teaching and Practice (3 Credit Hours)

This course prepares students to teach counseling and related courses. Topics covered are learning theories, retention of material, motivation, classroom instructional strategies and techniques, and assessment of learning from the core learning expectations.

COUN 835 Advanced Counseling Research Design and Assessment (3 Credit Hours)

The doctoral-level course examines advanced topics and controversies in qualitative and quantitative counseling research; this integration of theoretical with applied counseling material will augment the department's standard doctoral research offerings.

Prerequisites: FOUN 814 and FOUN 722

COUN 842 Advanced Counseling Theory and Practice (3 Credit Hours)

An in-depth study of selected counseling theories through the study of cases.

Prerequisites: COUN 601, COUN 633, COUN 645 and COUN 650

COUN 844 Advanced Group Counseling (3 Credit Hours)

Development of group leadership skills through group experiences in class and in the field.

Prerequisites: COUN 601, COUN 633, COUN 644, COUN 645, and COUN 650

COUN 845 Diagnosis and Treatment Planning (3 Credit Hours)**COUN 846 Advanced Counseling Supervision (3 Credit Hours)**

This course provides advanced training and skill development in supervision. Specific topics in supervision will also be examined. These include: ethical and legal issues, multicultural competency in supervision; theories of counselor development; theories/models, processes, and skills in supervision.

COUN 848 Multicultural Perspectives in Counselor Education, Supervision, and Research (3 Credit Hours)

Counseling doctoral students will study multicultural issues in counselor preparation graduate programs, counseling supervision, and counseling research.

Prerequisites: Admission to Ph.D. program or graduate program director approval

COUN 868 Internship in Counseling (3-6 Credit Hours)

This internship is designed to provide individual students with a planned program of advanced on-the-job professional experience in a college, school, or community/agency setting. In addition, supervisory and teaching experiences are required. Internship assignments will be controlled and coordinated by a university instructor. Direct supervision is given by an experienced professional in the setting. Minimum of 600 hours.

COUN 869 Advanced Supervised Practicum in Counseling (3 Credit Hours)

This advanced supervised practicum in counseling experience will enable doctoral-level students to develop and/or refine advanced counseling skills and conceptually link counselor practice and supervision. Minimum of 200 hours.

Prerequisites: COUN 801, COUN 820, COUN 742/COUN 842, COUN 744/COUN 844

COUN 883 Complementary & Alternative Therapies in Mental Health Counseling (3 Credit Hours)

The course provides an overview of complementary and alternative therapies being used in mental health today, looking at their effectiveness and safety in treating specific client populations and for use in treating specific disorders, including ADHD, depression, addictions, and anxiety. Modalities covered include acupuncture, nutritional medicine, herbal medicine, biofeedback, meditation, hypnotherapy, aromatherapy, and others.

Prerequisites: Admission to the Counseling graduate program or graduate program director approval

COUN 886 Spirituality in Counseling (3 Credit Hours)

An overview of methods for integrating spirituality into counseling as a means of promoting holistic wellness for both clients and counselors. Emphasis will be placed upon theories of spiritual development, beliefs inherent in major wisdom traditions, implicit and explicit strategies for integrating spirituality into counseling, and the counselor's own personal and professional awareness and growth.

COUN 895 Topics in Counseling (1-6 Credit Hours)

The study of selected topics in counseling.

COUN 897 Independent Study (3-6 Credit Hours)

Individualized study under the supervision of a graduate faculty member.

COUN 898 Dissertation Seminar (3 Credit Hours)

This seminar is designed to assist students in making substantive progress in identifying and developing their dissertation proposal. Students will critically examine the current literature associated with their research interests and examine applicable conceptual constructs and methodologies.

Prerequisites: COUN 801, COUN 820, COUN 835, COUN 842, COUN 844, COUN 846, COUN 848, COUN 869, FOUN 813 and FOUN 814

COUN 899 Dissertation (1-12 Credit Hours)

1-12 credits.

COUN 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

COUN 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

CPD - Center for Professional Development

CPD 517 Digital Leadership (3 Credit Hours)

This course explores technology as it relates to leadership experiences. Theories, case studies and real world examples are analyzed to show both successful and unsuccessful uses of online and digital approaches that inform leaders' communication strategies. Students will explore how their own digital identities may impact their futures as leaders. They will also learn how to create digital identities that will shape their professional identities throughout their careers.

Prerequisites: Graduate standing

CPSY - Clinical Psychology

CPSY 632 Intellectual Assessment (3 Credit Hours)

Provides training in theories of intelligence and psychometric properties, administration, scoring and interpretation of major individually administered intelligence tests for children, adolescents and adults.

CPSY 651 Developmental Psychology (3 Credit Hours)

This course covers topics related to the physical, cognitive, social and emotional aspects of growth, from conception to death. It focuses on human growth and development, but other organisms are also considered.

Prerequisites: Students must be in the clinical psychology Ph.D. program or receive permission from the instructor

CPSY 661 Psychopathology (3 Credit Hours)

The course provides a conceptual basis for the study of abnormal behavior. Students conduct an in-depth review of the literature related to the classification, etiology, and treatment of mental disorders.

Prerequisites: Students must be in the clinical psychology Ph.D. program or receive permission from the instructor

CPSY 664 Clinical Assessment: Personality and Individual Differences (3 Credit Hours)

This course covers history of personality theory and assessment, and psychometrics, and introduces tools and techniques aimed at understanding individual differences in personality and assessment of major psychopathology.

Prerequisites: Student must be a clinical Ph.D. degree student or receive permission of the instructor

CPSY 698 Research in Psychology (3 Credit Hours)

Individual project under guidance of a research advisor. Required for students choosing thesis option. Limited to a total of 3 hours of credit.

Prerequisites: Students must be in the clinical psychology Ph.D. program and receive permission from the instructor

CPSY 699 Thesis (3 Credit Hours)

Individual project under guidance of a research advisor. Required for students choosing thesis option.

Prerequisites: Students must be in the clinical psychology Ph.D. program and receive permission from the instructor; CPSY 698

CPSY 700 Clinical and Ethical Practice (3 Credit Hours)

Introduces basic therapy skills to clinical psychology students and explores the ethical framework which guides the profession.

Prerequisites: Must be enrolled in the doctoral clinical psychology program

CPSY 713 Research Methods in Psychology (3 Credit Hours)

This course will cover research design and methodology. Topics may include experimental, quasi-experimental, single subject and survey research; validity; reliability; psychometric theory; confounds; measurement; sampling; inductive inference. Additionally, this course will cover Responsible Conduct of Research, including completion of CITI course, protection of human subjects, University Human Subjects Committee and IRB, APA Style, paper structure, references, tables, figures, etc., research proposal writing, including searching for sources, writing, oral presentation, data collection and management issues (e.g., Qualtrics, SONA, data cleaning). Students are required to complete a Research Proposal with Introduction and Methods and Data Analysis Plan and give an oral presentation of research proposal.

Prerequisites: Students must be in the clinical psychology Ph.D. program

CPSY 720 Multicultural Issues in Clinical Psychology (3 Credit Hours)

The course covers issues relevant to diverse populations to enhance student development of cultural humility and improved cultural competence in clinical practice. The course reviews conceptual and theoretical foundations as well individual and systemic influences that contribute to mental health.

Prerequisites: Students must be enrolled in the clinical psychology PhD program or receive permission from the instructor

CPSY 725 Cognitive Behavioral Therapy (3 Credit Hours)

Covers theory and techniques of cognitive and behavioral approaches. Applications for assessment and treatment of adults, children, couples and families are discussed.

Prerequisites: This course is limited to clinical psychology PhD students or permission of instructor

CPSY 727 Analysis of Variance and Experimental Design (4 Credit Hours)

Review of the basic descriptive and inferential statistical procedures with a heavy emphasis on fundamental and advanced analysis of variance techniques. Topics include contrasts, factorial designs, within-subject and mixed designs, and analysis of covariance. Course materials are covered in the context of classical experimental and quasi-experimental design.

Prerequisites: Students must be in the clinical psychology Ph.D. program or receive permission from the instructor

CPSY 728 Regression and Correlation Design (4 Credit Hours)

Course covers correlation with heavy emphasis on regression analysis in the context of the general linear model. Topics include partial correlations, categorical and continuous interactions, non-linear regression, and multivariate statistics. Course materials are covered in the context of correlational designs and survey research.

Prerequisites: Students must be in the clinical psychology Ph.D. program or receive permission from the instructor

CPSY 736 Multilevel Models: HLM (3 Credit Hours)

Social science data frequently have a hierarchical or multilevel structure as a consequence of sampling designs or repeated measures. The purpose of the course is to introduce students to the basic principles and applications of hierarchical linear modeling in social science research. Topics covered include an introduction to multilevel analyses, random intercept models, random slope models, hypotheses testing, hierarchical models for limited dependent variables, model fitting, three-level models, and repeated-measures applications.

Prerequisites: Students must be in the clinical psychology Ph.D. program or receive permission from the instructor

CPSY 744 Program Evaluation (3 Credit Hours)

This course is designed to introduce students to the field of program evaluation as well as to give students practical experience conducting a program evaluation. Students will get experience creating and conducting qualitative and quantitative assessments. A course goal is to work in small groups to conduct a program evaluation.

Prerequisites: Students must be in the clinical psychology Ph.D. program or receive permission from the instructor

Pre- or corequisite: CPSY 727/CPSY 827 and CPSY 728/CPSY 828 (or current enrollment)

CPSY 745 Psychometric Theory (3 Credit Hours)

This course introduces classical test theory, including definitions and equations for test reliability, standard error of measurement, and related statistics. Additional topics include scaling, item statistics useful in test constructions, norms commonly used in educational and psychological testing, test validity and exploratory factor analysis. If time permits, Item Response (IRT) and Generalizability Theory are introduced.

Prerequisites: Students must be in the clinical psychology Ph.D. program or receive permission from the instructor

Pre- or corequisite: CPSY 728 or CPSY 828 or equivalent

CPSY 746 Structural Equation Modeling (3 Credit Hours)

This course covers the topics of linear structural equation modeling and focuses on estimation, measurement models, confirmatory and hierarchical factor analysis, structural equations, longitudinal models, multisample analyses, and mean structures.

Prerequisites: Students must be in the clinical psychology Ph.D. program or receive permission from the instructor

Pre- or corequisite: CPSY 745 or CPSY 845 or equivalent

CPSY 749 Social and Affective Bases of Behavior (3 Credit Hours)

This course discusses the behavior of the human as a member of a group and the experience and expression of emotion. Topics include attitude theory and change, interpersonal attraction, stereotypes and discrimination, social cognition and social affect, aggression, theories of emotion and emotion regulation.

Prerequisites: Students must be in the clinical psychology Ph.D. program or receive permission from the instructor

CPSY 795 Topics in Clinical Psychology I (1-4 Credit Hours)

Study of selected topics in clinical psychology.

Prerequisites: Students must be in the clinical psychology Ph.D. program or receive permission from the instructor

CPSY 796 Topics in Clinical Psychology II (1-4 Credit Hours)

Study of selected topics in clinical psychology.

Prerequisites: Students must be in the clinical psychology Ph.D. program or receive permission from the instructor

CPSY 801 Empirically-Supported Therapies (3 Credit Hours)

Empirically-Supported Therapies is designed to foster the integration of clinical science and the practice of psychotherapy. Course objectives include learning how to identify, evaluate, and implement empirically supported interventions for various psychological disorders.

Prerequisites: Students must be in the clinical psychology Ph.D. program or receive permission from the instructor

CPSY 814 Research in Clinical Psychology (1-6 Credit Hours)

Individual research project under guidance of a research advisor.

Prerequisites: student must be enrolled in the doctoral clinical PhD program

CPSY 826 Biological and Cognitive Aspects of Behavior (3 Credit Hours)

This course provides an integrative overview of how brain structure and functioning produces behavior and cognition in both normal and clinical contexts. Students learn gross neuroanatomy and physiology of the nervous system (primarily central), a working knowledge of functional neuroanatomy, and how the central nervous system functions in an integrated fashion. Students also learn the basics of brain-behavior relationships and how these present normally and in clinical cases in order to gain a general and broader understanding of cognitive processes.

Prerequisites: Students must be in the clinical PhD program or receive permission of the instructor

CPSY 833 Grant and Manuscript Writing (3 Credit Hours)

The course is designed: (1) to teach students to write article-length scholarly manuscripts in APA format of publishable quality, and (2) to teach students the critical components of grant applications. By the end of this course, each student will have prepared a manuscript that is ready for submission to a peer-reviewed journal and have completed sections of a federal grant application.

Prerequisites: Students must be in the clinical psychology Ph.D. program or receive permission from the instructor

CPSY 835 Health Psychology (3 Credit Hours)

This course focuses on contemporary theory and research topics in health psychology. The course examines psychological and behavioral issues affecting health maintenance, coping with life-threatening illnesses and chronic diseases, and health promotion. The course uses the biopsychosocial (mind-body) model as an organizing framework, emphasizing the dynamic interactions among biological, social, personality, and behavioral factors jointly in influencing people's health. The course is conducted as a seminar.

Prerequisites: Students must be in the clinical psychology Ph.D. program or receive permission from the instructor

CPSY 836 Multilevel Models: HLM (3 Credit Hours)

Social science data frequently have a hierarchical or multilevel structure as a consequence of sampling designs or repeated measures. The purpose of the course is to introduce students to the basic principles and applications of hierarchical linear modeling in social science research. Topics covered include an introduction to multilevel analyses, random intercept models, random slope models, hypotheses testing, hierarchical models for limited dependent variables, model fitting, three-level models, and repeated-measures applications.

Prerequisites: Students must be in the clinical psychology Ph.D. program or receive permission from the instructor

CPSY 844 Program Evaluation (3 Credit Hours)

This course is designed to introduce students to the field of program evaluation as well as to give students practical experience conducting a program evaluation. Students will get experience creating and conducting qualitative and quantitative assessments. A course goal is to work in small groups to conduct a program evaluation.

Prerequisites: Students must be in the clinical psychology Ph.D. program or receive permission from the instructor

Pre- or corequisite: CPSY 727/CPSY 827 and CPSY 728/CPSY 828 (or current enrollment)

CPSY 846 Structural Equation Modeling (3 Credit Hours)

This course covers the topics of linear structural equation modeling and focuses on estimation, measurement models, confirmatory and hierarchical factor analysis, structural equations, longitudinal models, multisample analyses, and mean structures.

Prerequisites: Students must be in the clinical psychology Ph.D. program or receive permission from the instructor

Pre- or corequisite: CPSY 745 or CPSY 845 or equivalent

CPSY 849 Social and Affective Bases of Behavior (3 Credit Hours)

This course discusses the behavior of the human as a member of a group and the experience and expression of emotion. Topics include attitude theory and change, interpersonal attraction, stereotypes and discrimination, social cognition and social affect, aggression, theories of emotion and emotion regulation.

Prerequisites: Students must be in the clinical psychology Ph.D. program or receive permission from the instructor

CPSY 883 Research in Clinical Psychology (1-4 Credit Hours)

Individual project under guidance of a research advisor.

Prerequisites: Students must be in the clinical psychology Ph.D. program

CPSY 890 Internship in Clinical Psychology (4 Credit Hours)

Pre-doctoral internship in clinical psychology.

Prerequisites: Students must be in the clinical psychology Ph.D. program

CPSY 895 Clinical Practicum (3 Credit Hours)

Student assigned to a clinical practice setting to learn the skills of a clinical psychologist under close supervision. Various mental health settings throughout southeastern Virginia are used for this experience.

CPSY 896 Advanced Clinical Practicum (3-6 Credit Hours)

Student assigned to a practice setting to be given an opportunity to learn the advanced skills of a clinical psychologist under close supervision. Various mental health settings throughout the area are used.

CPSY 899 Clinical Dissertation (1-6 Credit Hours)

Student works with research mentor to develop, write, and defend an empirical dissertation.

CPSY 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

Prerequisites: Students must be in the clinical psychology Ph.D. program or receive permission from the instructor

CRIM - Criminology

CRIM 700 Proseminar in Criminology and Criminal Justice (3 Credit Hours)

This course provides students with a broad overview of enduring topics and emerging issues in criminology and criminal justice. It also explores the history and role of criminology as an academic discipline and criminal justice as an institutional system in American society.

CRIM 701 Criminology and Public Policy (3 Credit Hours)

This course covers the policy process as it relates to crime legislation, criminological theory and implications for public policy.

CRIM 702 Advanced Criminological Theory (3 Credit Hours)

This course is an examination of criminological theory for the advanced student. The focus is on critical analysis of both contemporary and historical criminological theories. In order to aid in the development of a critical understanding of theory, beyond understanding the content of central theories, the class focuses on discussion of theory development and testing. In addition, the class focuses on an understanding of the relationship of one theory to another as well as the state of empirical evidence surrounding each theory.

CRIM 703 Inequality, Crime and Justice (3 Credit Hours)

This course examines the linkages between social characteristics and crime. The course concentrates on what we know about the impact of gender, age, race and social class on crime and criminal justice.

CRIM 705 Multivariate Statistics in Criminological Research (3 Credit Hours)

This course teaches multivariate statistical techniques to train criminal justice researchers and policy makers to explore the causes and consequences of crime and criminal justice policies. Although the exact statistical techniques covered may vary, they will typically include multiple regression, multiple discriminate analysis, logistic regression, factor analysis, cluster analysis and path analysis.

CRIM 710 Qualitative Methods in Criminology and Criminal Justice (3 Credit Hours)

The central goal of this graduate seminar is to enable students to create and critique qualitative research designs focused on contemporary issues in criminology and criminal justice. A number of qualitative approaches will be covered including field observational research, focused interviews, case studies and content analysis. The seminar explores techniques, strengths and limitations of these varied qualitative methodologies.

CRIM 715 Advanced Quantitative Techniques in Criminology & Criminal Justice (3 Credit Hours)

This course explores advanced statistical techniques commonly used in research on crime and justice. The major focus of the course will be hierarchical linear modeling (HLM), a diverse set of techniques that extend standard multivariate analysis to accommodate nested data. Other advanced techniques will also be covered: event history/survival models, time series, etc.

CRIM 720 Advanced Research Methods in Criminology & Criminal Justice (3 Credit Hours)

This course provides students with advanced understanding of issues in criminology/criminal justice research including: history, philosophy, sociology, epistemology, politics and ethics of social science research; methodological questions of reliability, validity, conceptualization, operationalization, scale construction, data collection methodologies, sampling.

CRIM 740 Social Structures, Crime and Justice (3 Credit Hours)

This course examines the links between social structures and institutions, and justice at the individual, neighborhood, city, state and country levels. Students explore the ways in which structures and institutions are both agents of social control and facilitators or initiators of crime. Emphasis will be placed on theories, methodologies and empirical assessments.

CRIM 745 Crime and Communities (3 Credit Hours)

This course provides a foundation of the most important theories and research relating to residential communities and crime. The casual linkages between features of neighborhoods and social disorder will be explored in the context of criminological theories. Students will emerge with sufficient knowledge to develop a class or design a significant research project.

CRIM 750 Crimes of the State (3 Credit Hours)

This course explores crimes of the state from a sociological and criminological perspective by examining historical and current cases of governmental crime. This will cover the history, theory and method of the field; controls of and constraints on state crime; and cases of state crime.

CRIM 755 Researching the Criminal Justice System (3 Credit Hours)

Students will develop original research projects on the criminal justice system, police, courts and /or corrections. Projects will be designed to culminate in a publishable paper.

CRIM 760 Life Course Criminology (3 Credit Hours)

This course is designed to introduce graduate students to life-course perspectives for understanding crime and deviant behavior. Students discuss the various methodologies, both quantitative and qualitative, most commonly found in studies of the life course today.

CRIM 795 Topics in Criminal Justice (1-3 Credit Hours)

Topics vary by semester

CRIM 797 Independent Study (1-3 Credit Hours)

Supervised independent study arranged with instructor and approved by graduate program director.

CRIM 800 Proseminar in Criminology and Criminal Justice (3 Credit Hours)

This course provides students with a broad overview of enduring topics and emerging issues in criminology and criminal justice. It also explores the history and role of criminology as an academic discipline and criminal justice as an institutional system in American society.

CRIM 801 Criminology and Public Policy (3 Credit Hours)

To familiarize students with the policy process as it relates to crime legislation, criminological theory and implications for public policy.

CRIM 802 Advanced Criminological Theory (3 Credit Hours)

This course is an examination of criminological theory for the advanced student. The focus is on critical analysis of both contemporary and historical criminological theories. In order to aid in the development of a critical understanding of theory, beyond understanding the content of central theories, the class focuses on discussion of theory development and testing. In addition, the class focuses on an understanding of the relationship of one theory to another as well as the state of empirical evidence surrounding each theory.

CRIM 803 Inequality, Crime and Justice (3 Credit Hours)

This course examines the linkages between social characteristics and crime. The course concentrates on what is known about the impact of gender, age, race and social class on crime and criminal justice.

CRIM 805 Multivariate Statistics in Criminological Research (3 Credit Hours)

This course teaches multivariate statistical techniques to train criminal justice researchers and policy makers to explore the causes and consequences of crime and criminal justice policies. Although the exact statistical techniques covered may vary, they will typically include multiple regression, multiple discriminate analysis, logistic regression, factor analysis, cluster analysis and path analysis.

CRIM 810 Qualitative Methods in Criminology and Criminal Justice (3 Credit Hours)

The central goal of this graduate seminar is to enable students to create and critique qualitative research designs focused on contemporary issues in criminology and criminal justice. A number of qualitative approaches will be covered including field observational research, focused interviews, case studies and content analysis. The seminar explores techniques, strengths and limitations of these varied qualitative methodologies.

CRIM 811 Interviewing and Ethnography (3 Credit Hours)

This course focuses on the methodological, practical, and theoretical considerations involved in designing interview-based or ethnographic research studies. Practical in its approach, students will leave this course with the necessary skills, competencies, and instruments/protocols necessary to complete data collection for an interview-based or ethnographic project.

CRIM 815 Advanced Quantitative Techniques in Criminology & Criminal Justice (3 Credit Hours)

This course explores advanced statistical techniques commonly used in research on crime and justice. The major focus of the course is hierarchical linear modeling (HLM), a diverse set of techniques that extend standard multivariate analysis to accommodate nested data. Other advanced techniques are also covered: event history/survival models, time series, etc.

CRIM 820 Advanced Research Methods in Criminology & Criminal Justice (3 Credit Hours)

This course provides students with advanced understanding of issues in criminology/criminal justice research including: history, philosophy, sociology, epistemology, politics and ethics of social science research; methodological questions of reliability, validity, conceptualization, operationalization, scale construction, data collection methodologies, sampling.

CRIM 830 Corrections (3 Credit Hours)

This course examines issues surrounding jail and prison environments in the U.S. Topics include the philosophy of incarceration, inmate rights, inmate (mal)adaptation, misconduct, inmate and correctional officer safety and well-being, classification, rehabilitative programming, and evidence-based solutions and scholarly opportunities aimed at improving the experience of both inmates and staff.

CRIM 840 Social Structures, Crime and Justice (3 Credit Hours)

This course examines the links between social structures and institutions, and justice at the individual, neighborhood, city, state and country levels. Students explore the ways in which structures and institutions are both agents of social control and facilitators or initiators of crime. Emphasis will be placed on theories, methodologies and empirical assessments.

CRIM 845 Crime and Communities (3 Credit Hours)

This course provides a foundation of the most important theories and research relating to residential communities and crime. The casual linkages between features of neighborhoods and social disorder will be explored in the context of criminological theories. Students will emerge with sufficient knowledge to develop a class or design a significant research project.

CRIM 848 Queer Communities, Crime, and Victimization (3 Credit Hours)

This course provides a systematic introduction to the study of queer communities in criminology and criminal justice, while still drawing from diverse academic disciplines, such as sociology, history, and women's, gender, and sexuality studies. We will first explore the contexts of LGBTQ individuals' criminalized conduct across time and space, as well as our guiding theoretical lens. We will critically interrogate existing literatures on queer peoples' victimization as well as their offending. Finally, we will explore emerging public health and education concerns.

CRIM 850 Crimes of the State (3 Credit Hours)

This course explores crimes of the state from a sociological and criminological perspective by examining historical and current cases of governmental crime. This course covers the history, theory and method of the field; controls of and constraints on state crime; and cases of state crime.

CRIM 855 Researching the Criminal Justice System (3 Credit Hours)

Students develop original research projects focusing on the criminal justice system, police, courts and/or corrections. Projects are designed to culminate in a publishable paper.

CRIM 860 Life Course Criminology (3 Credit Hours)

This course is designed to introduce graduate students to life-course perspectives for understanding crime and deviant behavior. Students discuss the various methodologies, both quantitative and qualitative, most commonly found in studies of the life course today.

CRIM 861 Gender and Crime (3 Credit Hours)

This course provides a systematic introduction to the study of gender and crime. We first explore theories, trends, patterns, and pathways, which include gendered contexts of risk, victimization, and offending. We also explore the role of the state, such as in regulating reproduction or in furthering criminalization and surveillance through institutions such as schools, the crimino-legal system, and carceral settings. Other topics, including the experiences of women in criminal justice occupations, are also discussed.

CRIM 890 Professional Development and Dissertation Seminar (3 Credit Hours)

This course enhances the process of professionalization of students by supporting ongoing dissertation progress as well as preparing the student for publishing, grant writing, and the job market.

CRIM 895 Topics in Criminal Justice (1-3 Credit Hours)

Topics vary by semester.

CRIM 897 Independent Study (1-3 Credit Hours)

Supervised study arranged with an instructor and approved by the graduate program director.

CRIM 899 Dissertation (1-9 Credit Hours)

Dissertation hours.

CRIM 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

CRIM 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

CRJS - Criminal Justice

CRJS 521 Deviant Behavior (3 Credit Hours)

A study of various definitions and forms of deviant behavior, theoretical explanations of causes of deviant behavior, and the impact of deviant behavior on society and the individual.

CRJS 526 Criminological Theory (3 Credit Hours)

An in-depth study of the major theoretical issues in criminology. Deals extensively with issues of crime causation.

CRJS 527 Gender-Based Violence (3 Credit Hours)

This course takes an expansive and intersectional approach to studying various forms of gender-based violence, from the interpersonal to the systemic, institutional, and cultural. Prevalence, risk factors, theoretical explanations, and legal remedies related to topics such as intimate partner violence, sexual assault on college campuses, gender-based violence in the military, sexual violence against undocumented immigrants, commercial sexual exploitation, and racism and reproductive health will be examined.

CRJS 541 Drugs and Society (3 Credit Hours)

The study of sociological and social psychological explanations of drug-using behaviors and of legal and medical control of drugs. Topics include changes in the legal status of drugs, cross-cultural and historical variations in the control of drugs, and social epidemiology of drug use in contemporary society.

CRJS 550 Blacks, Crime and Justice (3 Credit Hours)

Examines historical and contemporary theories and research on African-Americans, criminal behavior and the administration of justice. Selected topics will include African-American perspectives, the death penalty, victimization, police brutality, and justice systems in Africa and the Caribbean.

CRJS 562 Substantive Criminal Law (3 Credit Hours)

This course deals with the major substantive concepts involved in American criminal law, including development of criminal law, elements of criminal liability, defenses against criminal responsibility, and descriptions and definitions of specific offenses.

CRJS 575 Criminal Justice Systems Around the World (3 Credit Hours)

The study of criminal justice systems around the world in order to understand how criminal behavior is defined and responded to in various cultures. Cultural differences will be highlighted in order to recognize that definitions of and responses to crimes closely reflect the cultures in which they exist.

CRJS 595 Topics in Criminal Justice (3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule, and will be more fully described in information distributed to academic advisors.

CRJS 596 Topics in Criminal Justice (3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule, and will be more fully described in information distributed to academic advisors.

CRJS 597 Tutorial Work in Special Topics in Criminal Justice (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

CRJS 598 Tutorial Work in Special Topics in Criminal Justice (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

CRJS 620 Criminological Theory (3 Credit Hours)

An in-depth study of the major theoretical issues in criminology. The course deals extensively with issues of crime causation, the way theory shapes and informs the study of crime and related social issues, and the relationship between theory, research, and practice.

CRJS 625 The Administration of Criminal Justice (3 Credit Hours)

An analysis of the criminal justice system with an emphasis on the decision-making responsibilities of its officials.

CRJS 627 Violence Against Women (3 Credit Hours)

This course examines the many ways in which violence against women functions as an agent of social control. Violence is viewed on a continuum in order to determine how a variety of acts contribute to the subordination of women. Specific types of violence are explored including: wife assault, rape, incest, sexual harassment and pornography.

CRJS 663 Corrections (3 Credit Hours)

A study of society's response to crime through its use of institutional and noninstitutional corrections. Topics include inmate culture, correction officer behavior and community corrections programs.

CRJS 668 Internship (3 Credit Hours)

Students gain first-hand experience in professional settings which are deemed appropriate given their academic background and career objectives. Students are required to complete a research project that corresponds to their specific internship placement

Prerequisites: Permission of the instructor

CRJS 695 Topics in Criminal Justice (3 Credit Hours)

Advanced seminars on selected topics in criminal justice. Topics will vary by semester.

CRJS 696 Topics in Criminal Justice (3 Credit Hours)

Advanced seminars on selected topics in criminal justice. Topics will vary by semester.

CRJS 697 Independent Study in Special Topics in Criminal Justice (3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: Approval of the department chair

CRJS 698 Independent Study in Special Topics in Criminal Justice (3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: Approval of the department chair

CRJS 699 Thesis (3-9 Credit Hours)

Thesis hours.

CRJS 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

CS - Computer Science

CS 500 Foundations of Computing (3 Credit Hours)

The course aims to provide students foundational training in computing. This includes topics in discrete mathematics, counting and combinatorics, probability, proofs methods, basic automata theory and algorithm design and analysis.

Prerequisites: MATH 211 or equivalent, CS 250 or CS 251 or CS 253 or equivalent experience with programming and basic data structures

CS 502 Formal Software Foundations (3 Credit Hours)

Laboratory work required. Foundational principles and techniques for building correct-by-construction software systems with provable guarantees. Includes functional programming, algebraic and polymorphic data types, pattern matching, computer-assisted theorem proving, proof automation, extraction of certified executable code, examples of verified algorithms.

Prerequisites: CS 381 or equivalent experience

CS 510 Professional Workforce Development I (3 Credit Hours)

Laboratory work required. Provides students with challenges of business environments in developing a technology based project. Students identify a societal problem, identify solutions, define project solutions, develop project objectives, conduct feasibility analysis, establish organizational group structure to meet project objectives and develop formal specifications. Students make formal technical project presentations and develop web documentation. Students prepare a draft grant proposal.

CS 511 Professional Workforce Development II (3 Credit Hours)

Laboratory work required. Students write professional documents and continue the development of the project defined in CS 410/510. Written work is reviewed and returned for corrective rewriting. Students will design and develop a project prototype using accepted best practices of professional software development. They will demonstrate the prototype to a formal panel and defend its satisfaction of the goals established in CS 410/510. This is a writing intensive course.

CS 517 Computational Methods and Software (3 Credit Hours)

Laboratory work required. Algorithms and software for fundamental problems in scientific computing. Topics: properties of floating point arithmetic, linear systems of equations, matrix factorizations, stability of algorithms, conditioning of problems, least-squares problems, eigenvalue computations, numerical integration and differentiation, nonlinear equations, iterative solution of linear systems.

CS 518 Web Programming (3 Credit Hours)

Laboratory work required. Overview of Internet and World Wide Web; web servers and security, HTTP protocol; web application and design; server side scripts and database integration, and programming for the Web.

Prerequisites: A grade of C or better in CS 312 and CS 330, or equivalent experience

CS 522 Introduction to Machine Learning (3 Credit Hours)

Laboratory work required. An introduction to machine learning with a focus on practical aspects of various learning techniques. Topics include supervised learning (linear models, probabilistic models, support vector machine, decision trees, neural networks, etc.), unsupervised learning (scaling, dimension reduction, clustering, etc.), reinforcement learning, and model evaluation. The course will also discuss applications on image analysis, text processing, and biomedical informatics.

Prerequisites: MATH 316 and CS 150 or CS 151 or CS 153 (or equivalent programming experience)

CS 531 Web Server Design (3 Credit Hours)

Laboratory work required. Extensive coverage of the hypertext transfer protocol (HTTP), specifications and commentary (IETF RFCs), and implications for servers and clients. Students will develop a web server providing common HTTP functionality and implementing all HTTP (including unsafe and conditional) methods, content negotiation, transfer and content encoding, basic & digest authentication, and server-side execution of programs (i.e., dynamic resources). Frequent in-class demonstrations of progress and protocol conformance will be required.

Prerequisites: Familiarity with Internet and network (including socket) programming

CS 532 Web Science (3 Credit Hours)

An overview of the World Wide Web and associated decentralized information structures, focusing mainly on the computing aspects of the Web: how it works, how it is used, and how it can be analyzed. Students will examine a number of topics including: web architecture, web characterization and analysis, web archiving, Web 2.0, social networks, collective intelligence, search engines, web mining, information diffusion on the web, and the Semantic Web.

CS 533 Web Security (3 Credit Hours)

Provides detailed experience with: principles of web security, attacks and countermeasures, the browser security model, web app vulnerabilities, injection, denial-of-service, TLS attacks, privacy, fingerprinting, same-origin policy, cross site scripting, authentication, JavaScript security, emerging threats, defense-in-depth, techniques for writing secure code, web archiving, and rehosting.

Prerequisites: A grade of C or better in CS 312 and CS 330

CS 541 App Development for Smart Devices (3 Credit Hours)

Laboratory work required. Project-oriented coverage of the principles of application design and development for Android platform smart devices. Topics include user interface; input methods; data handling; network techniques; localization and sensing. Students are required to produce a professional-quality mobile application.

Prerequisites: Knowledge of Java

CS 545 Introduction to Quantum Computing (3 Credit Hours)

The course covers the fundamental concepts of quantum information and computation, including the quantum bits, single- and multi-gate circuits, and related concepts like superposition, entanglement, interference, measurements, basic theory, quantum communication protocols, and time-permitted basic algorithms in quantum computing. The class focuses on the material required to transition from theory to practical use cases based on the class's interests. Familiarity with Jupyter Notebooks, linear algebra, and discrete structures is recommended.

Prerequisites: Prior programming experience, with preference for Python

CS 550 Database Concepts (3 Credit Hours)

Laboratory work required. Three level database architecture. The relational database model and relational algebra. SQL and its use in database procedures and with conventional programming languages. Entity relationship modeling. Functional dependencies and normalization. Transactions, concurrency and recovery.

Prerequisites: Familiarity with elementary set theory, propositional logic, and any two programming languages are expected; a course in finite mathematics or discrete structures is recommended

CS 554 Network Management (3 Credit Hours)

Laboratory work required. The administration of computer networks and their interaction with wide area networks: network topologies for local and wide area networks, common protocols and services, management of distributed file services, routing and configuration, security, monitoring and trouble-shooting.

CS 555 Introduction to Networks and Communications (3 Credit Hours)

Internet and the 5-layered protocol architecture for the Internet, applications built on top of data networks, specifically the Internet, the web, the transport layer, TCP and UDP protocols, the network layer, the data link layer, also some of the technologies for the physical layer.

Prerequisites: Familiarity with C++ or Java programming for Unix systems

CS 558 Unix System Administration (3 Credit Hours)

Laboratory work required. Aspects of administering a SOLARIS/UNIX operating system in a networked environment are covered. Topics covered include installation, file system management, backup procedures, process control, user administration, device management, Network File Systems (NFS), Network Information Systems (NIS), UNIX security, Domain Name Services (DNS), and integration with other operating systems.

Prerequisites: experience with UNIX

CS 560 Computer Graphics (3 Credit Hours)

Laboratory work required. An introduction to graphical systems and methods. Topics include basic primitives, windowing, transformations, hardware, interaction devices, 3-D graphics, curved surfaces, solids, and realism techniques such as visible surface, lighting, shadows, and surface detail. Requires project involving OpenGL programming.

CS 562 Cybersecurity Fundamentals (3 Credit Hours)

Introduction to networking and the Internet protocol stack; Vulnerable protocols such as HTTP, DNS, and BGP; Overview of wireless communications, vulnerabilities, and security protocols; Introduction to cryptography; Discussion of cyber threats and defenses; Firewalls and IDS/IPS; Kerberos; Transport Layer Security, including certificates; Network Layer Security.

CS 563 Cryptography for Cybersecurity (3 Credit Hours)

This course covers mathematical foundations, including information theory, number theory, factoring, and prime number generation; cryptographic protocols, including basic building blocks and protocols; cryptographic techniques, including key generation and key management, and applications; and cryptographic algorithms--DES, AES, stream ciphers, hash functions, digital signatures, etc.

Prerequisites: MATH 162M

CS 564 Networked Systems Security (3 Credit Hours)

Authentication in cyber systems including password-based, address-based, biometrics-based, and SSO systems; Authorization and accounting in cyber systems; Securing wired and wireless networks; Secured applications including secure e-mail services, secure web services, and secure e-commerce applications; Security and privacy in cloud environments.

CS 565 Information Assurance for Cybersecurity (3 Credit Hours)

Introduction to information assurance. Topics to be covered include metrics, planning and deployment; identity and trust technologies; verification and evaluation, and incident response; human factors; regulation, policy languages, and enforcement; legal, ethical, and social implications; privacy and security trade-offs; system survivability; intrusion detection; and fault and security management.

Prerequisites: MATH 162M or familiarity with computer security area

CS 566 Principles and Practice of Cyber Defense (3 Credit Hours)

This course is to help students gain a thorough understanding of vulnerabilities and attacks in systems and networks and learn cyber defense best practices. It covers fundamental security design principles and defense strategies and security tools used to mitigate various cyber attacks. The topics may include identification of Recon Ops, intrusion detection, identification of C2 Ops, data exfiltration detection, identifying malicious codes, network security techniques, cryptography, malicious activity detection, system security architectures, defense in depth, distributed/cloud and virtualization.

CS 567 Introduction to Reverse Software Engineering (3 Credit Hours)

Laboratory work required. Covers all the major components such as static analysis, dynamic analysis, Windows x86/64 Assembly, APIs, DLL/process injection, covert launching methods, behaviors, anti-disassembly, anti-VM, packing/unpacking, shell code, C++, buffer overflow attacks and various kinds of networking attacks; includes a final project that analyzes a piece of real malware.

Prerequisites: CS 250 or CS 251 or CS 253 and CS 270 or equivalent experience

CS 569 Data Analytics for Cybersecurity (3 Credit Hours)

The course introduces classical and advanced models and techniques in machine learning and deep learning. It applies these techniques in the cybersecurity domain including anomaly detection, network security, and malware detection and classification. Advanced applications such as self-driving cars and IoT systems are also discussed. In addition, cyber-attacks on machine learning techniques and AI systems and the possible consequences are also discussed.

Prerequisites: CS 462/CS 562 or CS 465/CS 565 or experience in cybersecurity

CS 570 Introduction to Computer Architecture (3 Credit Hours)

This course provides an overview of the fundamentals of computer architecture. Major components include basic computer logic, integrated circuits, instruction sets, cache-RAM interaction, virtual memory, the fetch/execute cycle, basics of microprogramming, pipelined implementation, parallel processors including SISD, MIMD, SIMD, and SPMD. The course also introduces hardware multithreading, multicores, multiprocessors, GPUs, multiprocessor network topologies, and cluster networking.

Prerequisites: Instructor permission required

CS 571 Operating Systems (3 Credit Hours)

Operating system structures. Multiprogramming and multiprocessing. Process management. Memory and other resource management. Storage management, I/O systems, distributed systems. Protection and security. The concepts will be illustrated through example systems such as Unix and Windows.

Prerequisites: ECE 346 or ECE 443 or a grade of C or better in CS 361 and CS 170; a grade of C or better in ENGN 122 or CS 150 or CS 260

CS 575 Introduction to Computer Simulation (3 Credit Hours)

Efficient implementation methods. Time management. Planning and design of simulation experiments. Statistical issues in simulation. Generation of random numbers and stochastic variates. Programming with graphically- and text-based simulation languages. Verification and validation of simulation models. Distributed simulation. Special topics such as HLA will be discussed.

CS 576 Systems Programming (3 Credit Hours)

Laboratory work required. This course is to help students fully understand and utilize the internal workings and capabilities provided by modern computing, networking and programming environments. Topics include: Shell Script Programming, X Windows (Xlib and Motif), UNIX internals (I/O, Processes, Threads, IPC and Signals), Network Programming (UDP/TCP Sockets and Multicasting) and Java Systems Programming (SWING, Multithreading and Networking).

CS 578 Computational Geometry, Methods and Applications (3 Credit Hours)

The discipline of Computational Geometry is devoted to the study of algorithms which are formulated in terms of spatially embedded arrangements of objects, such as points, lines, surfaces, and solids. This course covers fundamental algorithms including convex hulls, polygon triangulations, point location, Voronoi diagrams, Delaunay triangulations, binary space partitions, quadrees, and other topics.

CS 580 Introduction to Artificial Intelligence (3 Credit Hours)

Laboratory work required. Introduction to concepts, principles, challenges, and research in major areas of AI. Areas of discussion include: natural language and vision processing, machine learning, machine logic and reasoning, robotics, expert and mundane systems.

CS 581 Trustworthy Health Analytics (3 Credit Hours)

This course offers a comprehensive, project-driven approach to integrating AI in healthcare, focusing on building prototype models for prevention, diagnosis, and treatment while stressing the need of adopting ethical, responsible methods to reduce risks and improve patient outcomes.

CS 586 Introduction to Parallel Computing (3 Credit Hours)

Laboratory work required. The motivation for and successes of parallel computing. A taxonomy of commercially available parallel computers. Strategies for parallel decompositions. Parallel performance metrics. Parallel algorithms and their relation to corresponding serial algorithms. Numerous examples from scientific computing, mainly in linear algebra and differential equations. Implementations using public-domain network libraries on workstation clusters and computers.

CS 588 Principles of Compiler Construction (3 Credit Hours)

Laboratory work required. Theoretical and practical aspects of compiler design and implementation. Topics will include lexical analysis, parsing, translation, code generation, optimization, and error handling.

CS 591 Honors Research I in Computer Science (3 Credit Hours)

Laboratory work required. Students perform mentored research in a group environment to develop computational approaches in addressing computer science challenges. The project needs approval by the Computer Science Honors Program director, and registration requires approval of the research mentor and the Graduate Program Director. A GPA of 3.00 or better is required, or approval by the director of the Computer Science Honors Program.

CS 592 Honors Research II in Computer Science (3 Credit Hours)

Laboratory work required. Students continue mentored research using the project defined in CS 591. Students will present the work and findings to the public. The project needs approval by the Computer Science Honors Program director, and registration requires approval of the research mentor and the Graduate Program Director. A GPA of 3.00 or better is required, or approval by the director of the Computer Science Honors Program.

Prerequisites: A grade of B or better in CS 591

CS 595 Topics in Computer Science (1-3 Credit Hours)

Special topics.

CS 597 Independent Study in Computer Science (1-3 Credit Hours)

Independent study under the direction of an instructor.

Prerequisites: permission of the instructor

CS 600 Algorithms and Data Structures (3 Credit Hours)

This course covers the following topics: (i) Basic introduction to algorithms, their design and analysis (ii) Asymptotic notation (iii) Recurrence Relations and their solutions (iv) Sorting and Order Statistics: various algorithms for sorting and their analysis, lower bounds for sorting, computing medians, modes and various order statistics (v) Paradigms for algorithm design and analysis: Dynamic Programming, Greedy Method, Amortized Analysis, and (vi) Graphs and Elementary Graph Algorithms: Breadth-first and Depth-first Search, Topological Sort, Minimum Spanning Trees and Shortest Paths Algorithms.

Prerequisites: CS 361 or equivalent and CS 381 or equivalent

CS 620 Introduction to Data Science and Analytics (3 Credit Hours)

This course will explore data science as a burgeoning field. Students will learn fundamental principles and techniques that data scientists employ to mine data. They will investigate real life examples where data is used to guide assessments and draw conclusions. This course will introduce software and computing resources available to a data scientist to process, visualize, and model different types of data including big data. Cross-listed with DASC 620.

CS 624 Data Analytics and Big Data (3 Credit Hours)

This course introduces the essential data science tools to work with different types of data including streaming data and big data, including static and streaming data using Python software packages; modeling and predictive analysis using basic machine learning techniques; work with real sample data sets from different disciplines, e.g., the health sciences and finance industry; and how to work with big data using emerging technology such as Apache Spark.

CS 625 Data Visualization (3 Credit Hours)

This course covers the theory and application of data visualization. This includes issues in data cleaning to prepare data for visualization, theory behind mapping data to appropriate visual representations, introduction to visual analytics, and tools used for data analysis and visualization. Modern visualization software and tools will be used to analyze and visualize real-world datasets to reinforce the concepts covered in the course.

CS 626 Web Archiving Theory, Practice, and Implications (3 Credit Hours)

An interdisciplinary introduction to web archiving fundamentals including web crawling, collection development and summarization including planning, analyzing, and sharing collections. Includes a review of ethical and legal issues, trustworthiness, preservation, security, and cultural impact of web archiving.

Prerequisites: This course is intended for computer science students with limited information studies skills, as well as information science studies students with limited computer science skills

CS 635 Parallel Computer Architecture (3 Credit Hours)

This is a first course in parallel architecture, with an emphasis on the description and evaluation of commercially available machines. Topics to be covered include: parallelization and performance metrics, scalability and the "laws" of Amdahl and Gustavson, computational similarity, models of computation, parallelization paradigms, network characteristics and topology, communication calculus and templates, pipelining and parallelism, processor types, memory hierarchy, cache coherence protocols, latency-hiding mechanisms, routing algorithms, and languages and libraries to support parallel architecture.

Prerequisites: CS 665

CS 640 Digital Image Processing and Applications (3 Credit Hours)

Laboratory work required. The course covers digital image processing techniques including representation, sampling and quantization, imaging geometry, image transforms, image enhancement, image filtering, color image processing, image segmentation, and morphological image processing. Applications include image restoration, image compression, pattern recognition, and image fusion.

Prerequisites: Prior programming experience

CS 650 Advanced Databases (3 Credit Hours)

This course focuses on advanced database systems, with an emphasis on NoSQL databases to handle the challenges of scalability, flexibility, and high availability in real-world applications. Unlike typical database courses, it delves into the distinct data models and architectures of NoSQL systems, such as document, key-value, column-family, and graph databases. Students will receive hands-on experience developing safe, distributed, and scalable NoSQL-based solutions for modern data-intensive applications.

CS 656 Database Methodology (3 Credit Hours)

Laboratory work required. Analysis, design and implementation of databases and database applications using modern software engineering methods. Database CASE tools. Analysis using process, function, and dataflow analysis in conjunction with entity relationship modeling. Database diagrams and database design. Application suite design and high level design of applications. Refining implementations.

Prerequisites: CS 550

CS 660 3D Computer Graphics (3 Credit Hours)

Laboratory work required. The mathematical tools needed for the geometrical aspects of 3D computer graphics. Fundamentals: homogeneous coordinates, transformations and perspective. Theory of parametric and implicit curve and surface models: polar forms, Bezier arcs and de Casteljau subdivision, continuity constraints, B-splines, tensor product, and triangular patch surfaces. Representations of solids and conversions among them. Beometric algorithms for graphics problems, with applications to ray tracing, hidden surface elimination, etc.

Prerequisites: CS 560

CS 665 Computer Architecture (3 Credit Hours)

A detailed and quantitative study of the architecture of modern uni-processor computers. The major components are: the technology drivers, performance measures, instruction sets (including 80X86, VAX, and a generic RISC which is very similar to the MIPS series), processor implementation, advanced pipelining and superscalar features, cache and memory design, and I/O. The emphasis is on obtaining quantitative measures of performance, describing interactions of the various components, studying trade-offs between the components in commercial processors, and integration into a complete computer system including interaction of the software and hardware. (offered spring)

CS 667 Cooperative Education (1-3 Credit Hours)**CS 668 Internship (1-3 Credit Hours)**

Requirements will be established by the department and will vary with the amount of credit desired. Allows students an opportunity to gain a short duration career-related experience.

CS 669 Practicum (1-3 Credit Hours)**CS 690 Colloquium (1 Credit Hour)**

A one-hour weekly lecture given by faculty from Old Dominion and other institutions.

CS 695 Topics (1-3 Credit Hours)

CS 697 Independent Study in Computer Science (1-3 Credit Hours)

Independent study under the direction of an instructor.

Prerequisites: permission of the instructor

CS 698 Master's Project (3 Credit Hours)

Departmental permission required.

CS 699 Thesis Research (3 Credit Hours)

Departmental permission required.

CS 712 Stochastic Modeling (3 Credit Hours)

Stochastic processes are ways of quantifying the dynamic relationship of sequences of random events. This course will expose the participants to standard concepts and methods of stochastic modeling, as well as the rich diversity of applications. Topics include, but not limited to, Markov chains in discrete and continuous time, Poisson processes, renewal theory and branching processes.

CS 714 Monte Carlo Simulation (3 Credit Hours)

This course serves to illustrate important principles in Monte Carlo simulation methods and to demonstrate their power in applications. The course covers Metropolis-Hastings algorithm, Gibbs sampler, Markov Chain Monte Carlo, acceptance-rejection method, Monte Carlo integration, quasi-Monte Carlo, random walk, and random number generation.

CS 722 Machine Learning (3 Credit Hours)

This course presents both the foundational and the practical aspects of modeling, analyzing, and mining of computerized data sets, including classification, regression, clustering, semi-supervised learning, structured sparsity learning, etc. The course assignments are designed to contain both theoretical and programming components in order to train students to gain hands-on-experience.

CS 723 Introduction to Bioinformatics (3 Credit Hours)

This course introduces the fundamental knowledge in bioinformatics and the current advances in selected directions. The topics include: fundamental concepts and experimental techniques in molecular biology, computational methods in genomic sequence comparison and analysis, and computational methods in molecular structural modeling.

CS 724 High Performance Computing and Big Data (3 Credit Hours)

This course introduces parallel and distributed programming principles and has emphasis on hands-on programming and deploying high-performance computing applications with big data for different science and engineering disciplines. Topics includes programming on emerging technologies such as NVIDIA GPU, Hadoop Framework, and Apache Spark for large scale data analytics and mining applications.

CS 725 Information Visualization (3 Credit Hours)

This course covers the theory and application of information visualization and of visual analytics, the science of combining interactive visual interfaces and information visualization technique with automatic algorithms to support analytical reasoning through human-computer interaction. Research on visual perception, cognition, interactive visual interfaces, and visual analytics will be covered. Practical techniques for the display of complex multivariate data will be addressed. Course projects will require the development of interactive web-based interfaces to analyze and visualize real-world datasets.

Prerequisites: CS 625

CS 726 Application of Graphs in Bioinformatics (3 Credit Hours)

This course links the fundamental concepts and algorithms of graphs with the actual biological problems. Various biological problems will be selected to discuss the formulation of the graph, the graph algorithms, and the performance analysis.

CS 727 Data Analytics for Protein Structural Data (3 Credit Hours)

The goal of this course is to understand fundamental concepts and to survey current advances in computational structural bioinformatics. In the scope of computational structural bioinformatics, computational methods are developed to address 3-dimensional structure-related biological problems that often involve protein and RNA. The topics include basics of protein, DNA and RNA structures, principle of protein structure prediction, deep learning in protein structure problems and cryo-electron microscopy data and challenges.

CS 728 Deep Learning Fundamentals and Applications (3 Credit Hours)

This course covers key components of deep learning framework, including loss functions, regularization, training and batch normalization. The course also covers several fundamental deep learning architectures such as multilayer perceptrons, convolutional neural network, recurrent neural network and transformers, as well as advanced topics including graph neural network and deep reinforcement learning.

Prerequisites: CS 422 or CS 522 or CS 480 or CS 580 or CS 620 or CS 722 or CS 822 or CS 733 or CS 833, or other equivalent courses at the discretion of the instructor

CS 732 Human Computer Interaction (3 Credit Hours)

This course introduces students to principles and research methods in human-computer interaction (HCI), an interdisciplinary area studying the interaction between humans and interactive computing systems. Students will learn to model computer users and interfaces, significant cognitive and social phenomena surrounding the human use of computers, apply empirical techniques for task analysis and interface design, and evaluate designs qualitatively and quantitatively.

Prerequisites: Prior programming experience required

CS 733 Natural Language Processing (3 Credit Hours)

Natural language processing (NLP) techniques are the crux of many leading modern technologies. Advances in NLP are also critical in the pursuit of Artificial Intelligence. This course will discuss core problems in NLP and the state-of-the-art tools and techniques as well as advanced NLP research topics. The topics will include language models, part-of-speech tagging, syntactic parsing, word embedding, statistical machine translation, text summarization, question answering, and dialog interaction. At the end of the course, students will be familiar with many language-processing tasks and applications.

Prerequisites: CS 580

CS 734 Introduction to Information Retrieval (3 Credit Hours)

Laboratory work required. Theory and engineering of information retrieval in the context of developing web-based search engines. Topics include issues related to crawling, ranking, query processing, retrieval models, evaluation, clustering, machine learning, and other aspects related to building web search engines. Students will perform a mix of hands-on development and coding, as well as theoretical exploration of the research literature.

CS 735 Web Archiving Forensics (3 Credit Hours)

Explores the veracity of information on the web and social media. Digital information is easy to manipulate, copy, and delete, but web archives offer a trusted method for timestamping the appearance of web pages and their contents. Students will investigate how web archives can be used to establish the priority of information, as well as how they can be hacked or used to obfuscate the provenance of falsified content.

Prerequisites: Graduate standing and familiarity with command line utilities

CS 740 Computer Vision (3 Credit Hours)

This course covers the following topics: Image processing and filters; Edges and features; Interest points and features; Bag of words representation; Convolutional neural networks; Object detection; Image formation; 3D reconstruction; Motion analysis; and Light and shading.

Prerequisites: CS 422 and CS 480, or CS 522 and CS 580, or equivalent courses with the permission of the instructor

CS 741 Data-Driven Computational Imaging (3 Credit Hours)

This course introduces the basic concepts of computational imaging. The topics include principles of imaging systems, role of computational methods in enhancing imaging systems, computational imaging inverse problems, and data-driven machine learning approaches to solve inverse problems in computational imaging.

Prerequisites: Knowledge of linear algebra and prior programming experience

CS 742 High-Performance Computing on Emerging Architectures (3 Credit Hours)

With the advent of large learning models in machine learning, high-performance computing is playing a major role in realizing these models. This course deals with large-scale computing on high-performance emerging architectures, particularly heterogeneous architectures consisting of CPUs and GPUs. The course will expose students to different programming environments for efficiently programming emerging heterogeneous architectures.

Prerequisites: CS 250 or CS 350 or CS 361 or CS 381, or equivalent courses with the permission of the instructor

CS 744 Performance Evaluation of Computer Systems and Networks (3 Credit Hours)

The course will introduce some of the commonly used techniques in the performance evaluation of computing systems. Students will be exposed to a variety of analytical and simulation tools used in this field. The applicability of the techniques will be illustrated through case studies.

CS 745 Utility-Scale Quantum Computing (3 Credit Hours)

The course is project-driven and is designed to help transition from theory to actual implementation, particularly in utility-scale quantum computing. The course covers (i) the fundamental concepts of quantum information and computation, (ii) mapping computational problems onto quantum circuits, (iii) understanding noise in near-term quantum computers, and (iv) executing quantum circuits on real quantum hardware.

Prerequisites: Knowledge of Python, Linear Algebra, and Discrete Structures

CS 751 Introduction to Digital Libraries (3 Credit Hours)

Digital Libraries (DLs) are an increasingly popular research area that encompass more than traditional information retrieval or database methods and techniques. The course will cover a brief history of DL development, with emphasis on World Wide Web implementations. Case studies will be performed on various DLs. The class will focus heavily on project work. At the end of the course, students will be prepared to develop, evaluate, or apply digital library technologies in their work environment. Topics include: Repositories; Distributed Searching; Metadata Harvesting; Preservation, Reference Linking and Citation Analysis.

CS 752 Wireless Communications and Mobile Computing (3 Credit Hours)

This course looks at fundamental issues in the area of wireless networks and mobile computing. The course material is organized around the following broad themes: Basics of mobile and wireless communications; Cellular communications: Bandwidth allocation and reservation, Location management, Call admission strategies and QoS issues: Mobile IP and Mobile TCP; Mobile Ad-Hoc Networks (MANET): Routing, Multimedia and QoS support; Sensor networks.

CS 761 Malware Analysis and Reverse Engineering (3 Credit Hours)

Theory and practice in analysis and mitigation of malware in networked machines. Theoretical topics include methods of attack anatomy, identification, reverse and anti-reverse engineering. Practice entails learning tools and techniques used by malware attackers, defenders and analysts in lab-based projects conducted in a secure 'sandbox' mode.

CS 762 Memory Analysis and Forensics (3 Credit Hours)

This course is based on the Intel processor architecture employed in Windows, Linux and MacOS operating systems. Students will learn how memory is assigned to processes and how it is addressed, how memory data structures can be exploited by malware, and what is available for forensic analysis of memory. The course involves several hands-on lab work on recognizing process data structures in memory, memory acquisition, and use of a set of tools to catch the malware while preserving evidence from live memory analysis. Course requires a set of assigned reading and lab work.

Prerequisites: CS 270, CS 471, or instructor's permission

CS 764 Blockchains and Cryptocurrencies: Fundamentals, Technologies, and Economics (3 Credit Hours)

This course covers different aspects of cryptocurrencies, including P2P networks, distributed consensus, Bitcoin and Ethereum, blockchain technologies, cryptographic techniques (secure hashing, encryption, decryption, digital signatures), privacy and anonymity, mining and mining puzzles, wallets, smart contracts, case studies, cryptocurrency ecosystem, legal aspects, implications and impact on economy and finance, and future of cryptocurrencies.

Prerequisites: CS 471, CS 455/CS 555 or equivalent experience

CS 765 Internet of Things Security (3 Credit Hours)

This course covers various topics in Internet of Things (IoT) security, including web security, network security, mobile app security and secure cryptocurrency. It provides an in-depth study of various attack techniques and methods to defend against them. The course adopts the 'learning by doing' principle. Students are supposed to learn the attacks by performing them in a networked virtual machine environment. They will also play with a number of security tools to understand how they work and what security guarantee they provide. Laboratory work required.

Prerequisites: basic knowledge of programming, computer networks and operating systems; no prior knowledge of computer security is necessary

CS 772 Advanced Computer and Network Security (3 Credit Hours)

This course is a research-oriented, graduate-level course, centering around basic protocols and technique, as well as advanced, state-of-the-art topics to secure computer and Internet services. Topics include: System and Software Security, Cryptography and PKI, Internet Infrastructure and Network Security, Web and Browser Security, Cloud Security, and Online Privacy.

Prerequisites: CS 455 or CS 555

CS 773 Data Mining and Security (3 Credit Hours)

Introduction to data mining; Algorithms including naive Bayes, Decision Trees and Rules, Association Rules, Linear classification, and Clustering; Cross validation, Lift charts, ROC Curves; SVM, Bayesian networks, K-means clustering; Data transformation; PCA; Ensemble Learning; Application of data mining to security and privacy including authentication, authorization, and intrusion detection; Privacy-preserving data mining.

Prerequisites: CS 471 and CS 455 or CS 555

CS 776 Architectural Support for Cloud Computing (3 Credit Hours)

Cloud computing requires a great deal of architectural support. This course investigates various types of architectural support that make cloud computing almost infinitely scalable while maintaining efficiency. The course will look at various types of support provided by Google, Amazon, Facebook, Yahoo! and others.

CS 779 Design of Network Protocols (3 Credit Hours)

Understanding the design, implementation and performance of network protocols using TCP/IP protocol suite as a case study. The students will have hands-on experience on low-level tools and will access and study the source code of these protocols and writing networking software applications. Topics include: socket interface, IPv4 and IPv6, routing, UDP, multicasting and IGMP, TCP specification, implementation and performance.

Prerequisites: CS 455/CS 555 or equivalent

CS 781 AI for Health Sciences (3 Credit Hours)

This course explores the application of AI in health sciences, focusing on machine learning, NLP, computer vision, generative AI techniques for diagnostics, treatment planning, patient monitoring, and biomedical research. It covers precision medicine, ethical AI, and the integration of AI into practice. Students will gain a deep understanding and practical skills to develop innovative AI solutions that address real-world challenges in health sciences.

Prerequisites: Prior programming experience

CS 782 Generative AI (3 Credit Hours)

This course provides a deep dive into the foundations and current advancements in generative AI. It covers key concepts such as transformer models, GANs, VAEs, LLMs, and their applications across various fields, emphasizing both theory and hands-on learning, including ethical considerations such as fairness and bias mitigation. Students will develop a comprehensive understanding of generative AI and gain practical experience.

Prerequisites: Prior programming experience

CS 791 Graduate Seminar (1-3 Credit Hours)

Seminar.

Prerequisites: permission of the instructor

CS 795 Topics in Computer Science (1-3 Credit Hours)

Topics in computer science.

CS 796 Topics in Computer Science (1-3 Credit Hours)

Topics in computer science.

Prerequisites: permission of the instructor

CS 800 Research Methods (3 Credit Hours)

Introduction to research methods in computer science. Topics include academic publishing, academic writing, literature reviews, responsible conduct of research, and presenting research results. Research faculty will present overviews of their research and how research is conducted in their labs.

CS 812 Stochastic Modeling (3 Credit Hours)

Stochastic processes are ways of quantifying the dynamic relationship of sequences of random events. This course will expose the participants to standard concepts and methods of stochastic modeling, as well as the rich diversity of applications. Topics include, but not limited to, Markov chains in discrete and continuous time, Poisson processes, renewal theory and branching processes.

CS 814 Monte Carlo Simulation (3 Credit Hours)

This course serves to illustrate important principles in Monte Carlo simulation methods and to demonstrate their power in applications. The course covers Metropolis-Hastings algorithm, Gibbs sampler, Markov Chain Monte Carlo, acceptance-rejection method, Monte Carlo integration, quasi-Monte Carlo, random walk, and random number generation.

CS 822 Machine Learning (3 Credit Hours)

This course presents both the foundational and the practical aspects of modeling, analyzing, and mining of computerized data sets, including classification, regression, clustering, semi-supervised learning, structured sparsity learning, etc. The course assignments are designed to contain both theoretical and programming components in order to train students to gain hands-on-experience.

CS 823 Introduction to Bioinformatics (3 Credit Hours)

This course introduces the fundamental knowledge in bioinformatics and the current advances in selected directions. The topics include: fundamental concepts and experimental techniques in molecular biology, computational methods in genomic sequence comparison and analysis, and computational methods in molecular structural modeling.

CS 824 High Performance Computing and Big Data (3 Credit Hours)

This course introduces parallel and distributed programming principles and has emphasis on hands-on programming and deploying high-performance computing applications with big data for different science and engineering disciplines. Topics include programming on emerging technologies such as NVIDIA GPU, Hadoop Framework, and Apache Spark for large scale data analytics and mining applications.

CS 825 Information Visualization (3 Credit Hours)

This course covers the theory and application of information visualization and of visual analytics, the science of combining interactive visual interfaces and information visualization technique with automatic algorithms to support analytical reasoning through human-computer interaction. Research on visual perception, cognition, interactive visual interfaces, and visual analytics will be covered. Practical techniques for the display of complex multivariate data will be addressed. Course projects will require the development of interactive web-based interfaces to analyze and visualize real-world datasets.

Prerequisites: CS 625

CS 826 Application of Graphs in Bioinformatics (3 Credit Hours)

This course links the fundamental concepts and algorithms of graphs with the actual biological problems. Various biological problems will be selected to discuss the formulation of the graph, the graph algorithms, and the performance analysis.

CS 827 Data Analytics for Protein Structural Data (3 Credit Hours)

The goal of this course is to understand fundamental concepts and to survey current advances in computational structural bioinformatics. In the scope of computational structural bioinformatics, computational methods are developed to address 3-dimensional structure-related biological problems that often involve protein and RNA. The topics include basics of protein, DNA and RNA structures, principle of protein structure prediction, deep learning in protein structure problems and cryo-electron microscopy data and challenges.

CS 828 Deep Learning Fundamentals and Applications (3 Credit Hours)

This course covers key components of deep learning framework, including loss functions, regularization, training and batch normalization. The course also covers several fundamental deep learning architectures such as multilayer perceptrons, convolutional neural network, recurrent neural network and transformers, as well as advanced topics including graph neural network and deep reinforcement learning.

Prerequisites: CS 422 or CS 522 or CS 480 or CS 580 or CS 620 or CS 722 or CS 822 or CS 733 or CS 833, or other equivalent courses at the discretion of the instructor

CS 832 Human Computer Interaction (3 Credit Hours)

This course introduces students to principles and research methods in human-computer interaction (HCI), an interdisciplinary area studying the interaction between humans and interactive computing systems. Students will learn to model computer users and interfaces, significant cognitive and social phenomena surrounding the human use of computers, apply empirical techniques for task analysis and interface design, and evaluate designs qualitatively and quantitatively.

Prerequisites: Prior programming experience required

CS 833 Natural Language Processing (3 Credit Hours)

Natural language processing (NLP) techniques are the crux of many leading modern technologies. Advances in NLP are also critical in the pursuit of Artificial Intelligence. This course will discuss core problems in NLP and the state-of-the-art tools and techniques as well as advanced NLP research topics. The topics will include language models, part-of-speech tagging, syntactic parsing, word embedding, statistical machine translation, text summarization, question answering, and dialog interaction. At the end of the course, students will be familiar with many language-processing tasks and applications.

Prerequisites: CS 580

CS 834 Introduction to Information Retrieval (3 Credit Hours)

Laboratory work required. Theory and engineering of information retrieval in the context of developing web-based search engines. Topics include issues related to crawling, ranking, query processing, retrieval models, evaluation, clustering, machine learning, and other aspects related to building web search engines. Students will perform a mix of hands-on development and coding, as well as theoretical exploration of the research literature.

CS 835 Web Archiving Forensics (3 Credit Hours)

Explores the veracity of information on the web and social media. Digital information is easy to manipulate, copy, and delete, but web archives offer a trusted method for timestamping the appearance of web pages and their contents. Students will investigate how web archives can be used to establish the priority of information, as well as how they can be hacked or used to obfuscate the provenance of falsified content.

Prerequisites: Graduate standing and familiarity with command line utilities

CS 840 Computer Vision (3 Credit Hours)

This course covers the following topics: Image processing and filters; Edges and features; Interest points and features; Bag of words representation; Convolutional neural networks; Object detection; Image formation; 3D reconstruction; Motion analysis; and Light and shading.

Prerequisites: CS 422 and CS 480, or CS 522 and CS 580, or equivalent courses with the permission of the instructor

CS 841 Data-Driven Computational Imaging (3 Credit Hours)

This course introduces the basic concepts of computational imaging. The topics include principles of imaging systems, role of computational methods in enhancing imaging systems, computational imaging inverse problems, and data-driven machine learning approaches to solve inverse problems in computational imaging.

Prerequisites: Knowledge of linear algebra and prior programming experience

CS 842 High-Performance Computing on Emerging Architectures (3 Credit Hours)

With the advent of large learning models in machine learning, high-performance computing is playing a major role in realizing these models. This course deals with large-scale computing on high-performance emerging architectures, particularly heterogeneous architectures consisting of CPUs and GPUs. The course will expose students to different programming environments for efficiently programming emerging heterogeneous architectures.

Prerequisites: CS 250 or CS 350 or CS 361 or CS 381, or equivalent courses with the permission of the instructor

CS 844 Performance Evaluation of Computer Systems and Networks (3 Credit Hours)

The course will introduce some of the commonly used techniques in the performance evaluation of computing systems. Students will be exposed to a variety of analytical and simulation tools used in this field. The applicability of the techniques will be illustrated through case studies.

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Prerequisites: CS 471, CS 455/CS 555 or equivalent experience

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Prerequisites: basic knowledge of programming, computer networks and operating systems; no prior knowledge of computer security is necessary

CS 872 Advanced Computer and Network Security (3 Credit Hours)

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Prerequisites: CS 455 or CS 555

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Introduction to data mining; Algorithms including naive Bayes, Decision Trees and Rules, Association Rules, Linear classification, and Clustering; Cross validation, Lift charts, ROC Curves; SVM, Bayesian networks, K-means clustering; Data transformation; PCA; Ensemble Learning; Application of data mining to security and privacy including authentication, authorization, and intrusion detection; Privacy-preserving data mining.

Prerequisites: CS 471 and CS 455 or CS 555

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Prerequisites: CS 455/CS 555

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Prerequisites: Prior programming experience

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This course provides a deep dive into the foundations and current advancements in generative AI. It covers key concepts such as transformer models, GANs, VAEs, LLMs, and their applications across various fields, emphasizing both theory and hands-on learning, including ethical considerations such as fairness and bias mitigation. Students will develop a comprehensive understanding of generative AI and gain practical experience.

Prerequisites: Prior programming experience

CS 891 Graduate Seminar (1-3 Credit Hours)

Seminar.

Prerequisites: permission of the instructor

CS 895 Topics in Computer Science (1-3 Credit Hours)

Topics in computer science.

CS 896 Topics in Computer Science (1-3 Credit Hours)

Topics in computer science.

Prerequisites: permission of the instructor

CS 898 Doctoral Research (1-9 Credit Hours)

Independent study at the doctoral level under the direction of an instructor.

Prerequisites: Permission of the instructor

CS 899 Doctoral Dissertation (1-9 Credit Hours)

Research for the doctoral dissertation. Departmental permission required.

CS 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

CS 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

CSD - Communication Sciences and Disorders

CSD 549 Clinical Observation and Writing in Communication Sciences and Disorders (3 Credit Hours)

Speech-language pathology/audiology students will learn practical and foundational clinical skills necessary for deconstructing speech-language pathology treatment sessions, for identifying important parts-of-speech, and for completing disciplinary writing tasks. Objectives in this class are met using guided observations.

CSD 551 Introduction to Speech Sound Disorders (3 Credit Hours)

This course emphasizes causes, identification, and treatment of speech sound disorders. The class is designed to acquaint students with speech development from infancy through childhood, introduce assessment procedures and treatment principles, and build awareness and understanding of cultural and linguistic differences.

Prerequisites: Permission of instructor

CSD 553 Speech and Language Development (3 Credit Hours)

This course reviews speech and language development from the perspective of the speech-language pathologist.

CSD 558 Speech and Hearing Science (3 Credit Hours)

The content of this course focuses upon basic acoustics, speech acoustics, psychoacoustics, speech perception, and clinical laboratory instrumentation. The course is designed to provide fundamental information regarding normal and abnormal aspects of speech and hearing processes.

Prerequisites: Grade of C- or better in CSD 460 or CSD 560

CSD 560 Hearing Disorders and Basic Audiometry (3 Credit Hours)

A study of the physics of sound, anatomy, and physiology of the human ear, basic audiometry and hearing disorders.

CSD 561 Aural Rehabilitation I (3 Credit Hours)

A study of audiological findings and the implications for hearing therapy; speech and language development of the deaf.

CSD 597 Independent Study in Communication Sciences and Disorders (1-3 Credit Hours)

Independent study of special topics in communication sciences and disorders.

Prerequisites: Permission of instructor

CSD 612 Research and Evidence Based Practice in Speech-Language Pathology (3 Credit Hours)

This course will provide students with a background in evidence-based clinical practice by understanding elements of quality research methods. Students will learn how to identify reputable research outcomes that influence clinical decisions in speech-language pathology.

CSD 649 Clinical Procedures in Speech-Language Pathology (3 Credit Hours)

This course teaches students basic clinical procedures and competencies in speech-language pathology with an emphasis on language sampling and identification of grammatical categories, skills required by professionals practicing in the field of speech-language pathology.

Prerequisites: Permission of instructor

CSD 651 Spoken and Written Language Disorders: School-Aged Children (3 Credit Hours)

This course focuses on the relationship between spoken and written language and its role in language-based learning disabilities in school-aged students. It addresses the characteristics of language, reading, and spelling impairments; the subtypes of these disorders; and the different assessment and intervention approaches used with them.

Prerequisites: CSD 453 or CSD 553 or permission of the instructor

CSD 652 Speech Sound Disorders (3 Credit Hours)

The emphasis of this course is clinical assessment and intervention for phonology and articulation skills that can be disrupted in speech sound disorders including motor speech disorders.

Prerequisites: CSD 551

CSD 653 Language Disorders: Birth to Five Years (3 Credit Hours)

An advanced study of the diagnosis and intervention for infants and preschoolers with suspected language disorders arising from a variety of etiologies. This course has a particular emphasis on assessment and intervention using principles of evidence-based practice.

Prerequisites: CSD 453/CSD 553 or permission of instructor

CSD 655 Voice and Resonance Disorders (2 Credit Hours)

This course emphasizes the current etiological theories, research, diagnostic procedures, and therapeutic techniques related to voice and resonance disorders. Students will study terminology and concepts related to the resonance, phonation, and respiration systems underlying voice production.

Prerequisites: Permission of instructor

CSD 656 Theories and Therapies in Stuttering (2 Credit Hours)

This course emphasizes current etiological theories, research, diagnostic procedures and therapeutic techniques related to stuttering.

Prerequisites: Permission of instructor

CSD 657 Aphasia (3 Credit Hours)

The objective of this course is to investigate the etiologies, communicative disorders, diagnostic methods and therapeutic techniques related to aphasia, dyslexia and dysgraphia related to acquired neurologic conditions.

CSD 658 Swallowing Disorders (3 Credit Hours)

This course reviews the structures and neural bases of swallowing, common etiologies that cause dysphagia, and clinical techniques used in assessment and management of swallowing disorders in pediatric and adult populations.

CSD 659 Augmentative and Alternative Communication (3 Credit Hours)

This course will identify populations that may benefit from Augmentative and Alternative Communication (AAC) for nonverbal communication disorders, describe the assessment process relative to AAC and tenets of intervention, provide information regarding legal issues related to AAC, and demonstrate how to acquire and use AAC instrumentation.

Prerequisites: Permission of instructor

CSD 660 Procedures in Audiology (3 Credit Hours)

Advanced study of the physics of sound, anatomy, and physiology of audition, hearing disorders, and audiometric procedures, providing knowledge and skills necessary for a speech-language pathologist.

CSD 662 Cognitive-Communication Disorders (3 Credit Hours)

The objective of this course is to investigate the etiologies, cognitive impairments, communication manifestations, diagnostic methods and therapeutic techniques related to traumatic brain injury, right hemisphere brain damage, and various dementias.

Prerequisites: Permission of instructor

CSD 663 Clinical Perspectives on Autism Spectrum Disorders (2 Credit Hours)

Students in this class will study diagnostic and intervention methods necessary for speech-language pathologists treating people diagnosed with Autism Spectrum Disorders.

Prerequisites: CSD 453/CSD 553 or equivalent

CSD 664 Culturally Sustaining Communication Practices in Speech-Language Pathology (1 Credit Hour)

Students will discuss cultural competence as applied in the speech-language pathology clinical process, including a self-examination of bias and effective communication through a culturally-responsive lens.

Prerequisites: Permission of instructor

CSD 665 Theories of Supervision in Speech-Language Pathology (1 Credit Hour)

Students will discuss models of effective clinical supervision, with an emphasis on preparation and planning to guide students, clinical fellows, and speech-language pathology assistants.

Prerequisites: Permission of instructor

CSD 668 Advanced Clinical Externship in Speech-Language Pathology (3 Credit Hours)

In this externship, students will apply advanced speech-language pathology techniques in diagnosis and intervention for individuals with communication and swallowing disorders in medical or educational settings. Students will work full time in an off-campus facility to complete clock hours for certification purposes.

Pre- or corequisite: Passing grade in CSD 669, and permission of faculty

CSD 669 Clinical Practicum in Speech-Language Pathology I, II, III (3 Credit Hours)

These practica are designed to provide students with experiences in the evaluation and treatment of a variety of communication disorders in children and adults.

Pre- or corequisite: CSD 351, CSD 352, CSD 451/CSD 551, CSD 453/CSD 553, CSD 460/CSD 560 (or equivalents) and permission of program faculty

CSD 697 Independent Study in Communication Sciences and Disorders (1-3 Credit Hours)

Independent study of special topics in communication sciences and disorders.

Prerequisites: Permission of instructor

CSD 750 Neuromotor Speech Disorders (3 Credit Hours)

The content of this course focuses on the neurological bases of speech, disorders of speech production associated with neurologic diseases, as well as methods for evaluation and treatment of those disorders.

CSD 850 Neuromotor Speech Disorders (3 Credit Hours)

The content of this course focuses upon the structural and neurological bases of speech disorders, particularly those related to laryngeal and central nervous system pathologies. Advanced expertise in neuromotor speech disorders will be developed along with in depth familiarity and analysis of related literature.

CYSE - Cybersecurity

CYSE 510 Artificial Intelligence (AI) Methods and Models (3 Credit Hours)

This course offers an introduction to Artificial Intelligence (AI). Students will explore the field's fundamental concepts, techniques, and applications. Methods, such as Generative AI (GenAI) that enable machines to learn and process information, and models, such as machine learning (ML) that uses data sets to recognize patterns and make decisions without human intervention will be covered. The course is designed for non-specialists and does not require prior computer science or programming knowledge.

CYSE 516 Cyber Defense Fundamentals (3 Credit Hours)

This course focuses on cybersecurity theory, information protection and assurance, and computer systems and networks security. The objectives are to understand the basic security models and concepts, learn fundamental knowledge and tools for building, analyzing, and attacking modern security systems, and gain hands-on experience in cryptographic algorithms, security fundamental principles, and Internet security protocol and standards. (Offered fall)

Prerequisites: permission of the instructor

Pre- or corequisite: ECE 355 or equivalent or permission of the instructor

CYSE 519 Cyber Physical System Security (3 Credit Hours)

Cyber Physical Systems (CPS) integrate computing, networking, and physical processes. The objectives of this course are to learn the basic concepts, technologies and applications of CPS, understand the fundamental CPS security challenges and national security impact, and gain hands-on experience in CPS infrastructures, critical vulnerabilities, and practical countermeasures.

Prerequisites: ECE 355 or permission of the instructor

CYSE 520 Applied Machine Learning in Cybersecurity (3 Credit Hours)

This course introduces the concepts and technologies of machine learning with a focus on applications related to cybersecurity. The objectives are to learn fundamental knowledge and practical experience and identify the use case of machine learning techniques in cybersecurity. The course will discuss traditional and advanced machine learning techniques, e.g., neural network, deep convolutional neural network, generative adversarial network, and transfer learning algorithms. Students will engage in oral and written communication by reporting and presenting the materials of the course project.

CYSE 521 Generative AI in Cybersecurity (3 Credit Hours)

This course provides an in-depth examination of the intersection between Generative AI (Gen AI) and Cybersecurity. It focuses on the dual nature of advanced AI systems as both enhancers and potential threats to security infrastructure. Students will acquire a comprehensive understanding of the underlying principles, algorithms, and practical applications of Gen AI models in the discovery of attack vectors, identification of cyber threats, and automation of security tasks. Additionally, the course will address defensive strategies aimed at mitigating the risks stemming from AI-driven cyberattacks.

CYSE 525 Cybersecurity Strategy and Policy (3 Credit Hours)

This course explores cybersecurity policy and strategy and introduces students to the essentials of strategy development and policy making in cybersecurity. Topics considered include planning principles in cyber strategy; risk management and cybersecurity policy; the connections between cybersecurity policies, businesses, and governmental institutions; the knowledge, skills, and abilities needed to develop and implement cybersecurity policy; the social, political and ethical implications that arise in cybersecurity policies and strategies; strategies to assess cybersecurity policy; and the ties between national security and cybersecurity policy.

CYSE 526 Cyber War (3 Credit Hours)

This course explores the national security dimensions of cybersecurity and examines cyber war in international relations. Exploration of cyber war begins with an examination of cybersecurity as a component of national security and investigates the topics of U.S. National Cybersecurity and other national approaches to cyber war. The topics of cyber deterrence, cyber as a military domain, the roles of international organizations in cyber war, cyber terrorism, the role of social media, and information warfare will be discussed. The international dimension of cybersecurity is also discussed.

CYSE 530 Introduction to Cybersecurity Risk Management (3 Credit Hours)

This course addresses the broad topic of risk management and how risk, threats, and vulnerabilities impact information systems. Areas of instruction include how to assess and manage risk based on defining an acceptable level of risk for information systems. Elements of a business impact analysis (BIA), business continuity plan (BCP), disaster recovery plan (DRP), and computer incident response team (CIRT) plan will also be discussed.

CYSE 531 Advanced Techniques Cybersecurity Risk Management (3 Credit Hours)

Expert-level approach on the Risk Management Framework (RMF) system Authorization to Operation (ATO), including Continuous cATO. Curriculum that is aligned to the NIST SP 800-53, Revision 5. Advanced topics include Assess and Authorize, System Categorization, Security Control Assessment, System Test Results, Plan of Action and Milestones (POA&M), and Continuous Monitoring (CONMON).

CYSE 532 Cyber Risk CSF/CMMC (3 Credit Hours)

This course introduces cybersecurity, the NIST Cybersecurity Framework (CSF), and the Cybersecurity Maturity Model Certification (CMMC) program. Topics to be addressed include the risk management fundamentals, IT risk management, and cyber risk controls; cyber threats and vulnerabilities; data security and sanitization; the NIST CSF, including its core functions, categories, and subcategories; and the CMMC comprising its levels, domains, and implementation guidelines.

CYSE 533 Cyber Risk FedRAMP/Audit (3 Credit Hours)

This course explores the Federal Risk and Authorization Management Program (FedRAMP) and Auditing. Topics to be addressed include an overview of the FedRAMP framework, including its objectives, components, and stages; the needed documents and guidelines to develop system security plans and security assessment reports; the NIST Risk Management Framework (RMF) comprising its different stages and the adoption mechanism; FISMA compliance and auditing assessment; and real-world case studies and future challenges.

CYSE 595 Topics in Cybersecurity (1-3 Credit Hours)

The advanced study of selected cybersecurity topics designed to permit small groups of qualified students to work on subjects of mutual interest. These courses will appear in the course schedule, and will be more fully described in information distributed to academic advisors.

Prerequisites: permission of the instructor

CYSE 597 Tutorial Work in Special Topics in Cybersecurity (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: approval of the instructor

CYSE 600 Cybersecurity Principles (3 Credit Hours)

This course provides an overview of the field of cybersecurity. It covers core cybersecurity topics including computer system architectures, critical infrastructures, cyber threats and vulnerabilities, cryptography, cryptographic protocol design, information assurance, network security, and risk assessment and management. Students are expected to become familiar with fundamental security concepts, technologies and practices, and develop a foundation for further study in cybersecurity.

CYSE 601 Advanced Cybersecurity Techniques and Operations (3 Credit Hours)

This course introduces tools and techniques used to secure and analyze large computer networks and systems. It will include significant hands-on lab work. Students will explore and map networks using a variety of diagnostic software tools, learn advanced packet analysis, configure firewalls, write intrusion detection rules, perform malware detection, forensic investigation, and practice techniques for penetration testing.

CYSE 602 Advanced Techniques for Cyber Defense (3 Credit Hours)

This course offers a deep dive into advanced cybersecurity techniques and operations, aiming to bolster cyber defense strategies. Participants will explore state-of-the-art methodologies encompassing threat analysis, incident response, ethical hacking, secure network architecture, and proactive mitigation strategies. Through immersive, hands-on experiences and real-world simulations, learners will develop the expertise required to adeptly secure digital environments against ever-evolving cyber threats. This course may be used as a leveling course.

CYSE 603 Advanced Cybersecurity Law and Policy (3 Credit Hours)

This course addresses two major cyber law subject matters. The first part of the course examines various U.S. laws and legal considerations that impact the digital and cyberspace worlds from civil and criminal perspectives. The second part, which builds upon the first, will familiarize cyber operations professionals about the extent of and limitations on their authorities to ensure operations in cyberspace are in compliance with U.S. law, regulations, directives and policies.

CYSE 605 Leadership and Management in Cybersecurity (3 Credit Hours)

This course introduces skills to manage technical professionals and lead strategic change in their organization. Based on the basic operations and functionality of cybersecurity systems, students will learn the management of cybersecurity technical professionals, including how to effectively lead and manage teams, how to launch and assess organizational change initiatives, and how to work effectively within an interdependent group to achieve common goals.

CYSE 607 Advanced Digital Forensics (3 Credit Hours)

This course introduces the concepts and technologies of digital forensics. Students will learn the advanced techniques and tools utilized for collecting, processing, and preserving digital evidence on computers, mobile devices, networks, and cloud computing environments. Students will also engage in oral and written communication to report digital forensic findings and prepare court presentation materials.

CYSE 608 Windows System for Cybersecurity (3 Credit Hours)

This course teaches the basic fundamentals of using and creating Windows Server domains using PowerShell. It also covers topics like active directory, server administration, and technologies such as Group Policy, Network Policy Server (NPS), Domain Name System (DNS), and Dynamic Host Configuration Protocol (DHCP). Additionally, it includes lessons on disk management, firewall administration, and Windows Server Networking Services like IPv4, IPv6, and more. This course may be used as a leveling course.

CYSE 609 Fundamentals of Linux System for Cybersecurity (3 Credit Hours)

This course introduces the basic operations in major Linux distros for cybersecurity using both graphical interface and command-line interface. Students will learn about the basic installation and configuration, file systems management, shell scripts, and user authentication in Linux systems. This course may be used as a leveling course.

CYSE 610 Advanced Cryptography (3 Credit Hours)

This course studies advanced topics in cryptography. It begins with an overview of necessary background in algebra and number theory, private- and public-key cryptosystems, and basic signature schemes. It then upgrades the design and analysis of modern cryptography, including how the security model is defined, how practical cryptographic algorithms work, and how to exploit flaws in the current models of cryptography.

CYSE 615 Mobile and Wireless Security (3 Credit Hours)

An overview of wireless and mobile security providing students with practical and theoretical experiences. Topics include smartphone security, mobile Internet security, mobile location privacy, and wireless ad hoc, mesh, and sensor network security.

CYSE 625 Advanced Ethical Hacking and Penetration Testing (3 Credit Hours)

This course teaches students the underlying principles and many of the techniques associated with the cybersecurity practice known as penetration testing or ethical hacking. The course covers planning, reconnaissance, scanning, exploitation, post-exploitation, and result reporting. Students will discover how system vulnerabilities can be exploited and learn to avoid such problems.

CYSE 626 Web Archiving Theory, Practice, and Implications (3 Credit Hours)

An interdisciplinary introduction to web archiving fundamentals including web crawling, collection development and summarization including planning, analyzing, and sharing collections. Includes a review of ethical and legal issues, trustworthiness, preservation, security, and cultural impact of web archiving.

Prerequisites: This course is intended for Cybersecurity students

CYSE 630 Introduction to Cybersecurity Risk Management (3 Credit Hours)

This course addresses the broad topic of risk management and how risk, threats, and vulnerabilities impact information systems. Areas of instruction include how to assess and manage risk based on defining an acceptable level of risk for information systems. Elements of a business impact analysis (BIA), business continuity plan (BCP), disaster recovery plan (DRP), and computer incident response team (CIRT) plan will also be discussed.

CYSE 631 Advanced Techniques Cybersecurity Risk Management (3 Credit Hours)

Expert-level approach on the Risk Management Framework (RMF) system Authorization to Operation (ATO), including Continuous cATO. Curriculum that is aligned to the NIST SP 800-53, Revision 5. Advanced topics include Assess and Authorize, System Categorization, Security Control Assessment, System Test Results, Plan of Action and Milestones (POA&M), and Continuous Monitoring (CONMON).

CYSE 632 Cyber Risk CSF/CMMC (3 Credit Hours)

This course introduces cybersecurity, the NIST Cybersecurity Framework (CSF), and the Cybersecurity Maturity Model Certification (CMMC) program. Topics to be addressed include the risk management fundamentals, IT risk management, and cyber risk controls; cyber threats and vulnerabilities; data security and sanitization; the NIST CSF, including its core functions, categories, and subcategories; and the CMMC comprising its levels, domains, and implementation guidelines.

CYSE 633 Cyber Risk FedRAMP/Audit (3 Credit Hours)

This course explores the Federal Risk and Authorization Management Program (FedRAMP) and Auditing. Topics to be addressed include an overview of the FedRAMP framework, including its objectives, components, and stages; the needed documents and guidelines to develop system security plans and security assessment reports; the NIST Risk Management Framework (RMF) comprising its different stages and the adoption mechanism; FISMA compliance and auditing assessment; and real-world case studies and future challenges.

CYSE 635 AI Security and Privacy (3 Credit Hours)

This course focuses on Machine Learning (ML) security and privacy. Students will understand and explore the vulnerabilities of the ML models, learn how to develop and deploy defenses to mitigate possible attacks, and gain hands-on experience to protect private data during model training and testing.

CYSE 640 Trustworthy and Responsible AI (3 Credit Hours)

This course introduces the concepts and the characteristics of trustworthy AI and the essential building blocks of AI trustworthiness with a focus on safety, reliability, resiliency, accountability and transparency, explainability and interpretability, fairness, and ethics. Students will gain an understanding of Trustworthy and Responsible AI concepts and gain hands-on experience in developing AI systems in a responsible and trustworthy manner.

CYSE 645 Advanced Cybersecurity Risk Management Practices (3 Credit Hours)

Expert-level approach on the Risk Management Framework (RMF) system Authorization to Operation (ATO), including Continuous cATO. Curriculum that is aligned to the NIST SP 800-53, Revision 5. Advanced topics include Assess and Authorize, System Categorization, Security Control Assessment, System Test Results, Plan of Action and Milestones (POA&M), and Continuous Monitoring (CONMON).

CYSE 695 Advanced Topics in Cybersecurity (1-3 Credit Hours)

The advanced study of selected cybersecurity topics designed to permit small groups of qualified students to work on subjects of mutual interest. These courses will appear in the course schedule, and will be more fully described by academic advisors.

Prerequisites: Permission of the instructor

CYSE 697 Independent Study in Cybersecurity (3 Credit Hours)

This course allows students to develop specialized expertise by independent study (supervised by a faculty member).

CYSE 698 Master's Project (3 Credit Hours)

This capstone course provides opportunities to synthesize and apply the knowledge and skills to solve real-world cyber security problems.

CYSE 800 Research Methods in Cybersecurity (3 Credit Hours)

Students learn how to use multiple research methods to conduct cybersecurity research. Students will conduct a multi-method research project in interdisciplinary groups.

Prerequisites: CYSE 600

CYSE 801 Advanced Cybersecurity Techniques and Operations II (3 Credit Hours)

Students apply the tools and techniques learned in Advanced Cybersecurity Techniques and Operations. Virtual laboratory work is conducted, and students produce scientific reports describing the results of their analyses, investigations, and diagnoses.

Prerequisites: CYSE 601

CYSE 802 Cybersecurity Seminar (3 Credit Hours)

Introduces new PhD students to the study of cybersecurity through an interdisciplinary lens through different fields of study offered as doctoral programs at ODU. Students will read studies published by ODU scholars and discuss how interdisciplinary research informs society. Students will identify possible research agendas for their doctoral studies. Professional development will be included.

CYSE 803 Moral Reasoning for Emerging Technologies (3 Credit Hours)

This course provides training in how to think critically and inclusively about moral and ethical concerns in the context of new, emerging, and developing technologies. In these contexts where ethical guidelines and practices have not been fully developed, it is necessary to have experience with flexible and adaptive training in identifying and thinking through moral concerns. Students will develop these skills through a study of philosophy of technology, history of technology, and Science and Technology Studies combined with active and creative forms of speculative application of these theories and methods.

CYSE 869 Cybersecurity Practicum (3 Credit Hours)

This course satisfies the cybersecurity PhD teaching requirement. During the semester enrolled, the student must be assigned as a teaching assistant or instructor of record and teach at least three hours of class and prepare at least one assignment, quiz or equivalent. PhD students are expected to satisfy the teaching requirement after completing their first year of study and at least one semester prior to scheduling their PhD defense.

CYSE 899 Doctoral Dissertation (1-9 Credit Hours)

Research for the doctoral dissertation.

DANC - Dance

DANC 595 Topics in Dance (1-3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses appear in the course schedule, and are more fully described in a booklet distributed to academic advisors.

Prerequisites: Appropriate survey course or permission of the instructor

DANC 596 Topics in Dance (1-3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses appear in the course schedule, and are more fully described in a booklet distributed to all academic advisors.

Prerequisites: Appropriate survey course or permission of the instructor

DANC 597 Tutorial Work in Special Topics in Dance (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: graduate standing and approval of the department chair

DANC 598 Tutorial Work in Special Topics in Dance (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: graduate standing and approval of the department chair

DANC 697 Tutorial Work in Special Topics in Dance (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: Graduate standing and approval of the department chair

DANC 698 Tutorial Work in Special Topics in Dance (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: Graduate standing and approval of the department chair

DASC - Data Science

DASC 596 Topics in Data Science (3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule and will be more fully described in information distributed to academic advisors.

DASC 597 Independent Study (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: approval of the program coordinator

DASC 600 Programming for Data Science (3 Credit Hours)

This course provides foundational programming skills essential for future coursework in data science. Designed for students with little to no prior programming experience, it develops essential skills in programming and problem-solving, equipping students with the ability to manipulate data, perform basic analyses, and create visualizations. The course emphasizes writing clean, efficient, and reproducible code.

DASC 605 Advanced Statistical Concepts in Data Science (3 Credit Hours)

This course will cover both classical and modern statistical methods used within data science. Concepts related to hypothesis testing, fundamentals of experimental design and analysis will be discussed along with tests of association for categorical data. Statistical methods that are often included in machine learning methods like sampling and bootstrapping are also included.

Prerequisites: STAT 603; Prior experience with the R language is helpful but not required

DASC 620 Introduction to Data Science and Analytics (3 Credit Hours)

This course will explore data science as a burgeoning field. Students will learn fundamental principles and techniques that data scientists employ to mine data. They will investigate real life examples where data is used to guide assessments and draw conclusions. This course will introduce software and computing resources available to a data scientist to process, visualize, and model different types of data including big data. Cross-listed with CS 620.

DASC 668 Internship (1-3 Credit Hours)

Requirements will be established by the School of Data Science and will vary with the amount of credit desired. Allows students an opportunity to gain a short duration career-related experience.

Prerequisites: Departmental permission required

DASC 669 Artificial Intelligence (AI) Practicum (3 Credit Hours)

Students demonstrate an ability to integrate and synthesize competencies from their certificate or degree program coursework applied to concentration areas. Students produce high quality written products and an e-portfolio that demonstrate the analysis, synthesis and intersection of AI knowledge with specific domains.

Prerequisites: Good academic standing (Graduate GPA of at least 3.0)

DASC 690 Data Science Capstone Project (3 Credit Hours)

The culminating course in the proposed MS in Data Science and Analytics degree program will bring students together with faculty and external partners. In consultation with a faculty advisor and a business or industry or government representative, students will be required to develop a project that aims to solve a data science/analytics problem in a real-world business, industry, or government setting. Faculty and business/industry/government representatives will serve as external mentors for the students during this experience. Note that an external mentor is not mandatory but encouraged.

Pre- or corequisite: DASC 620/CS 620, CS 624, CS 625, and STAT 603

DASC 695 Topics in Data Science (1-3 Credit Hours)

Provides the advanced student with an opportunity to study and investigate a variety of topics in the field of data science.

Prerequisites: Permission of the instructor

DASC 697 Independent Study in Data Science (1-3 Credit Hours)

Independent study under the direction of an instructor.

Prerequisites: Permission of the instructor

DASC 699 Thesis Research (3 Credit Hours)

Departmental permission required

Prerequisites: Departmental permission required

DASC 728 Deep Learning Fundamentals and Applications (3 Credit Hours)

This course covers key components of deep learning framework, including loss functions, regularization, training and batch normalization. The course also covers several fundamental deep learning architectures such as multilayer perceptrons, convolutional neural network, recurrent neural network and transformers, as well as some advanced topics such as graph neural network and deep reinforcement learning. The class activities include traditional lectures, paper reading and presentation, and projects.

Prerequisites: CS 422 or CS 522 or CS 480 or CS 580 or CS 722 or CS 822 or CS 733 or CS 833 or CS 620 or DASC 620, or other equivalent courses at the discretion of the instructor

DASC 741 Data-Driven Computational Imaging (3 Credit Hours)

This course introduces the basic concepts of computational imaging. The topics include principles of imaging systems, role of computational methods in enhancing imaging systems, computational imaging inverse problems, and data-driven machine learning approaches to solve inverse problems in computational imaging.

Prerequisites: Knowledge of linear algebra and prior programming experience

DASC 771 Fundamentals of Interpretable Machine Learning and Explainable AI (3 Credit Hours)

Laws in many countries and states within the U.S. require that predictive models impacting humans be accompanied by an understandable interpretation, yet many such models are based on so called black box models that can't be easily interpreted or explained. This course will enable students to produce explanations and interpretations for advanced ML and AI algorithms. It will review the state of the science methods for interpretable ML and explainable AI, including graphical and contextual approaches as well as model agnostic and model specific methods for generating understandable explanations and interpretations. The course will also introduce the concepts of algorithmic bias and model fairness as they relate to explanation and understanding.

Prerequisites: BDA 511/611, or CS 522, or CS 580

DASC 781 AI for Health Sciences (3 Credit Hours)

This course explores the application of AI in health sciences, focusing on machine learning, NLP, computer vision, generative AI techniques for diagnostics, treatment planning, patient monitoring, and biomedical research. It covers precision medicine, ethical AI, and the integration of AI into practice. Students will gain a deep understanding and practical skills to develop innovative AI solutions that address real-world challenges in health sciences.

Prerequisites: Prior programming experience

DASC 782 Generative AI (3 Credit Hours)

This course provides a deep dive into the foundations and current advancements in generative AI. It covers key concepts such as transformer models, GANs, VAEs, LLMs, and their applications across various fields, emphasizing both theory and hands-on learning, including ethical considerations such as fairness and bias mitigation. Students will develop a comprehensive understanding of generative AI and gain practical experience.

Prerequisites: Prior programming experience

DASC 795 Topics in Data Science (3 Credit Hours)

Provides the advanced student with an opportunity to study and investigate a variety of topics in the field of data science.

DASC 828 Deep Learning Fundamentals and Applications (3 Credit Hours)

This course covers key components of deep learning framework, including loss functions, regularization, training and batch normalization. The course also covers several fundamental deep learning architectures such as multilayer perceptrons, convolutional neural network, recurrent neural network and transformers, as well as some advanced topics such as graph neural network and deep reinforcement learning. The class activities include traditional lectures, paper reading and presentation, and projects.

Prerequisites: CS 422 or CS 522 or CS 480 or CS 580 or CS 722 or CS 822 or CS 733 or CS 833 or CS 620 or DASC 620, or other equivalent courses at the discretion of the instructor

DASC 841 Data-Driven Computational Imaging (3 Credit Hours)

This course introduces the basic concepts of computational imaging. The topics include principles of imaging systems, role of computational methods in enhancing imaging systems, computational imaging inverse problems, and data-driven machine learning approaches to solve inverse problems in computational imaging.

Prerequisites: Knowledge of linear algebra and prior programming experience

DASC 871 Fundamentals of Interpretable Machine Learning and Explainable AI (3 Credit Hours)

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Prerequisites: BDA 511/611, or CS 522, or CS 580

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Prerequisites: Prior programming experience

DASC 895 Topics in Data Science (3 Credit Hours)

Provides the advanced student with an opportunity to study and investigate a variety of topics in the field of data science.

DHSC - Doctor of Health Sciences

DHSC 700 Strategic Communication (3 Credit Hours)

Communication skills have never been more important than in the 21st century where professionals must balance verbal and written interactions. Strategic communication must align the message, the medium, and the audience to help organizations achieve their goals. This course will explore those concepts and help students improve their communication skills, including topics such as professional writing, developing effective PowerPoint presentations, importance of active listening, and evolving use of social media.

DHSC 701 Management of Organizational Change (3 Credit Hours)

A study of organizational management theory and organizational models in a variety of settings as related to culture, mission, performance and change management with an emphasis on the application of management theory and research. This course provides an opportunity to explore conceptual frameworks addressing organizational development, leadership, decision making, and the stages of change management.

DHSC 702 Healthcare Delivery Systems (3 Credit Hours)

This course focuses on the identification and analysis of factors and interrelationships which influence the operation of health services organizations with specific attention to local health departments, hospitals, multi-institutional systems, integrated health systems and strategic alliances. These organizations will be viewed and discussed comparatively with other types of health service agencies.

DHSC 703 Conflict Analysis & Negotiation (3 Credit Hours)

Examine issues and principles in the management of conflict and negotiation within organizations. Topics include resolution strategies and organizational design and change. Students will examine case studies and develop a conflict scenario that applies concepts learned throughout the course.

DHSC 704 Intro to Healthcare Analytics (3 Credit Hours)

The course introduces basic concepts in healthcare analytics. Students will develop data analysis skills with an emphasis on statistical reasoning. The course is designed to teach students how to use data to make informed decisions. This process includes reviewing the data, exploring all the underlying assumptions, summarizing and analyzing the data, and finally translating the results. Discussions and assignments will focus on honing data interpretation and the ability to strategically apply analysis results to improve health outcomes.

DHSC 705 Information Technology for Healthcare Organizations (3 Credit Hours)

This course introduces research methods and their applications in the healthcare environment. The course will provide an opportunity for students to establish and advance their understanding of research through exploring the fundamental definition of study design, technical methodology, data collection, data analysis, research ethics, statistical interpretation, and effective dissemination of research results. Students will be implementing theoretical concepts to critically review relevant literature and evaluate different types of research procedures and outcomes. Students will also apply the methodologies they learn to identify and explain and prepare a preliminary research protocol. The primary focus of this course is to develop the learner's ability to understand, evaluate, and apply research methods in healthcare settings and to prepare them to become effective leaders in that environment.

DHSC 706 Research Methods (3 Credit Hours)

This course provides the key concepts related to information technology within healthcare organizations. The course explores how information technologies are used as a tool to enhance performance within healthcare organizations for positive health outcomes. Topic areas include various information technologies used in the healthcare sector; methods for assessing and ensuring information technology value; laws, regulations, and standards to guide the practice; achieving effectiveness through information technology; and the latest development including business and clinical intelligence and telemedicine.

DHSC 800 Essentials of Financial Management (3 Credit Hours)

This course covers financial management in health care organizations including, but not limited to, financial decision-making using accounting information, operation of business units, principles of economics and capital budgeting processes along with budgetary and financial controls. Financial performance will be analyzed along with revenue determination and profitability. General accounting foundations and terminology will be covered. Students will analyze "real-life" cases to apply cost allocation, marginal cost pricing, breakeven, budget variance, capital investment, and financial analysis skills. Students will also identify and explore a health care finance-related topic, and prepare a research paper.

DHSC 803 Program Evaluation (3 Credit Hours)

To ensure student learning and program quality, address accreditation standards, and satisfy institutional initiatives, formative and summative program evaluation methods will be examined in depth. Formative evaluation topics include needs assessment, evaluability assessment, structured conceptualization, implementation evaluation, and process evaluation. Summative evaluation topics include outcome evaluations, impact evaluation, cost-effectiveness and cost-benefit analysis, secondary analysis, and meta-analysis. Strategies for establishing an evaluation culture within an educational institution will be discussed. Learners will apply this knowledge to their actual working environment through a series of practical exercises.

DHSC 804 Leadership and Professionalism (3 Credit Hours)

This course will expose learners to effective leadership approaches and skill sets. Topics will include fundamentals of leadership, leadership and professionalism self-assessment, leadership philosophy, professionalism, essential leadership and professionalism skills, modeling best leadership practices and behaviors, ethics in leadership, institutional and program accreditation, handling conflict, and emerging issues. Learners will apply this learning to their professional life through a series of practical exercises.

DHSC 805 Population Health & Preventive Care (3 Credit Hours)

This course discusses the determinants of health, health behavior change, measuring health status, and influences on health status including health disparities and socioeconomic status. This includes discussion on how healthcare organizations utilize this information to improve health status among populations. Additionally, students will be able to identify and understand population-based approaches aimed at health improvement.

DHSC 900 Policy & Politics of Health (3 Credit Hours)

An introduction to the policy process, frameworks for understanding health policy issues, background research necessary for policy implementation and implementation strategies.

DHSC 901 Healthcare Strategy (3 Credit Hours)

Examination of strategy-making issues for healthcare organizations, including analysis of economic incentives, financial strategies, development of mission and goals and formulation and implementation of long-range strategies to accomplish those goals.

DHSC 903 Leading Innovation (3 Credit Hours)

Increasingly complex environments require a commitment to develop innovative solutions to address changing systems and evolving needs. This course will examine concepts and case studies of innovation in a variety of organizations, along with the tools and strategies necessary to promote effective change through discovery and networking. Students will apply information learned throughout the program to develop an innovative proposal for their place of employment or for an organization they aspire to work for.

DMSC - Medical Science

DMSC 704 Quality Improvement in Healthcare (3 Credit Hours)

This course will cover the area of healthcare quality and improvement in all facets of healthcare including, but not limited to, private practice, clinical settings, hospital systems, and other healthcare facilities. Through a series of topics that range from teamwork, analysis, and communications, to risk analysis, accreditation, and personnel factors, the course will help the learner navigate facets of quality improvement that impact every corner of the healthcare environment. General government processes, regulations, and descriptions of accountability will also be explored.

DMSC 705 Advanced Clinical Practicum I (3 Credit Hours)

This is the first in a series of two courses that will allow the student to advance their skills and knowledge within their given specialty. Students will identify areas that they wish to implement improvements or change within their healthcare system at any level. Students will also have the opportunity to reflect on this process and refine their strategies for improvement.

DMSC 801 Advanced Clinical Practicum II (3 Credit Hours)

This is the second in a series of two courses allowing students to advance their skills and knowledge within their given specialty. This second course will build upon Advanced Clinical Practice I. Students will continue with projects to improve their clinical abilities and learn more advanced ideas and concepts within the healthcare structure and systems. Students will continue working with an identified preceptor or healthcare administrator to identify personal skills they wish to advance in the clinical setting or areas to implement improvements or change within their healthcare system at any level. Students will also have the opportunity to reflect on this process and refine their strategies for improvement. Students will also be exposed to professional colleagues who will provide expertise in several areas of healthcare, including leadership, research, and administration.

DMSC 802 Capstone I (4 Credit Hours)

This course is an overview of writing and the organizational skills necessary for completion of the Capstone and submission of articles for publication. It focuses on the development of writing.

DMSC 805 Capstone II (4 Credit Hours)

This is the second in a series of 3 Capstone courses in which students will continue working on their scholarly publication and enhance their knowledge of the grant process. This semester, students will explore the detailed components of the grant application process. The major milestone of this course will be the submission of a second rough draft of the student's scholarly publication.

DMSC 806 Capstone III (4 Credit Hours)

This is the third in a series of three Capstone courses in which students will complete the scholarly manuscript and further their knowledge of the grant process. The two major milestones of this course will be the completion of a complete grant application and the submission of their scholarly manuscript to a reputable medical journal.

DMSC 807 Learning Assessment and Evaluation (3 Credit Hours)

This course explores the importance of learning assessment and evaluation in health education. Students will navigate the learning assessment and evaluation process, including identifying the fundamentals of assessment, discovering evaluation and assessment methods, and evaluating these methods for quality, validity, and reliability. Topics specific to health professions education will also be discussed, including the use of situation judgement tests and simulation in assessment.

DMSC 808 Healthcare Policy for PAs (3 Credit Hours)

This course will explore the fundamental theories of health policy, including its innovations, implementation, and analysis, emphasizing its impact on the PA profession. The course will prepare doctoral physician assistants to critically analyze health policy and its potential impact on the PA profession.

Doctoral students will be expected to write critical analyses on various health policy topics.

DMSC 809 Teaching & Learning in PA Education (3 Credit Hours)

This course is a brief overview of organizational and leadership structures in academia and PA Programs. PA Program accreditation is emphasized in the planning and execution of the PA educational curriculum. Additionally, the course prepares doctoral students to plan and evaluate appropriate instructional methods to enhance learner achievement.

DNTH - Dental Hygiene

DNTH 512 Perspectives on Dental Hygiene Practice (3 Credit Hours)

Course is designed for the licensed dental hygienist who seeks to maintain an awareness of changing trends, perspectives, evidence-based interventions and technologies in dental hygiene, health, and society that influence the dental hygiene process of care. (Offered summer.)

Prerequisites: Admission into the dental hygiene program

DNTH 514 Educational Concepts for the Health Professional I (3 Credit Hours)

This course is designed to explore various educational concepts, principles and methods of teaching for adults. Students will learn to present educational information to a diverse client population, in a variety of settings, in an ethical and professional manner. Topics include, but are not limited to, objectives, planning, implementation and evaluation of instruction; instructional strategies; delivery models; presentation skills; and techniques for communicating health information. (offered fall)

Prerequisites: Admission to the dental hygiene program

DNTH 515 Research Methods in the Health Sciences (3 Credit Hours)

Designed to develop skills in scientific methods, evidence based decision making, levels of evidence, and critical analysis of research findings. Emphasis on types of research, problem selection and hypothesis writing, research planning and design, data collection and measuring techniques, analysis and interpretation of data, research proposal writing and computer application. A written research proposal is required for graduate credit. (offered fall)

DNTH 516 Administrative Leadership and Professional Development (3 Credit Hours)

A study of current trends that influence the profession of dental hygiene including oral health care delivery, manpower, financing mechanisms, quality improvement, third party payers, professional associations, regulatory agencies and legislation. Emphasis is on ethical, political, and legal issues as they relate to the dental hygiene profession. (offered spring)

Prerequisites: Admission to the dental hygiene program

DNTH 540 Telehealthcare Technology (3 Credit Hours)

This course will examine the concept, global impact, and trends in telehealthcare technology on the client/patient, multidisciplinary practitioners, and various healthcare systems. Emphasis is on effective evidence-based decision making to reduce errors in patient care, promote care in remote or underserved geographical areas, and the ability to retrieve and evaluate healthcare information that improves access to quality, cost effective health care. (Offered spring)

Prerequisites: permission of the instructor

DNTH 597 Independent Study in Dental Hygiene (1-6 Credit Hours)

Independent reading and study on a topic selected under direction of a faculty member. (Offered fall, spring, summer)

Prerequisites: permission of instructor

DNTH 604 Clinical Administration and Teaching (3 Credit Hours)

The application of principles and theories of education and management to dental hygiene clinical education. Emphasis is on planning, implementing and evaluating clinical teaching, assessment of clinical competence, management of human and physical resources, and regulations affecting clinical education. This course is offered only during fall semester.

Corequisites: DNTH 669

DNTH 611 Modeling and Simulation Applications in Healthcare (3 Credit Hours)

This course examines the principles and innovative applications for modeling and simulation in healthcare practice, research, education, and administration with emphasis on emerging issues and trends in technology. Topics include the selection and implementation of simulation technology in conceptual epidemiology public and environmental health, dental hygiene, dentistry, nursing, medicine, laboratory sciences, healthcare management and health information. (offered summer)

DNTH 621 Aging in the 21st Century (3 Credit Hours)

This course will expose the inter-professional student to current and future challenges of aging in our society. Topics will include Healthy People 2020 objectives, health promotion and disease prevention for the aging, sociocultural issues, and theories on behavior and motivation. Common systemic and oral health conditions of the aging adult will be identified. Critical analysis of the current health environment will provide a format for discussion and identification of strategies for health promotion and disease control for the aging. Measures for promoting and maintaining oral health and overall health of the aging population will be explored, with attention to current research from the literature. This course is offered during summer semesters only.

DNTH 650 Advanced International Dental Hygiene (3-9 Credit Hours)

Faculty-led experiences offer unique opportunities for students to travel abroad, develop cross cultural competence, experience global health challenges, and engage in projects that advance oral health worldwide.

Prerequisites: DNTH 514

DNTH 660 Educational Concepts for the Health Professional II (3 Credit Hours)

Explores instructional strategies and their application to contemporary health professional roles. Emphasis is on individuals as health care specialists in business and industry; professional, private and public organizations; higher education; and the health care industry. Topics include implementation and evaluation of instruction, roles and responsibilities of faculty within an accredited program affected by state and national standards, and ethical and career related issues and trends. Students are provided with practical experience in traditional and distance education instructional methods. (offered spring)

Prerequisites: DNTH 514 or permission of the instructor

DNTH 663 Interprofessional Health Promotion (3 Credit Hours)

Course brings together students from various health disciplines to learn each other's roles and collaborate as a team using technology to promote health and prevent disease. Focus will be on optimizing health efforts and outcomes through an interprofessional approach that is guided by the research evidence and current technologies. Topics include Healthy People 2020 objectives, age, specific clinical guidelines for health promotion and illness prevention, theories on behavior and motivation, sociocultural issues, telehealth care, and various health problems. Evidence-based measures used by the team for promoting and maintaining health throughout the lifespan are emphasized. (spring only)

DNTH 668 Internship (3-9 Credit Hours)

Experience-based learning activities designed to develop a role of competence related to the individual's area of specialization while working under the supervision of a faculty member or host supervisor within an educational, health care, research, or corporate health setting. A clinical dental hygiene internship is prerequisite to DNTH 669. Available for pass/fail grade only. (offered fall, spring, summer as available)

Prerequisites: DNTH 514, DNTH 515, DNTH 604 or permission of the instructor

DNTH 669 Clinical Administration & Teaching Practicum (1 Credit Hour)

This practicum course is for students to apply principles and theories of education and management to dental hygiene clinical education. Emphasis is on planning, implementing, and evaluating clinical teaching, assessment of clinical competence, management of human and physical resources, and regulations affecting clinical education. This course is only offered during fall semester.

Corequisites: DNTH 604

DNTH 695 Topics in Dental Hygiene (1-6 Credit Hours)

Advanced seminars on selected topics in dental hygiene. Topics vary by semester. (offered fall, spring, summer)

DNTH 697 Independent Study-Dental Hygiene (1-6 Credit Hours)

Independent reading and study on a topic selected under direction of a faculty member (offered fall, spring, summer).

Prerequisites: Graduate Program Director permission required

DNTH 698 Research (3 Credit Hours)

An original thesis research project executed with the major advisor and thesis committee supervising the student's research project. A written research proposal must be submitted and approved prior to beginning the project. Required for students in the thesis option. Available as pass/fail grade only. (offered fall, spring, summer).

Prerequisites: DNTH 515; FOUN 722 or HLSC 746 or CHP 640 or equivalent statistics course approved by the graduate program director

DNTH 699 Thesis (3 Credit Hours)

Devoted to research, writing of the thesis, and scheduled conferences with the candidate's advisor and thesis committee. Students must submit an acceptable written thesis demonstrating knowledge of problem selection, data classification, analysis and interpretation and defend it. Available as pass/fail grade only. (offered fall, spring, summer)

Prerequisites: DNTH 698

DNTH 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

ECE - Electrical and Computer Engineering

ECE 503 Power Electronics (3 Credit Hours)

Power electronics provides the needed interface between an electrical source and an electrical load and facilitates the transfer of power from a source to a load by converting voltages and currents from one form to another. Topics include: alternating voltage rectification, Pulse Width Modulation (PWM), DC converters (Buck, Boost, Buck-Boost, Cuk and SEPIC converters), negative feedback control in power electronics, isolated switching mode power supply, flyback and forward power supply, solid state power switches, AC inverter. (Offered spring)

Prerequisites: ECE 303, ECE 313 and a grade of C or better in ECE 202 and ECE 287

ECE 504 Electric Drives (3 Credit Hours)

Electric drives efficiently control the torque, speed and position of electric motors. This course has a multi-disciplinary nature and includes fields such as electric machine theory, power electronics, and control theory. Topics include: switch-mode power electronics, magnetic circuit, DC motor, AC motor, Brushless DC motor, induction motor, speed control of induction motor, vector control of induction motor, stepper-motor. (offered fall)

Prerequisites: ECE 303 and a grade of C or better in ECE 202 and ECE 287

ECE 505 Power System Design & Analysis (3 Credit Hours)

This course covers basic power circuit analysis and introductory power system engineering and focuses on the transmission line design, power flow study, short circuit protection, and power distribution in electric power systems, followed by a survey of several applications and case studies. (offered fall)

Prerequisites: ECE 303 or equivalent knowledge in electric machines and circuits

ECE 506 Computer Graphics and Visualization (3 Credit Hours)

The course provides a practical treatment of computer graphics and visualization with emphasis on modeling and simulation applications. It covers digital image and signal processing basics such as sampling and discrete Fourier transform, computer graphics fundamentals, visualization principles, and software architecture for visualization in modeling and simulation. Written communication and information literacy skills are stressed in this course. (Offered fall).

Prerequisites: ECE 348 or CS 361 or MSIM 603

ECE 507 Introduction to Game Development (3 Credit Hours)

An introductory course focused on game development theory and modern practices with emphasis on educational game development. Topics include game architecture, computer graphics theory, user interaction, audio, high level shading language, animation, physics, and artificial intelligence. The developed games can run on a variety of computer, mobile, and gaming platforms. (Cross listed with MSIM 508). (Offered spring).

Prerequisites: CS 361 or ECE 348

ECE 508 Fundamentals of Electric Vehicles (3 Credit Hours)

This course covers the fundamentals of electric vehicles and focuses on the components, power control, energy management, power train dynamics and other related topics in purely electric and hybrid electric vehicle systems, including a survey of several applications and case studies. (Offered spring)

Prerequisites: ECE 303 and a grade of C or better in ECE 202 and ECE 287

ECE 509 Introduction to Distributed Simulation (3 Credit Hours)

An introduction to distributed simulation. Topics include motivation for using distributed simulation, distributed simulation architectures, time management issues, and distributed simulation approaches. Current standards for distributed simulation are presented.

Prerequisites: ECE 348

ECE 510 Model Engineering (3 Credit Hours)

The goal of this course is to develop understanding of the various modeling paradigms appropriate for capturing system behavior and conducting digital computer simulation of many types of systems. The techniques and concepts discussed typically include UML, concept graphs, Bayesian nets, Markov models, Petri nets, system dynamics, Bond graphs, etc. Students will report on a particular technique and team to implement a chosen system model. (Cross-listed with MSIM 510.)(Offered spring).

Prerequisites: ECE 306 or equivalent

Pre- or corequisite: ECE 320 or equivalent

ECE 512 Advanced Virtual Reality, Augmented Reality, and Haptics System (3 Credit Hours)

This course is designed to introduce students to the hardware and software required for humans to interact with virtual worlds, both visually and tactilely. Students will be introduced to virtual reality (VR), augmented reality (AR), and haptic devices. A discussion of relative coordinate systems will allow them to virtually position the devices in a virtual world. They will learn to build a haptic device and build an interface using a microcontroller. They will also learn how to interface the devices with a virtual world built in a standard game engine such as Unreal. The course will be project based giving the opportunity to work with VR and AR goggles.

Prerequisites: ECE 250 or CS 250 or (CS 251 and CS 260) or equivalent

ECE 515 Parallel Computing for High-Performance Data Analytics (3 Credit Hours)

Introduction to modeling and analysis of parallel execution performance of emerging simulations on modern high-performance (HPC) and Cloud computing platforms. Hands-on experience with Old Dominion University campus HPC clusters and Cloud-based platforms available globally. Programming models for large-scale and data-analytics applications. Case studies of realistic parallel scientific, engineering, and data-analytics simulations. Course projects may be assigned for students to apply the gained knowledge to analyze execution efficiency of a parallel distributed simulation.

Prerequisites: ENGN 122 or equivalent

ECE 516 Cyber Defense Fundamentals (3 Credit Hours)

This course focuses on cybersecurity theory, information protection and assurance, and computer systems and networks security. The objectives are to understand the basic security models and concepts, learn fundamental knowledge and tools for building, analyzing, and attacking modern security systems, and gain hands-on experience in cryptographic algorithms, security fundamental principles, and Internet security protocol and standards. (Offered fall)

Prerequisites: Permission of the instructor

Pre- or corequisite: ECE 355

ECE 518 Transportation Simulation and Analytics (3 Credit Hours)

This course is designed to introduce students to i) the fundamental concepts of transportation simulation; ii) traffic simulation models for the planning, design, and operations of modern transportation systems; iii) approaches to develop, calibrate, and validate transportation simulation models; and iv) methods to design and analysis of transportation simulation experiments. This course emphasizes the modeling, simulation, and analysis of emerging mobility systems such as connected/autonomous vehicles, electrical vehicles, and micro-mobility. The structured lectures and hands-on work with the simulation tools provide students the ability and practical experience to solve complex, real-world transportation problems with simulation.

Prerequisites: ECE 250, or CS 250, or CS 251 and CS 260, and ECE 306

ECE 519 Cyber Physical System Security (3 Credit Hours)

Cyber Physical Systems (CPS) integrate computing, networking, and physical processes. The objectives of this course are to learn the basic concepts, technologies and applications of CPS, understand the fundamental CPS security challenges and national security impact, and gain hands-on experience in CPS infrastructures, critical vulnerabilities, and practical countermeasures. (Offered spring)

Prerequisites: ECE 355 or permission of the instructor

ECE 530 Therapy and Function Models for Medical Simulation (3 Credit Hours)

This course introduces students to the main Modeling & Simulation models. (1) Anatomical modeling based on robust medical image segmentation and meshing methodologies. (2) A therapy model to determine the impact of a medical intervention by synthesizing the effect of a therapy on the patient's tissues. (3) A collision model, which interacts with anatomy and therapy models, is used for haptics-driven simulations. This course will also explore physiological simulation and the use of finite elements to model biomechanics.

Prerequisites: ECE 250 or CS 250 or CS 251 and CS 260 or equivalent

ECE 541 Advanced Digital Design and Field Programmable Gate Arrays (3 Credit Hours)

Course will present FPGA technologies and methods using CAD design tools for implementation of digital systems using FPGAs. Topics include advanced methods of digital circuit design including specification, synthesis, implementation and prototyping; managing multiple clock domains, static timing analysis, timing closure, system reset design, simulation, and optimization; troubleshooting using embedded logic analyzers and integrated development environments (IDEs). Practical system design examples include general purpose data processing, system on a chip (SOC) prototyping, hardware accelerators, and an introduction to domain specific architectures. (Offered spring)

Prerequisites: ECE 342

ECE 543 Computer Architecture (3 Credit Hours)

An introduction to computer architectures. Analysis and design of computer subsystems including central processing units, memories and input/output subsystems. With features based on the ARM CPU architecture, students will learn important concepts, including data paths, computer arithmetic, instruction cycles, pipelining, virtual and cache memories, direct memory access and controller design. (Offered fall).

Prerequisites: ECE 346

Pre- or corequisite: ECE 342

ECE 545 Introduction to Computer Vision (3 Credit Hours)

Overview of digital image processing including visual perception, image formation, spatial transformations, image enhancement, color image representation and processing, edge detection, image segmentation, and data processing method for computer vision applications. Hand-on projects will be introduced to better understand computer vision applications. (Offered fall)

Prerequisites: A grade of C or better in either ENGN 122 or ENGN 150 or CS 150 and a grade of C or better in ECE 304

ECE 550 Introduction to Machine Learning Engineering (3 Credit Hours)

Machine Learning provides a practical treatment of design, analysis and implementation of algorithms, which learn from examples. Topics include multiple machine learning models: linear regression, logistic regression, neural networks, support vector machines, deep learning, Bayesian learning and unsupervised learning. Students are expected to use popular machine learning tools and algorithms to solve real data engineering problems. (Offered spring)

Prerequisites: ECE 304 and a grade of C or better in either ENGN 122 or ENGN 150 or CS 150 or CS 151 or CS 153

ECE 551 Communication Systems (3 Credit Hours)

Fundamentals of communication systems engineering. Modulation methods including continuous waveform modulation (amplitude, angle). Design and analysis of modulation systems and the performance in the presence of noise. Communication simulation exercises through computer experiments. (Offered spring)

Prerequisites: ECE 304 and ECE 302

ECE 552 Introduction to Wireless Communication Networks (3 Credit Hours)

Introduction to current wireless network technologies and standards. The radio frequency spectrum and radio wave propagation models (pathloss, fading, and multipath). The radio link and link budgets. Modulation, diversity, and multiple access techniques. Wireless network planning and operation. Current and emerging wireless technologies (satellite systems, vehicular/sensor networks). (Offered fall)

Prerequisites: ECE 304 and ECE 302

ECE 553 Analysis for Modeling and Simulation (3 Credit Hours)

An introduction to analysis techniques appropriate to the conduct of modeling and simulation studies. Topics include input modeling, random number generation, output analysis, variance reduction techniques, and experimental design. In addition, techniques for verification & validation are introduced. Course concepts are applied to real systems and data.

Prerequisites: ECE 306 and ECE 304

ECE 554 Introduction to Bioelectrics (3 Credit Hours)

Covers the electrical properties of cells and tissues as well as the use of electrical and magnetic signals and stimuli in the diagnosis and treatment of disease. Typical topics to be covered include basic cell physiology, endogenous electric fields in the body, electrocardiography, cardiac pacing, defibrillation, electrotherapy, electroporation, electrotherapy in wound healing. In addition, ultrashort electrical pulses for intracellular manipulation and the application of plasmas to biological systems will be covered.

Prerequisites: PHYS 111N or higher; MATH 200 or higher

ECE 555 Network Engineering and Design (3 Credit Hours)

Emphasis is on gaining an understanding of networking design principles that entails all aspects of the network development life cycle. Topics include campus LAN models and design, VLANs, internetworking principles and design, WAN design, design of hybrid IP networks, differentiated vs. integrated services, traffic flow measurement and management. (offered spring)

Prerequisites: ECE 355 or permission of the instructor

ECE 558 Instrumentation (3 Credit Hours)

Computer interfacing using a graphical programming language with applications involving digital-to-analog conversion (DAC), analog-to-digital conversion (ADC), digital input output (DIO), Virtual Instrument System Architecture (VISA) and universal Service Bus (USB). Analysis of sampled data involving use of probability density function, mean and standard derivations, correlations, and the power spectrum. (offered spring, summer)

Prerequisites: ECE 302 or permission of the instructor

ECE 561 Automatic Control Systems (3 Credit Hours)

This course introduces the fundamental principles and methodologies of feedback control of linear systems. Learn to analyze and design current control systems found in automobiles, aircraft, autonomous vehicles, robots, and many other engineering systems. The course introduces time and frequency domain techniques including root locus, Bode, Nyquist and state space methods together with computer-aided analysis and design. These topics serve as a foundation for further studies in, for example, automation, electrical drives, power electronics, and robotics. (Offered fall)

Prerequisites: ECE 202

ECE 562 Introduction to Medical Image Analysis (MIA) (3 Credit Hours)

Introduction to basic concepts in medical image analysis. Medical image registration, segmentation, feature extraction, and classification are discussed. Basic psychophysics, fundamental ROC analysis and FROC methodologies are covered. (Offered every other spring)

Prerequisites: a grade of C or better in MATH 212

ECE 563 Design and Modeling of Autonomous Robotic Systems (3 Credit Hours)

This course focuses on autonomous robotics systems with emphasis on using modeling and simulation (M&S) for system level design and testing. Fundamental concepts associated with autonomous robotic systems are discussed. Course topics include: robotic control, architectures, and sensors as well as more advanced concepts such as error propagation, localization, mapping and autonomy. Design strategies that leverage M&S to accelerate the development and testing of sophisticated autonomous robotic algorithms for individual or teams of robots are covered.

Prerequisites: CS 150 or ENGN 122 or ENGN 150

ECE 564 Biomedical Applications of Low Temperature Plasmas (3 Credit Hours)

This course is cross listed between ECE, BME and BIOL. It is designed to be taken by senior undergraduate students and first year graduate students. The course contents are multidisciplinary, combining materials from engineering and the biological sciences. The course covers an introduction to the fundamentals of non-equilibrium plasmas, low temperature plasma sources, and cell biology. This is followed by a detailed discussion of the interaction of low temperature plasma with biological cells, both prokaryotes and eukaryotes. Potential applications in medicine such as wound healing, blood coagulation, sterilization, and the killing of various types of cancer cells will be covered. (Offered fall)

Prerequisites: Senior standing

ECE 568 Realtime Interactive Simulation and Visualization (3 Credit Hours)

This course is designed to provide students with advanced knowledge and skills in the field of real-time interactive simulation and visualization using the Unreal game engine with emphasis on applications for engineering and sciences. Topics covered include 3D computer graphics theory fundamentals, software architecture, user interaction, physics engine, artificial intelligence, animation, visual representations of complex data, cross-platform development (desktop, mobile, VR/AR). Applications include robotics simulation, transportation simulation, serious games, medical simulation, virtual laboratories, among others.

Prerequisites: ECE 250 or CS 250 or CS 251 and CS 260 or equivalent

ECE 570 Foundations of Cyber Security (3 Credit Hours)

Course provides an overview of theory, tools and practice of cyber security and information assurance through prevention, detection and modeling of cyber attacks and recovery from such attacks. Techniques for security modeling, attack modeling, risk analysis and cost-benefit analysis are described to manage the security of cyber systems. Fundamental principles of cyber security and their applications for protecting software and information assets of individual computers and large networked systems are explored. Anatomy of some sample attacks designed to compromise confidentiality, integrity and availability of cyber systems are discussed. (Offered fall).

Prerequisites: A grade of C or better in ENGN 122 or ENGN 150 or CS 150 and junior standing or permission of the instructor

ECE 571 Introduction to Solar Cells (3 Credit Hours)

This course is designed to provide the fundamental physics and characteristics of photovoltaic materials and devices. A focus is placed on i) optical interaction, absorption, and design for photovoltaic materials and systems, ii) subsequent energy conversion processes in inorganic/organic semiconductor such as generation, recombination, and charge transport, and iii) photovoltaic testing and measurement techniques to characterize solar cells including contact and series resistance, open circuit voltage, short circuit current density, fill factor, and energy conversion efficiency of photovoltaic devices. (Offered fall)

Prerequisites: ECE 332

ECE 572 Plasma Processing at the Nanoscale (3 Credit Hours)

The science and design of partially ionized plasma and plasma processing devices used in applications such as etching and deposition at the nanoscale. Gas phase collisions, transport parameters, DC and RF glow discharges, the plasma sheath, sputtering, etching, and plasma deposition.

Prerequisites: ECE 323

ECE 573 Solid State Electronics (3 Credit Hours)

The objective of this course is to understand basic semiconductor devices by understanding semiconductor physics (energy bands, carrier statistics, recombination and carrier drift and diffusion) and to gain an advanced understanding of the physics and fundamental operation of advanced semiconductor devices. Following the initial introductory chapters on semiconductor physics, this course will focus on the theory of p-n junctions, metal-semiconductor Schottky diodes, MOS capacitors, MOS field effect transistors (MOSFET) and bipolar junction transistors (BJTs). (Offered fall)

Prerequisites: ECE 313, ECE 323, ECE 332 and MATH 212

ECE 574 Optical Fiber Communications (3 Credit Hours)

This course introduces seniors and first year graduates to the physics and design of optical fiber communication systems. The topics covered are: electromagnetic waves; optical sources including laser diodes; optical amplifiers; modulators; optical fibers; attenuation and dispersion in optical fibers; photodetectors; optical receivers; noise considerations in optical receivers; optical communication systems.

Prerequisites: ECE 323

ECE 575 Transportation Data Analytics (3 Credit Hours)

This course presents the basic techniques for transportation data analytics. It will discuss statistical modeling, prominent algorithms, and visualization approaches to analyze both small- and large-scale data sets generated from transportation systems. Practices of using different data for various real-world traffic/transportation applications and decision making will also be discussed.

Prerequisites: STAT 330 or ECE 304

ECE 583 Embedded Systems (3 Credit Hours)

This course covers fundamentals of embedded systems: basic architecture, programming, and design. Topics include processors and hardware for embedded systems, embedded programming and real time operating systems. (Offered fall)

Pre- or corequisite: ECE 346

ECE 595 Topics in Electrical and Computer Engineering (1-3 Credit Hours)

Study of topics in electrical and computer engineering.

Prerequisites: departmental approval

ECE 596 Topics in Electrical and Computer Engineering (1-3 Credit Hours)

Study of topics in electrical and computer engineering.

Prerequisites: departmental approval

ECE 601 Linear Systems (3 Credit Hours)

A comprehensive introduction to the analysis of linear dynamical systems from an input-output and state space point of view. Concepts from linear algebra, numerical linear algebra and linear operator theory are used throughout. Some elements of state feedback design and state estimation are also covered.

Prerequisites: MATH 307

ECE 607 Machine Learning I (3 Credit Hours)

Course provides a practical treatment of design, analysis, implementation and applications of algorithms. Topics include multiple machine learning models: linear models, neural networks, support vector machines, instance-based learning, Bayesian learning, genetic algorithms, ensemble learning, reinforcement learning, unsupervised learning, etc.

Prerequisites: Graduate standing

ECE 611 Numerical Methods in Engineering Analysis (3 Credit Hours)

Course intended to provide graduate students in Electrical and Computer Engineering with a basic knowledge of numerical methods applied to engineering problem-solving process. The course includes the following topics: Introduction to computing (Matlab), Truncation errors and Taylor series, Numerical integration, Solution of non-linear equations, Least-Square regression, Interpolations, Ordinary and partial differential equations, and Finite difference methods. Applications to the area of electrical engineering.

Prerequisites: Graduate standing or advisor's permission (for BS/MS students)

ECE 612 Digital Signal Processing I (3 Credit Hours)

This course covers fundamentals of digital signal processing. Topics include frequency domain analysis of discrete-time signals and linear systems, sampling and reconstruction of signals, the Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), and digital filter design and implementations. Practical applications and examples will be discussed. Problem solving using MATLAB is required.

Prerequisites: ECE 381 or equivalent

ECE 623 Electromagnetism (3 Credit Hours)

Review of electrostatic and magnetostatic concepts, time varying field, Maxwell's equations, plane wave propagation in various media, transmission lines, optical wave guides, resonant cavities, simple radiation systems, and their engineering applications.

Prerequisites: ECE 323 or equivalent

ECE 642 Computer Networking (3 Credit Hours)

The course is based on the ISO (International Standard Organization) OSI (Open Systems Interconnection) reference model for computer networks. A focus is placed on the analysis of protocols at different layers, network architectures, and networking systems performance analysis. Current topic areas include LANs, MANs, TCP/IP networks, mobile communications, and ATM.

Prerequisites: ECE 455 or ECE 555 or permission of the instructor

ECE 643 Computer Architecture Design (3 Credit Hours)

Digital computer design principles. The course focuses on design of state-of-the-art computing systems. An emphasis is placed on superscalar architectures focusing on the pipelining and out-of-order instruction execution operations.

Prerequisites: ECE 443 or ECE 543

ECE 648 Advanced Digital Design (3 Credit Hours)

This course introduces methods for using high level hardware description language such as VHDL and/or Verilog for the design of digital architecture. Topics include top-down design approaches, virtual prototyping, design abstractions, hardware modeling techniques, algorithmic and register level design, synthesis methods, and application decomposition issues. Final design project is required.

Prerequisites: ECE 341

ECE 651 Statistical Analysis and Simulation (3 Credit Hours)

An introduction to probabilistic and statistical techniques for analysis of signals and systems. This includes a review of probability spaces, random variables, and random processes. Analysis and simulation of systems with random parameters and stochastic inputs are considered.

Prerequisites: MATH 312 and one undergraduate course in probability or statistics or permission of instructor

ECE 652 Wireless Communications Networks (3 Credit Hours)

Fundamental concepts in wireless communication systems and networks: radio waveform propagation modeling (free-space, reflections and multipath, fading, diffraction and Doppler effects); physical and statistical models for wireless channels; modulation schemes for wireless communications and bandwidth considerations; diversity techniques; MIMO systems and space-time coding; multiuser systems and multiple access techniques (TDMA, FDMA, CDMA); spread spectrum and multiuser detection; introduction to wireless networking and wireless standards; current and emerging wireless technologies.

Prerequisites: ECE 451 or ECE 551 or permission of instructor

ECE 667 Cooperative Education (1-3 Credit Hours)

Student participation for credit based on academic relevance of the work experience, criteria, and evaluative procedures as formally determined by the department prior to the semester in which the work experience is to take place.

ECE 668 Internship (1-3 Credit Hours)

Academic requirements will be established by the department and will vary with the amount of credit desired. Allows students an opportunity to gain short duration career related experience. Meant to be used for one-time experience. Work may or may not be paid. Project is completed during the term.

Prerequisites: Approval by department is required; Additional support may be provided by the Monarch Internship and Co-Op Office in the semester prior to enrollment

ECE 669 Practicum (1-3 Credit Hours)

Academic requirements will be established by the department and will vary with the amount of credit desired. Allows students an opportunity to gain short duration career related experience. Student is usually already employed - this is an additional project in the organization.

Prerequisites: Approval by department is required; Additional support may be provided by the Monarch Internship and Co-Op Office in the semester prior to enrollment

ECE 695 Topics in Electrical or Computer Engineering (3 Credit Hours)

This course will be offered as needed, depending upon the need to introduce special subjects to target specific areas of master's-level specializations in electrical or computer engineering.

ECE 698 Master's Project (1-3 Credit Hours)

Individual project directed by the student's professor in major area of study.

ECE 699 Thesis (1-9 Credit Hours)

Directed research for the master's thesis.

Prerequisites: departmental approval

ECE 731 Graduate Seminar (1 Credit Hour)

Graduate seminar presentations, given by faculty, students, and invited speakers on a diverse range of technical topics of current interest. A selection of topics will help students prepare for an academic career at a university, liberal arts college, private college, or community college. These selected speakers will also present topics to help students develop essential teaching skills. Student speakers will receive advice and comments from faculties on their communication skills before and after their presentation.

Prerequisites: graduate standing

ECE 742 Computer Communication Networks (3 Credit Hours)

This is an advanced level course in data communications. A focus is placed on the analysis, modeling, and control of computer communication systems. Topics include packet switched networks, circuit switched networks, ATM networks, network programming, network control and performance analysis, network security, and wireless sensor networks.

Prerequisites: ECE 642 or permission of instructor

ECE 754 Advanced Bioelectrics (3 Credit Hours)

Bioelectrics is a new field encompassing both the science and technology of applying electrical stimuli to biological systems. This course covers the pulsed power technology that is required to generate electrical stimuli as well as the biological responses they evoke in cells and tissues. Particular emphasis is placed on the medical applications of bioelectrics, including tumor ablation, gene electrotransfer, wound healing, decontamination with cold plasma, and treatment of cardiac arrhythmias.

Prerequisites: ECE 454 or ECE 554 or BIOE 454 or BIOE 554

ECE 755 Biomembranes and Ion Channels (3 Credit Hours)

This course will give an overview of the structure and dynamics of biomembranes, the ion channels that are embedded in them, and the electrical properties of biomembranes. Topics include molecular dynamics modeling of biomembranes, membrane damage and repair, ion channel dynamics and their experimental assessment using patch clamping, and excitability in neurons and cardiomyocytes.

Prerequisites: ECE 454 or ECE 554 or BIOL 523

ECE 762 Digital Control Systems (3 Credit Hours)

Mathematical representation, analysis, and design of discrete-time and sampled-data control systems. Topics include transfer function and state space representations, stability, the root locus method, frequency response methods, and state feedback.

Prerequisites: ECE 381, ECE 461 or ECE 561, and ECE 601 or permission of instructor

ECE 763 Multivariable Control Systems (3 Credit Hours)

A comprehensive introduction to techniques applicable in control of complex systems with multiple inputs and outputs. Both the frequency domain and state variable approaches are utilized. Special topics include robust and optimal control.

Prerequisites: ECE 461 or ECE 561 and ECE 601 or permission of instructor

ECE 766 Nonlinear Control Systems (3 Credit Hours)

An introduction to mathematical representation, analysis, and design of nonlinear control systems. Topics include phase-plane analysis, Lyapunov stability theory for autonomous and nonautonomous systems, formal power series methods and differential geometric design techniques.

Prerequisites: ECE 461 or ECE 561 and ECE 601 or permission of instructor

ECE 772 Fundamentals of Solar Cells (3 Credit Hours)

The course provides an overview of the fundamentals of solar cell technologies, design, and operation. The course is designed for graduate students in Engineering and Science interested in the field of alternative energy. The course objectives are to make sure each student: understands the various forms of alternative energies, understands solar cell design, understands solar cell operation, and acquires knowledge of the various solar cells technologies. The topics to be covered include: Alternative energies; Worldwide status of Photovoltaics; Solar irradiance; Review of semiconductor properties; Generation, recombination; Basic equations of device physics; p-n junction diodes; Ideal solar cells; Efficiency limits; Efficiency losses and measurements; Module fabrication; c-Si technology; classical; Photovoltaic systems; Design of stand-alone system; Residential PV systems.

Prerequisites: Graduate standing in Engineering and Science

ECE 773 Introduction to Nanotechnologies (3 Credit Hours)

This course will introduce the rapidly emerging field of nanotechnology with special focus on underlying principles and applications relevant to the nanoscale dimensions. Specifically, this course will cover (1) the basic principles related to synthesis and fabrication of nanomaterials and nanostructures, (2) zero-, one-, two- and three-dimensional nanostructures, (3) characterization and properties of nanomaterials, and (4) application of nanoscale devices.

Prerequisites: graduate standing in Engineering and Science

ECE 774 Semiconductor Characterization (3 Credit Hours)

Introduction of basic methods for semiconductor material and device characterization. Topics include resistivity, carrier doping concentration, contact resistance, Schottky barrier height, series resistance, channel length, threshold voltage, mobility, oxide and interface trapped charge, deep level impurities, carrier lifetime, and optical, chemical and physical characterization.

Prerequisites: ECE 473 or ECE 573 or equivalent

ECE 775 Non-thermal Plasma Engineering (3 Credit Hours)

This course covers the fundamental principals governing low temperature plasma discharges and their applications. First the fundamental properties of plasmas are introduced. These include the kinetic theory of gases, collisional processes, and plasma sheaths. Then in-depth coverage of the physical mechanisms underlying the operation of non-equilibrium plasma discharges is presented, including important characteristics such as their ignition, evolution, and eventual quenching. Finally, practical applications of non-thermal plasmas, including applications in biology and medicine, are presented.

Prerequisites: graduate standing

ECE 777 Semiconductor Process Technology (3 Credit Hours)

Theory, design and fabrication of modern integrated circuits that consist of nano scale devices and materials. Topics include crystal growth and wafer preparation process including epitaxy, thin film deposition, oxidation, diffusion, ion implantation, lithography, dry etching, VLSI process integration, diagnostic assembly and packaging, yield and reliability.

Prerequisites: ECE 473 or ECE 573

ECE 780 Machine Learning II (3 Credit Hours)

Advanced topics in machine learning and pattern recognition systems. Data reduction techniques including principle component analysis, independent component analysis and manifold learning. Introduction to sparse coding and deep learning for data representation and feature extraction.

Prerequisites: ECE 607 or equivalent

ECE 782 Digital Signal Processing II (3 Credit Hours)

Review of fundamental concepts in digital signal processing: time and frequency domain analysis of discrete time signals and systems, Fourier transforms (DFT/FFT), digital filters, analysis, design, and implementation. Recursive and non-recursive digital filter analysis and design. Multirate signal processing. Random signal modeling and parameter estimation. Signal estimation, orthogonality and normal equations, optimal linear filters. Spectrum estimation. Problem solving using MATLAB is required.

Prerequisites: ECE 612 or equivalent

ECE 783 Digital Image Processing (3 Credit Hours)

Principles and techniques of two-dimensional processing of images. Concepts of scale and spatial frequency. Image filtering in spatial and transform domains. Applications include image enhancement and restoration, image compressing, and image segmentation for computer vision.

Prerequisites: ECE 381 or ECE 612 or ECE 782 or ECE 882

ECE 784 Computer Vision (3 Credit Hours)

Principles and applications of computer vision, advanced image processing techniques as applied to computer vision problems, shape analysis and object recognition.

Prerequisites: graduate standing

ECE 787 Digital Communications (3 Credit Hours)

Fundamental concepts of digital communication and information transmission: information sources and source coding; orthonormal expansions of signals, basis functions, and signal space concepts; digital modulation techniques including PAM, QAM, PSK and FSK; matched filters, demodulation and optimal detection of symbols and sequences; bandwidth; mathematical modeling of communication channels; channel capacity.

Prerequisites: ECE 451/ECE 551 or equivalent or permission of the instructor

ECE 795 Topics in Electrical and Computer Engineering (3 Credit Hours)

Topics in Electrical and Computer Engineering

Prerequisites: departmental approval

ECE 796 Topics in Electrical and Computer Engineering (3 Credit Hours)

Study of selected topics in Electrical and Computer Engineering.

Prerequisites: departmental approval

ECE 797 Independent Study (1-3 Credit Hours)

This course allows students to develop specialized expertise by independent study (supervised by a faculty member).

Prerequisites: departmental approval

ECE 831 Graduate Seminar (1 Credit Hour)

Graduate seminar presentations, given by faculty, students, and invited speakers on a diverse range of technical topics of current interest. A selection of topics will help students prepare for an academic career at a university, liberal arts college, private college, or community college. These selected speakers will also present topics to help students develop essential teaching skills. Student speakers will receive advice and comments from faculties on their communication skills before and after their presentation.

ECE 842 Computer Communication Networks (3 Credit Hours)

This is an advanced level course in data communications. A focus is placed on the analysis, modeling, and control of computer communication systems. Topics include packet switched networks, circuit switched networks, ATM networks, network programming, network control and performance analysis, network security, and wireless sensor networks.

Prerequisites: ECE 642 or permission of instructor

ECE 854 Advanced Bioelectrics (3 Credit Hours)

Bioelectrics is a new field encompassing both the science and technology of applying electrical stimuli to biological systems. This course covers the pulsed power technology that is required to generate electrical stimuli as well as the biological responses they evoke in cells and tissues. Particular emphasis is placed on the medical applications of bioelectrics, including tumor ablation, gene electrotransfer, wound healing, decontamination with cold plasma, and treatment of cardiac arrhythmias.

Prerequisites: ECE 454 or ECE 554 or BIOE 454 and BIOE 554

ECE 855 Biomembranes and Ion Channels (3 Credit Hours)

This course will give an overview of the structure and dynamics of biomembranes, the ion channels that are embedded in them, and the electrical properties of biomembranes. Topics include molecular dynamics modeling of biomembranes, membrane damage and repair, ion channel dynamics and their experimental assessment using patch clamping, and excitability in neurons and cardiomyocytes.

Prerequisites: ECE 454 or ECE 554 or BIOL 523

ECE 861 Advanced Probabilistic Methods for Electrical and Computer Engineering (3 Credit Hours)

This course focuses on three common problems in electrical and computer engineering that are best addressed using probabilistic methods: detecting the absence or presence of a signal in noise, estimating unknown parameters using noisy measurements, and allocating limited resources when demand is uncertain. Applications include computer networks, communication systems, control systems, power distribution networks, and biomedical systems. In each case, specific algorithms are presented for solving these problems along with the supporting analysis for predicting their performance.

Prerequisites: ECE 651

ECE 862 Digital Control Systems (3 Credit Hours)

Mathematical representation, analysis, and design of discrete-time and sampled-data control systems. Topics include transfer function and state space representations, stability, the root locus method, frequency response methods, and state feedback.

Prerequisites: ECE 381, ECE 461 or ECE 561, and ECE 601 or permission of instructor

ECE 863 Multivariable Control Systems (3 Credit Hours)

A comprehensive introduction to techniques applicable in control of complex systems with multiple inputs and outputs. Both the frequency domain and state variable approaches are utilized. Special topics include robust and optimal control.

Prerequisites: ECE 461 or ECE 561 and ECE 601 or permission of the instructor

ECE 866 Nonlinear Control Systems (3 Credit Hours)

An introduction to mathematical representation, analysis, and design of nonlinear control systems. Topics include phase-plane analysis, Lyapunov stability theory for autonomous and nonautonomous systems, formal power series methods and differential geometric design techniques.

Prerequisites: ECE 461 or ECE 561 and ECE 601 or permission of instructor

ECE 872 Fundamentals of Solar Cells (3 Credit Hours)

The course provides an overview of the fundamentals of solar cell technologies, design, and operation. The course is designed for graduate students in Engineering and Science interested in the field of alternative energy. The course objectives are to make sure each student: understands the various forms of alternative energies, understands solar cell design, understands solar cell operation, and acquires knowledge of the various solar cells technologies. The topics to be covered include: Alternative energies; Worldwide status of Photovoltaics; Solar irradiance; Review of semiconductor properties; Generation, recombination; Basic equations of device physics; p-n junction diodes; Ideal solar cells; Efficiency limits; Efficiency losses and measurements; Module fabrication; c-Si technology; classical; Photovoltaic systems; Design of stand-alone system; Residential PV systems.

Prerequisites: Graduate standing in Engineering and Science

ECE 873 Introduction to Nanotechnologies (3 Credit Hours)

This course will introduce the rapidly emerging field of nanotechnology with special focus on underlying principles and applications relevant to the nanoscale dimensions. Specifically, this course will cover (1) the basic principles related to synthesis and fabrication of nanomaterials and nanostructures, (2) zero-, one-, two- and three-dimensional nanostructures, (3) characterization and properties of nanomaterials, and (4) application of nanoscale devices.

Prerequisites: graduate standing in Engineering and Science

ECE 874 Semiconductor Characterization (3 Credit Hours)

Introduction of basic methods for semiconductor material and device characterization. Topics include resistivity, carrier doping concentration, contact resistance, Schottky barrier height, series resistance, channel length, threshold voltage, mobility, oxide and interface trapped charge, deep level impurities, carrier lifetime, and optical, chemical and physical characterization.

Prerequisites: ECE 473 or ECE 573 or equivalent

ECE 875 Non-thermal Plasma Engineering (3 Credit Hours)

This course covers the fundamental principals governing low temperature plasma discharges and their applications. First the fundamental properties of plasmas are introduced. These include the kinetic theory of gases, collisional processes, and plasma sheaths. Then in-depth coverage of the physical mechanisms underlying the operation of non-equilibrium plasma discharges is presented, including important characteristics such as their ignition, evolution, and eventual quenching. Finally, practical applications of non-thermal plasmas, including applications in biology and medicine, are presented.

Prerequisites: graduate standing

ECE 877 Semiconductor Process Technology (3 Credit Hours)

Theory, design and fabrication of modern integrated circuits that consist of nano scale devices and materials. Topics include crystal growth and wafer preparation process including epitaxy, thin film deposition, oxidation, diffusion, ion implantation, lithography, dry etching, VLSI process integration, diagnostic assembly and packaging, yield and reliability.

Prerequisites: ECE 473 or ECE 573

ECE 880 Machine Learning II (3 Credit Hours)

Advanced topics in machine learning and pattern recognition systems. Data reduction techniques including principle component analysis, independent component analysis and manifold learning. Introduction to sparse coding and deep learning for data representation and feature extraction.

Prerequisites: ECE 607 or equivalent

ECE 882 Digital Signal Processing II (3 Credit Hours)

Review of fundamental concepts in digital signal processing: time and frequency domain analysis of discrete time signals and systems, Fourier transforms (DFT/FFT), digital filters, analysis, design, and implementation. Recursive and non-recursive digital filter analysis and design. Multirate signal processing. Random signal modeling and parameter estimation. Signal estimation, orthogonality and normal equations, optimal linear filters. Spectrum estimation. Problem solving using MATLAB is required.

Prerequisites: ECE 612 or equivalent

ECE 883 Digital Image Processing (3 Credit Hours)

Principles and techniques of two-dimensional processing of images. Concepts of scale and spatial frequency. Image filtering in spatial and transform domains. Applications include image enhancement and restoration, image compressing, and image segmentation for computer vision.

Prerequisites: ECE 381 or ECE 612 or ECE 782 or ECE 882

ECE 884 Computer Vision (3 Credit Hours)

Principles and applications of computer vision, advanced image processing techniques as applied to computer vision problems, shape analysis and object recognition.

Prerequisites: Graduate standing

ECE 887 Digital Communications (3 Credit Hours)

Fundamental concepts of digital communication and information transmission: information sources and source coding; orthonormal expansions of signals, basis functions, and signal space concepts; digital modulation techniques including PAM, QAM, PSK and FSK; matched filters, demodulation and optimal detection of symbols and sequences; bandwidth; mathematical modeling of communication channels; channel capacity.

Prerequisites: ECE 451/ECE 551 or equivalent or permission of the instructor

ECE 892 Doctor of Engineering Project (1-12 Credit Hours)

Directed individual study applying advanced level technical knowledge to identify, formulate, and solve a complex, novel problem in electrical and computer engineering.

ECE 895 Topics in Electrical and Computer Engineering (3 Credit Hours)

Topics in Electrical and Computer Engineering.

Prerequisites: departmental approval

ECE 896 Topics in Electrical and Computer Engineering (3 Credit Hours)

Topics in Electrical and Computer Engineering

ECE 897 Independent Study (1-3 Credit Hours)

This course allows students to develop specialized expertise by independent study (supervised by a faculty member)

Prerequisites: departmental approval

ECE 899 Dissertation Research (1-9 Credit Hours)

Directed research for the doctoral dissertation.

Prerequisites: departmental approval

ECE 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

ECE 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

ECON - Economics

ECON 502 Transportation Economics (3 Credit Hours)

A survey of the transportation system in the United States including its development, pricing, and regulation. Special attention is given to railroads, highways, pipeline, water and air transportation; and the roles that these modes of transportation play in economic development.

ECON 507 Labor Market Economics (3 Credit Hours)

Economic analysis of various facets of labor markets. Emphasis is placed on the analysis of labor supply, labor demand, wage determination, earnings differentials and inequality, occupational choice, human capital investment, labor market discrimination, mobility and immigration, impact of unions, and unemployment.

ECON 510 Economics for Managers (3 Credit Hours)

Managerial economics applies key economic principles to decision making in business organizations. This course provides insight into consumer and business behavior and allows an improved understanding of how the external business environment can shape how businesses operate. Economics, at its core, a way of thinking about problems, courses of action, and the impact of decisions. Economics stresses the important of incentives as determinants of consumer and business behavior and stresses the interaction between costs and benefits in the margin with respect to decision making.

Prerequisites: Admission to the MBA program OR approval by the MBA program office/instructor

ECON 521 Public Economics (3 Credit Hours)

This course examines the interaction between government and the economy, with particular emphasis on the role of the federal government. Topics that address the motivation for government involvement in the economy include market failure, income inequality, and redistribution of income. Specific programs studied include Medicare/Medicaid, welfare programs, and the social security system.

ECON 527 Industrial Organization and Public Policy (3 Credit Hours)

A study of market structures and the conduct and performance of business firms in different market structures. The emphasis is on the theory and measurement of industrial concentration and public policy responses to industrial concentration.

ECON 531 Money and Banking (3 Credit Hours)

Examines the nature and functions of money and credit, the commercial banking system, the Federal Reserve System, the quantity theory of money, the theory of income determination, the balance of payments and exchange rates, and the history of monetary policy in the United States.

ECON 535 Health Economics: A Global Perspective (3 Credit Hours)

This course introduces the student to the economics of health care and the application of health economics to health care problems, the issues surrounding those problems, and the potential solutions to those problems. The course will emphasize institutional features of the health care industry, the market for health care, the political economy of health care, and government involvement in the delivery of health care. Further, the course will survey the delivery of health care in other countries and provide a global perspective on selected health care issues such as AIDS, water and air quality, and the aging of the population.

ECON 536 Sports Economics (3 Credit Hours)

This course introduces the student to the economics of sports in America. The course will emphasize institutional features of the sport industry. Specific topics included are: sports franchises as profit-maximizing firms; monopoly and antitrust rules as applied to the sports industry; public finance of sports; costs and benefits of a sports franchise to a city; the labor economics of professional sports; discrimination in sports; and the economics of college sports. This course may not be applied toward the major in economics as an economics elective or toward the minor in economics or the M.A. in economics. (It could, however, be used as a non-economics elective for the major.)

ECON 545 Urban Economics (3 Credit Hours)

An analysis of the economic factors which give rise to the formation of urban centers and which contribute to the following problems: urban poverty, housing conditions, traffic congestion, and the fiscal crisis faced by modern cities.

ECON 547 Natural Resource and Environmental Economics (3 Credit Hours)

Topics discussed include conservation and scarcity, market failure, fishery management, benefit-cost analysis, water resource development, environmental quality, recreation, energy, and marine resources.

ECON 551 History of Economic Thought (3 Credit Hours)

A study of the history of economic theory with attention to the economic ideas and philosophy of Adam Smith, David Ricardo, Karl Marx, J.M. Keynes and other major figures in the development of economics.

ECON 554 Economic Development (3 Credit Hours)

This course is intended to provide an introduction to the problems of economic development in the Third World, including the problems of economic growth, income distribution, poverty, urbanization, uneven development, agricultural policy, economic planning, industrial policy, trade policy, balance of payments, finance, and currency crises. To illustrate these issues we will examine the problems of certain individual countries, such as Brazil, Korea, Philippines, India, Mexico, Kenya, Indonesia, and Thailand. In the course we try to strike a balance between economic theory and institutional economics.

ECON 555 Comparative Economic Systems (3 Credit Hours)

This course examines and compares different economies from around the world, including such economies as the UK, France, Germany, Sweden, Japan, India, Korea, Russia, and China. Students look at the economic growth, GDP per capita, unemployment, inflation, income distribution, economic efficiency, institutions, policies, industrial structure, legal infrastructure, and international trade of these economies. Students study the functioning of markets and the problems of market and government failure. The course addresses the question, what is the best way to organize society?

ECON 595 Selected Topics in Economics (1-3 Credit Hours)

Taught on an occasional basis. A study of selected topics, the title of which will appear in the course schedule.

Prerequisites: Permission of the instructor

ECON 620 Economic Decision-Making (3 Credit Hours)

This course examines the economics of successful businesses and successful business strategies. During this course, students will examine the sources of competitive advantage, how competition evolves over time, and the dynamics of competitive advantage. Students will explore how firms interact with each other and how these strategic interactions shape markets. At the end of this course, students will have a broader understanding of how firms operate in markets and the interactions between consumer and business behavior.

Prerequisites: ECON 510, or MBA 606 and ECON 607

ECON 625 Mathematical Economics (3 Credit Hours)

This course focuses on the use of mathematical techniques in solving complex economic problems. Primary emphasis is given to matrix algebra, differential calculus, constrained optimization techniques and dynamic optimization techniques.

ECON 650 International Economics (3 Credit Hours)

An analysis of international trade theory, commercial policy, foreign exchange markets, open economy macroeconomics, and balance of payments. The course provides the theoretical basis to understand contemporary international economic issues. (Credit may not be applied toward the M.A. in economics.)

ECON 668 Economics Internship (1-3 Credit Hours)

The course is a practicum in the field of economics applying theories, concepts, and quantitative tools in a professional environment.

Prerequisites: Twelve hours of economics and permission of the graduate program director

ECON 695 Selected Topics in Economics (1-3 Credit Hours)

Advanced topics in economics specifically designed for school teachers. (Credit may not be applied toward the M.A. in economics or the MBA.)

Prerequisites: Permission of the instructor

ECON 696 Selected Topics in Economics (1-3 Credit Hours)

Advanced topics in economics are covered in this course.

ECON 697 Readings in Economics (3 Credit Hours)

Individual readings in a selected field under the direction of a faculty member of the department.

ECON 698 Economic Methodology and Research (3 Credit Hours)

Students writing the capstone empirical research paper will take this course. Under the supervision of a faculty member, students will discuss theoretical models, analytical techniques, data analysis, and policy recommendations resulting from their capstone research project.

ECON 699 Thesis (6 Credit Hours)

Directed research for thesis.

ECON 700 Economic Analytics (3 Credit Hours)

This course provides the skills necessary to successfully identify, acquire, manage, and analyze economic data. The course primarily focuses on the application of statistical methods in support of economic analysis. During the course, students will (1) develop research hypotheses; (2) identify data to test the hypotheses; (3) utilize coding to access and obtain data, (4) use descriptive statistics to discuss the properties of the data, (5) explore the bivariate least squares estimator, and (6) interpret and present the results of economic analysis.

ECON 701 Advanced Microeconomic Analysis (3 Credit Hours)

This course considers microeconomic theory as a means of organizing the behavior of individuals and firms in economic settings. The course provides the theoretical framework for microeconomic research in business and in government. The theory of the household and the theory of the firm will be presented in detail along with consideration of distribution theory and welfare theory. The material will be presented with the aid of graphical techniques, logic, calculus, matrix algebra, and optimization techniques.

Pre- or corequisite: ECON 625 or equivalent

ECON 703 Advanced Macroeconomic Analysis (3 Credit Hours)

This course presents classical and modern macroeconomic models, including the Solow growth model, the Ramsey infinite horizon model, the overlapping generations model, and the endogenous growth model. The course also explores classical and modern models of monetary policy. This course provides students with mathematical and analytical tools and techniques to analyze macroeconomic issues including the impact of monetary and fiscal policy and the interaction among inflation, unemployment, and interest rates.

Pre- or corequisite: ECON 625 or equivalent

ECON 706 Econometrics I (3 Credit Hours)

Single-equation econometric models; serial correlation, heteroscedasticity, specification error, missing observations, and errors-in-variables and forecasting.

Pre- or corequisite: ECON 625 or equivalent

ECON 707 Econometrics II (3 Credit Hours)

Multi-equation econometric models; problems such as identification, single-equation estimation, estimation of equation systems, and model evaluation techniques; time-series models such as autoregressive and moving average models; forecasting with time-series models.

Prerequisites: ECON 706 or equivalent

ECON 708 Econometrics III (3 Credit Hours)

Issues in cross-section and panel data, focuses on problems such as selection bias, heterogeneity, unobserved heterogeneity, treatment effects, truncation and censoring. The course covers multivariate techniques such as principal component analysis and factor analysis, along with event studies and nonparametric and semiparametric estimators.

Pre- or corequisite: ECON 706 or equivalent

ECON 752 International Trade (3 Credit Hours)

Pure theory of international trade, mathematical models of trade, instruments of trade policy, theory and practice of economic integration, trade liberalization issues from international and regional viewpoints.

Prerequisites: ECON 604 or ECON 650 or equivalent

ECON 754 Economic Development (3 Credit Hours)

Introduction to the problems of economic development in the third world, including the problems of economic growth, income distribution, poverty, urbanization, uneven development, agricultural policy, economic planning, industrial policy, trade policy, balance of payments, finance, and currency crises.

Prerequisites: ECON 604 or ECON 650

ECON 795 Selected Topics in Economics (1-3 Credit Hours)

Designed to provide the advanced student with an opportunity to study independently or in small groups and investigate specific topics of current interest in the field of economics.

Prerequisites: Ph.D. standing and permission of the chair and coordinator

ECON 801 Advanced Microeconomic Analysis (3 Credit Hours)

This course considers microeconomic theory as a means of organizing the behavior of individuals and firms in economic settings. The course provides the theoretical framework for microeconomic research in business and in government. The theory of the household and the theory of the firm will be presented in detail along with consideration of distribution theory and welfare theory. The material will be presented with the aid of graphical techniques, logic, calculus, matrix algebra, and optimization techniques.

Prerequisites: ECON 607 or equivalent

Pre- or corequisite: ECON 625 or equivalent

ECON 803 Advanced Macroeconomic Analysis (3 Credit Hours)

This course presents classical and modern macroeconomic models, including the Solow growth model, the Ramsey infinite horizon model, the overlapping generations model, and the endogenous growth model. The course also explores classical and modern models of monetary policy. This course provides students with mathematical and analytical tools and techniques to analyze macroeconomic issues including the impact of monetary and fiscal policy and the interaction among inflation, unemployment, and interest rates.

Prerequisites: ECON 618 or equivalent

Pre- or corequisite: ECON 625 or equivalent

ECON 806 Econometrics I (3 Credit Hours)

Single-equation econometric models; serial correlation, heteroscedasticity, specification error, missing observations, and errors-in-variables and forecasting.

Pre- or corequisite: ECON 625 or equivalent

ECON 807 Econometrics II (3 Credit Hours)

Multi-equation econometric models; problems such as identification, single-equation estimation, estimation of equation systems, and model evaluation techniques; time-series models such as autoregressive and moving average models; forecasting with time-series models.

Prerequisites: ECON 806 or equivalent

ECON 808 Econometrics III (3 Credit Hours)

Issues in cross-section and panel data, focuses on problems such as selection bias, heterogeneity, unobserved heterogeneity, treatment effects, truncation and censoring. The course covers multivariate techniques such as principal component analysis and factor analysis, along with event studies and nonparametric and semiparametric estimators.

Pre- or corequisite: ECON 806 or equivalent

ECON 852 International Trade (3 Credit Hours)

Pure theory of international trade, mathematical models of trade, instruments of trade policy, theory and practice of economic integration, trade liberalization issues from international and regional viewpoints.

Prerequisites: ECON 604 or ECON 650 or equivalent

ECON 854 Economic Development (3 Credit Hours)

Introduction to the problems of economic development in the third world, including the problems of economic growth, income distribution, poverty, urbanization, uneven development, agricultural policy, economic planning, industrial policy, trade policy, balance of payments, finance, and currency crises.

Prerequisites: ECON 604 or ECON 650

ECON 895 Selected Topics in Economics (1-3 Credit Hours)

Designed to provide the advanced student with an opportunity to study independently or in small groups and investigate specific topics of current interest in the field of economics.

Prerequisites: Ph.D. standing and permission of the chair and coordinator

ECON 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

ECON 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

EDUC - Education

EDUC 649 Foundations and History of Education (3 Credit Hours)

This seminar explores foundational ideas of democratic education. While focusing on the contexts and conditions of contemporary education, it traces the roots of educational theory and philosophy from the formation of the common school to the policy reforms of the 21st century. This look at the present through the past provides insight into the interactions between social, economic, political, ideological, and environmental factors and its impact on the purposes of education, school curriculum and ideas of measurement and evaluation. Students will be expected to consider the implications of/ for democratic education, historically and presently, as it relates to issues of race, class, gender, and multiculturalism.

ELS - Educational Leadership and Services

ELS 596 Topics in Education (1-3 Credit Hours)

The College of Education offers selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly.

Prerequisites: permission of the instructor

ELS 597 Topics in Education (1-3 Credit Hours)

The College of Education offers selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly.

Prerequisites: permission of the instructor

ELS 598 Topics in Education (1-3 Credit Hours)

The College of Education offers selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly.

Prerequisites: permission of the instructor

ELS 623 Design of Service Delivery Plans to Meet the Needs of Military Connected Children and Families (4 Credit Hours)

Students will apply their foundational and assessment knowledge for supporting military students to a capstone project in service delivery program design. This course will engage participants in surveying and considering a range of services, program elements, and strategies that may be employed to improve educational, social, and emotional school experiences for children of military-related families. Participants will engage in processes for selecting and preparing to implement optimal support strategies and structures to meet the identified needs of military students in their school setting. They will become familiar with and prepared to craft specific plans to utilize, for the benefit of military children, their peers and families: (a) various school, community, and government services; (b) classroom- and school-based programs designed to improve academic achievement and/or emotional well-being; and (c) classroom- and school-based strategies for designing and implementing programs and services that meet the needs of these children and their families.

Prerequisites: FOUN 662 and acceptance into the Military Child and Family Education Certificate Program or approval from the certificate program director

ELS 660 Program Evaluation, Research and Planning (3 Credit Hours)

In this course principal licensure candidates learn to identify organizational needs, develop research-based strategies to address those needs, and use data-driven planning to implement, monitor, and manage processes involved in implementing change strategies.

Prerequisites: ELS 600

ELS 667 Cooperative Education (1-3 Credit Hours)

Cooperative Education.

ELS 668 Internship in Educational Leadership (3-6 Credit Hours)

The internship is designed to establish a bond between theory and practice, while providing opportunities for independent and guided practice, feedback, coaching, and reflection. Ultimately, it will engage prospective administrators in planned and coordinated active learning experiences. Pre- or

Corequisites: ELS 700 or ELS 800

ELS 669 Instructional Internship (3 Credit Hours)

Each internship course will require students to complete a minimum of 160 hours in each course. Course is designed to provide field experiences which will prepare them to serve as instructional and curriculum leadership in K-12 environments. Student must produce 1) a portfolio with required artifacts; 2) prepare a 10-12 reflective paper according to identified guidelines and 3) complete internship evaluation with mentor and college supervisor at least three times during the term.

Prerequisites: ELS 673

ELS 673 Critical Issues Research (3 Credit Hours)

The student completes an in-depth study of a critical issue in his/her profession and documents the work in a critical issue paper. Student must be able to demonstrate written and oral communication skills and critical and analytical skills in dealing with a major issue in educational leadership. Course to be taken near completion of program.

Prerequisites: ELS 600, ELS 610, ELS 621, ELS 626, and ELS 660

ELS 697 Topics in Educational Leadership (1-6 Credit Hours)

The study of selected topics in educational leadership. Arranged individually with students.

ELS 700 Strategic Leadership and Management for School Improvement (3 Credit Hours)

This course is designed to give students entering the ODU Licensure program an understanding of the complex roles and challenges of a school principal, while focusing on the constantly changing nature of administrative responsibility. Students develop an integrated view of the knowledge base, research and practice of administration within a context of multiple perspectives and a wide range of thinking. The purpose of the course is to increase understanding of education, the role of educational administration, the forces that are moving education into a new era, the transitions that are occurring, and the use of the latest, best practices to improve the education of all children.

ELS 701 Accountability and Organizational Improvement (3 Credit Hours)

This course is an in-depth study of effective data based decision-making practices for contemporary school leaders. Formative and summative data based decision making practices will be explored, as well as how to work with large and small groups of staff members to analyze multiple measures of data and create school improvement designs for student and school success. An emphasis is placed on using data to make decisions at the division, school, and classroom levels.

Prerequisites: ELS 700

ELS 702 Educational Politics and Policymaking (3 Credit Hours)

This course teaches aspiring school leaders how politics and policy shapes school-based decision making and how school leaders can influence politics and policy processes to improve learning environments for children. The course focuses contemporary problems that confront school leaders as they work to improve the conditions of learning for their students, faculty and staff. To effectively address and solve problems school leaders need to understand the processes of policymaking at various educational levels and to develop the relevant skills of policymaking needed at the school level. Thus, this course addresses the following three essential principles of educational politics and policy as they apply to school level administrators: political and policy dynamics that influence their work in schools; accurately identify, diagnose, and develop the right solutions to the right problems in order to achieve instructional goals of the school and division; and confront, engage in, and effectively deal with conflict (i.e., politics) emanating from within the school, division, or community in order to achieve school and division learning goals.

Prerequisites: ELS 700

ELS 710 Strategic Communication and External Relations (3 Credit Hours)

This course serves as an introduction for prospective administrators to the social and political context of the educational environment. The underlying concept of this course is collaboration. Today's administrators face a variety of multifaceted challenges in their daily routines. Therefore, they must recognize the impact of political, socioeconomic situations, community diversity, equity issues, and school community relations on their leadership practices.

Prerequisites: ELS 700

ELS 727 Learning Theories and Professional Development (3 Credit Hours)

This course exposes students to the essential elements of instructional leadership. Central to the skills and knowledge necessary to be an effective instructional leader are a deep understanding of the learning sciences that inform us about the essence of effective teaching. Effective instructional leaders have a solid basis for assessing and promoting high quality instruction, giving them the tools to proactively build a school's organizational capacity of sustained growth in student achievement. Students will engage in reading, reflection, dialog, writing, problem solving and field-work, designed to build an understanding of how these topics are intrinsically tied to supporting teachers in their classrooms through facilitating better understandings of standards and accountability, effective lesson planning and curriculum development, assessment and grading, classroom management and discipline.

Prerequisites: ELS 700

ELS 728 Instructional Leadership and Supervision (3 Credit Hours)

This course develops student's skills, knowledge and dispositions in the area of instructional leadership. Students will explore how effective instructional leaders can use their integrated knowledge of quality instruction and the core principles of learning to set the mission and vision for the school, facilitate school improvement planning and professional development and finally how instructional supervision is used to integrate these activities and support the growth of individual teachers as well as building organizational capacity. Effective instructional leaders have a solid basis for assessing and promoting high quality instruction, giving them the tools to proactively build a school's organizational capacity for sustained growth in student achievement. Students will engage in reading, reflection, dialog, writing, problem solving and field-work, designed to help them build an integrated understanding of those leadership practices that help support teacher instructional growth and those that build organizational capacity for sustained improvement.

Prerequisites: ELS 700

ELS 753 Educational Finance and Budgeting (3 Credit Hours)

This course examines how public schools are financed, including an analysis of the sources of revenues, the distribution of revenue, and the budgeting and expenditure of revenue. Special emphasis will be placed on the Virginia funding formula, education as an investment in human capital, and how funding relates to student achievement. Students will learn the fiscal management skills and understandings necessary to manage the finances of a school or school system, including the study of system and school procedures related to budget planning, budget management, internal school account management, inventory control, and purchasing procedures.

Prerequisites: ELS 700

ELS 757 Educational Law and Ethics (3 Credit Hours)

This course is an introduction to law, particularly with respect to federal and state statutes and court decisions dealing with the public schools. The topics span a wide spectrum of law-related concerns. The study of law is intended to be practical by providing the legal understanding necessary for a school administrator to negotiate his or her way through the maze of difficult legal and ethical matters commonly faced each day.

Prerequisites: ELS 600 or ELS 700

ELS 787 Pupil Personnel Services for Diverse Populations (3 Credit Hours)

This course focuses on the theories and skills that leaders need in order to administer the broad array of special services (i.e., special education, bilingual programming, counseling, and psychological, social work, and therapy services) so that students with all diverse needs are included in regular education.

ELS 795 Topics in Educational Leadership (1-3 Credit Hours)

Study of selected topics in educational leadership.

Prerequisites: permission of the instructor

ELS 797 Topics in Educational Leadership (1-3 Credit Hours)

Topics in Educational Leadership.

ELS 800 Strategic Leadership and Management for School Improvement (3 Credit Hours)

This course is designed to give students entering the ODU Licensure program an understanding of the complex roles and challenges of a school principal, while focusing on the constantly changing nature of administrative responsibility. Students develop an integrated view of the knowledge base, research and practice of administration within a context of multiple perspectives and a wide range of thinking. The purpose of the course is to increase understanding of education, the role of educational administration, the forces that are moving education into a new era, the transitions that are occurring, and the use of the latest, best practices to improve the education of all children.

ELS 801 Accountability and Organizational Improvement (3 Credit Hours)

This course is an in-depth study of effective data based decision-making practices for contemporary school leaders. Formative and summative data based decision making practices will be explored, as well as how to work with large and small groups of staff members to analyze multiple measures of data and create school improvement designs for student and school success. An emphasis is placed on using data to make decisions at the division, school, and classroom levels.

Prerequisites: ELS 700 or ELS 800

ELS 802 Educational Politics and Policymaking (3 Credit Hours)

This course teaches aspiring school leaders how politics and policy shapes school-based decision making and how school leaders can influence politics and policy processes to improve learning environments for children. The course focuses contemporary problems that confront school leaders as they work to improve the conditions of learning for their students, faculty, and staff. To effectively address and solve problems school leaders need to understand the processes of policymaking at various educational levels and to develop the relevant skills of policymaking needed at the school level. Thus, this course addresses the following three essential principles of educational politics and policy as they apply to school level administrators: political and policy dynamics that influence their work in schools; accurately identify, diagnose, and develop the right solutions to the right problems in order to achieve instructional goals of the school and division; and confront, engage in, and effectively deal with conflict (i.e., politics) emanating from within the school, division, or community in order to achieve school and division learning goals.

Prerequisites: ELS 700 or ELS 800

ELS 810 Strategic Communication and External Relations (3 Credit Hours)

This course serves as an introduction for prospective administrators to the social and political context of the educational environment. The underlying concept of this course is collaboration. Today's administrators face a variety of multifaceted challenges in their daily routines. Therefore, they must recognize the impact of political, socioeconomic situations, community diversity, equity issues, and school community relations on their leadership practices.

Prerequisites: ELS 700 or ELS 800

ELS 811 Leadership Theory for Educational Improvement (3 Credit Hours)

This course provides the necessary knowledge to become an integral part of the educational improvement process at the school, division, and state levels. Students will analyze and relate the significant educational trends of the past 20 years to the political process, analyzing the impact on school planning. Students will take an active and vocal role in the discourse and debate about educational policy and practice. Emphasis will be placed on analyzing the context and implementing planning systems to develop mission, goals and programs that result in educational improvement.

ELS 815 Leadership for Equity and Inclusive Education (3 Credit Hours)

This course focuses on the theories and practices that help educational leaders ensure that students with special needs receive an equitable and inclusive education. Emphasis is on perspectives of difference versus deviance, historical foundations of specialized programs, current social and legal contexts that influence programming, questions of social justice, and possibilities for the inclusion of all students. While this course addresses the needs of all students, concentration is on individuals with disabilities and the laws that safeguard their rights.

ELS 821 Policy and Politics in Educational Leadership (3 Credit Hours)

This course focuses on the theories and practices needed to build relationships and support from the state political process, the local community, businesses, and media. Emphasis will be placed on the use of influence, and its impact on relationships, policies, and programs. Focus is placed on developing a shared vision to bring schools and communities together as partners in improving student learning. Two-way communication mechanisms for school improvement using political influence and power are examined.

Prerequisites: ELS 811

ELS 827 Learning Theories and Professional Development (3 Credit Hours)

This course exposes students to the essential elements of instructional leadership. Central to the skills and knowledge necessary to be an effective instructional leader are a deep understanding of the learning sciences that inform us about the essence of effective teaching. Effective instructional leaders have a solid basis for assessing and promoting high quality instruction, giving them the tools to proactively build a school's organizational capacity of sustained growth in student achievement. Students will engage in reading, reflection, dialog, writing, problem solving and field-work, designed to build an understanding of how these topics are intrinsically tied to supporting teachers in their classrooms through facilitating better understandings of standards and accountability, effective lesson planning and curriculum development, assessment and grading, classroom management and discipline.

Prerequisites: ELS 700 or ELS 800

ELS 828 Instructional Leadership and Supervision (3 Credit Hours)

This course develops student's skills, knowledge and dispositions in the area of instructional leadership. Students will explore how effective instructional leaders can use their integrated knowledge of quality instruction and the core principles of learning to set the mission and vision for the school, facilitate school improvement planning and professional development and finally how instructional supervision is used to integrate these activities and support the growth of individual teachers as well as building organizational capacity. Effective instructional leaders have a solid basis for assessing and promoting high quality instruction, giving them the tools to proactively build a school's organizational capacity for sustained growth in student achievement. Students will engage in reading, reflection, dialog, writing, problem solving and field-work, designed to help them build an integrated understanding of those leadership practices that help support teacher instructional growth and those that build organizational capacity for sustained improvement.

Prerequisites: ELS 700 or ELS 800

ELS 831 Accountability Systems in Public Education (3 Credit Hours)

This course addresses the design, development, implementation, and alignment of public education accountability systems at the federal, state, and local levels. Particular attention is given to how the design and implementation of accountability systems affects educational equity and school reform efforts.

Prerequisites: ELS 660 and ELS 880

ELS 835 Organizational Theory and Behavior in Education (3 Credit Hours)

This course includes the psychology of organizational behaviors, theories of managing people, individual and organizational learning, individual motivation and organizational behavior, interpersonal communications and perceptions, group dynamics, problem management, managing multigroup work, managing diversity, leadership and organizational culture, leadership and decision making, the effective exercise of power and influence, supervision and employee development, organizational analysis, and managing change.

ELS 853 Educational Finance and Budgeting (3 Credit Hours)

This course examines how public schools are financed, including an analysis of the sources of revenues, the distribution of revenue, and the budgeting and expenditure of revenue. Special emphasis will be placed on the Virginia funding formula, education as an investment in human capital, and how funding relates to student achievement. Students will learn the fiscal management skills and understandings necessary to manage the finances of a school or school system, including the study of system and school procedures related to budget planning, budget management, internal school account management, inventory control, and purchasing procedures.

Prerequisites: ELS 600 or ELS 700 or ELS 800

ELS 857 Educational Law and Ethics (3 Credit Hours)

This course is an introduction to law, particularly with respect to federal and state statutes and court decisions dealing with the public schools. The topics span a wide spectrum of law-related concerns. The study of law is intended to be practical by providing the legal understanding necessary for a school administrator to negotiate his or her way through the maze of difficult legal and ethical matters commonly faced each day.

Prerequisites: ELS 700 or ELS 800

ELS 869 Instructional Internship (3 Credit Hours)

Course is designed to provide field experiences that will prepare students to serve as instructional and curriculum leadership in K-12 environments. Student must 1) produce a portfolio with required artifacts; 2) prepare a 10-12 page reflective paper according to identified guidelines and 3) complete internship evaluation with mentor and college supervisor at least three times during the term. Each internship course will require students to complete a minimum of 160 hours.

Prerequisites: ELS 673

ELS 871 Educational Systems Planning and Futures (3 Credit Hours)

The course covers the theoretical framework of strategic, operational, cooperative and future planning in education, leading to the development of a cyclic planning process which includes the appropriate tasks, steps and skills to effect administrative and policy change.

ELS 874 Advanced School Finance, and Operations (3 Credit Hours)

This course examines social justice issues related to the financial, political, and operational aspects of America's public schools. The politics of current legislation, court cases, finances, and operations of the school system are included.

Prerequisites: ELS 753/ELS 853 or equivalent

ELS 876 Leadership for Social Justice (3 Credit Hours)

In this course, students study and engage in dialogue related to the critical role of education in a democratic society in a rapidly changing and increasingly complex world. Through a focused discussion of theories and concepts such as democratic schools, social justice, critical theory and power, feminism, critical race theory, and difference/normalization, students come to understand the possible roles education can play in society and their need to continuously reflect on their own vision for leadership in public schools.

ELS 878 Leadership for Teaching and Learning (3 Credit Hours)

In this course, participants examine what is currently known and explore what needs to be known about pedagogy in a context of school renewal. The foundational perspective for the course is social justice in which course participants seek ways to transform teaching/instruction so that all schools work for all students particularly those students who historically have been disenfranchised from receiving an equitable education.

ELS 879 Field Research in School Administration and Supervision (3 Credit Hours)

Field study approach to problems related to school administration and supervision.

Prerequisites: a master's degree

ELS 880 Multicultural Curriculum Leadership and Globalization (3 Credit Hours)

This course examines social justice issues related to the curriculum leadership aspect of America's public schools and abroad. This course is designed to provide advanced understanding of the curriculum development process through conception, implementation, and evaluation with a particular focus on multiculturalism. Theoretical and philosophical bases of curriculum development are addressed as well as current trends including brain-based learning, multiculturalism, globalization, organizational thinking and the strategic change process.

ELS 883 Contemporary Issues in Education (3 Credit Hours)

This course is a survey of current issues in education, as well as the political, financial, and social issues affecting education leadership. The course will explore relationships between current issues, historical perspectives, philosophical theories, and sociologic influences. The exploration of contemporary issues related to equity and achievement will serve as a critical component of the class.

ELS 895 Topics in Educational Leadership (1-3 Credit Hours)

Study of selected topics in educational leadership.

Prerequisites: permission of the instructor

ELS 896 Topics in Urban Educational Leadership (1-3 Credit Hours)

Study of selected topics in urban educational leadership.

Prerequisites: master's degree and permission of the instructor

ELS 897 Topics in Educational Leadership (1-3 Credit Hours)

Independent Study, topics in Educational Leadership.

ELS 899 Dissertation (1-12 Credit Hours)

1-12 credits.

Prerequisites: permission of faculty advisor

ELS 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

ELS 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

ENGL - English

ENGL 506 The Teaching of Literature (3 Credit Hours)

This course is designed to provide an intensive examination of issues, approaches, and methods utilized in the teaching of literature, particularly literature written for children and young adults.

ENGL 507 Chaucer's Canterbury Tales (3 Credit Hours)

A study of The Canterbury Tales with an introduction to Middle English language and culture.

ENGL 516 English Renaissance Drama (3 Credit Hours)

An extensive survey of the secular national dramas of Renaissance England that were written and performed by Shakespeare's contemporaries in London between 1576 and 1642. Students study the literary features, social contexts and ideological underpinning of representative works by Kyd, Marlowe, Jonson, Webster, Ford, and others.

ENGL 518 Jewish Writers (3 Credit Hours)

This course introduces students to the Jewish literary traditions and the cultural trends shaping these traditions and the Jewish identity. It will examine the impact of such issues as immigration, family, marginality, the Holocaust, assimilation, cultural diversity, feminism, Israel, race and religion. Readings will include short stories, poems, essays, novels, and autobiographical writing.

ENGL 519 The Harlem Renaissance (3 Credit Hours)

The class provides students with a solid grasp of the Harlem Renaissance: what it was, why it came to be, and how it continues to resonate in American culture. Students will gain a greater understanding of this period and the ways in which the artistic endeavors of the Harlem Renaissance - especially the literature - helped to transform that era and make possible the growing respect for diversity that we now enjoy.

ENGL 521 British Literature 1660-1800 (3 Credit Hours)

British literature from the Restoration of the monarchy after the Civil War and Puritan Commonwealth to the French Revolution, focusing on how cultural changes (legalized female actors, commercialized printing, colonialism, and growing market capitalism) interacted with the flowering of satire and scandalous theatrical comedy, and the emergence of modern literary forms (periodical journalism, "picturesque" poetry, and the novel).

ENGL 523 The Romantic Movement in Britain (3 Credit Hours)

A study of the literature written in Britain between 1770-1830, focusing on how the literary experiments and innovations of poets like Blake, Wordsworth, Coleridge, Byron, Percy Shelley, Keats, Burns, and Barbauld, and of novelists like Mary Shelley, Radcliffe, and Scott interacted with cultural changes such as the Industrial Revolution, the French Revolution, and the emergence of feminism and working-class radicalism.

ENGL 527 Writing in the Disciplines (3 Credit Hours)

This is a discussion/workshop course emphasizing contexts and strategies of text production in and across academic disciplines and professional settings. Students will produce a variety of texts designed to meet the needs of specific audiences.

ENGL 532 Origins and Early Development of the British Novel to 1800 (3 Credit Hours)

A study of early British novels and how the novel genre developed from and in relation to other traditions such as the epic, romance, criminal biography, periodical journalism, and travel narrative.

ENGL 533 Victorian Literature (3 Credit Hours)

A study of the chief writers and the cultural and philosophical backgrounds of the Victorian era, touching on the changes from the early to the later part of the period. Works analyzed include fiction, nonfiction prose, and poetry.

ENGL 535 Management Writing (3 Credit Hours)

This course focuses on writing as a means of making and presenting management decisions.

ENGL 536 Writing for the Government (3 Credit Hours)

This course will focus on writing for a number of government agencies through the application of rhetorical theory. The course will apply theory to practice in the process of assessing audience, context, and genre, as well as ethical writing practices.

ENGL 538 The Twentieth-Century British Novel (3 Credit Hours)

Examination and analysis of a variety of novels in their editorial and cultural contexts.

ENGL 539 Writing in Digital Spaces (3 Credit Hours)

This course will teach students the rhetorically sound development of digital media for a range of audiences within a variety of possible digital contexts through discussion of accessibility and the application of fundamentals of usability studies.

ENGL 540 General Linguistics (3 Credit Hours)

An introduction to linguistic analysis of world languages. Emphasis is on the analysis of sound systems (phonetics, phonology) and the structure of words and sentences (morphology and syntax).

ENGL 541 American Travel Literature (3 Credit Hours)

This is a survey course that examines the American experience, American identity and American culture through travel "texts" that include prose, poetry, art, and film. The course takes an interdisciplinary American Studies approach, using lenses such as race, gender, and class.

ENGL 542 English Grammar (3 Credit Hours)

This course is a descriptive study of English grammar as it relates to the contexts in which it is used, with implication for grammar pedagogy and TESOL classrooms.

ENGL 543 Southern and African American English (3 Credit Hours)

This course focuses on the linguistic diversity of the American South, with an emphasis on different dialects and cultures throughout the region. In addition to consideration of the variation in the language system, it examines the social salience of stigmatized Southern varieties and dialect discrimination, directed towards Southern and African American speakers both inside and out of the South.

ENGL 544 History of the English Language (3 Credit Hours)

A study of the origins and development of the English language. Focus is on the changes of sounds, words, and language structures across time, with deep consideration of the social and cultural factors that shape the history of English.

ENGL 545 Forensic linguistics (3 Credit Hours)

The course is an introduction to forensic linguistics—the application of linguistic analysis to language as used in legal contexts (e.g., federal, state, and local code, legal documents, government and the judicial process, etc.). Course topics include interaction in the legal process (interviews, interrogations, courtroom discourse), authorship analysis, speaker identification and profiling, multilingualism, trademarks and product warnings, language and sexual crimes, and terrorism. Students become familiar with debates in the forensic domain, theoretical issues, and tools of analysis that are suited to forensic work.

ENGL 547 The American Novel to 1920 (3 Credit Hours)

Examination of the American novel from its origins in the late eighteenth century through World War I. The course will emphasize the novel as a genre, cultural trends during the period, and such relevant literary modes as romanticism, realism, and naturalism.

ENGL 548 The American Novel 1920 to Present (3 Credit Hours)

Examination of the American novel from the end of World War I to the present day. The course will emphasize formal issues related to the genre of the novel and relevant literary and cultural trends during the period including modernism and postmodernism.

ENGL 549 Craft of Literary Nonfiction (3 Credit Hours)

A detailed study of technique in literary nonfiction with an emphasis on the memoir, the essay, reportage, and travel narrative. Especially designed for, but not limited to, creative writing students; supplements the creative writing workshops.

ENGL 550 American English (3 Credit Hours)

When people think of 'American English,' they usually have a standard form in mind. In this course, we focus on the variety of ways English is spoken in the U.S. and the social meaning of that variation. We also discuss language-based discrimination and strategies that can be used to confront it. Models for collecting, describing, and analyzing variation in American English are introduced and applied to real-life situations.

ENGL 551 Advanced Fiction Workshop (3 Credit Hours)

This course, an expansion of the principles and techniques learned in ENGL 451, focuses on the writing and criticism of the short story, the novella, and the novel. May be repeated for credit.

ENGL 552 Advanced Poetry Workshop (3 Credit Hours)

This course, an expansion of the principles and techniques learned in ENGL 452, focuses on the writing and criticism of poetry. May be repeated for credit.

Prerequisites: ENGL 352 or permission of the instructor, based on writing samples submitted

ENGL 554 Creative Nonfiction (3 Credit Hours)

A course in the techniques of writing nonfiction imaginatively within a factual context. Emphasis is placed on concern for reader psychology, selection of significant detail, and the development of a style at once lively and lucid. Assignments are made individually with regard to the student's field of interest - history, biography, science, politics, informal essay, etc. Advice is given on the marketing of promising manuscripts. May be repeated for credit.

Prerequisites: ENGL 327W or ENGL 351 or permission of the instructor, based on writing samples submitted

ENGL 555 The Teaching of Composition, Grades 6-12 (3 Credit Hours)

A study of the theory and practice of teaching writing. Special attention will be given to the ways effective teachers allow theories and experiences to inform their pedagogical strategies.

ENGL 556 The Craft of Fiction (3 Credit Hours)

A detailed study of fictional technique in the novel and short story, with emphasis on character development, conflict, point of view, plot, setting, mood, tone, and diction. Especially designed for, but not limited to, creative writing students; supplements the creative writing workshops.

ENGL 557 The Craft of Poetry (3 Credit Hours)

A detailed study of technique in poetry, with emphasis on form, imagery, rhythm, and symbolism. Especially designed for, but not limited to, creative writing students; supplements the creative writing workshops.

ENGL 559 New Literatures in English (3 Credit Hours)

A study of the diverse 'new' literatures in English of the Caribbean and Central America, Africa, India, as well as of Canada and Australia, in their current historical and political contexts.

ENGL 561 American Poetry of the Early Twentieth Century (3 Credit Hours)

Works of important American poets from 1900-1945 are studied.

ENGL 563 Women Writers (3 Credit Hours)

This course applies concepts developed through women's and gender studies scholarship using intersectional feminist frameworks that acknowledge the socially constructed nature of the word 'woman' to interpret and analyze works by writers who identify as women and speak from diverse perspectives. This is a writing intensive course.

ENGL 564 Native American Literature (3 Credit Hours)

This class offers an investigation of Native American literature both past and present and seeks to foster an appreciation for indigenous cultures, traditions, and the ongoing concerns that inform so much of Native literary output. By privileging Native centered approaches to narrative and history-keeping, the course hopes to promote a greater understanding of the issues Native peoples faced in the colonial milieu and the continued implications of those histories for Native communities and indigenous identities today.

ENGL 565 African-American Literature (3 Credit Hours)

An investigation of how African American literature has innovated, influenced, and been influenced by literary movements, historical events, social transitions, and political upheavals.

ENGL 566 Asian American Literature (3 Credit Hours)

The course introduces students to key texts in Asian American literature, supported by critical studies (and on occasion films) to interrogate the theme of Asian American identities in their multiple forms. The course will examine sociopolitical histories that undercut the literature, and the contributions of Asian American writers to the breadth and scope of American as well as global literatures today.

Prerequisites: Permission of the instructor

ENGL 573 Writing with Video (3 Credit Hours)

This course engages students in a comprehensive exploration of video as a rhetorical narrative medium, with emphasis on the actual production of video work. Writing is also integrated into the production process. From brainstorming to storyboarding and critique, writing is positioned as an integral part of the course.

ENGL 577 Language, Gender and Power (3 Credit Hours)

This class explores social hierarchy through the lenses of language and power. Using the metaphor of the 'cultural food chain' for the social order (gender, race, class, sexual orientation, and other aspects of personhood), we examine how language is central to reproducing hierarchies as well as confronting and disrupting them.

ENGL 582 Sports Journalism (3 Credit Hours)

This is primarily a sportswriting course in which students are introduced to various types and styles of sports stories that are representative of sports journalism as practiced in newspapers and magazines. The course also explores the role of sports in American society.

ENGL 583 Reporting and News Writing II (3 Credit Hours)

Designed to familiarize students with the fundamentals of beat reporting and its practice in the multi-media environment of 'converged' newsrooms. The course emphatically focuses on writing but also provides instruction on how the tools and techniques of multimedia platforms are used to enhance storytelling. Emphasis is also placed on accessing information through web-based resources and government documents.

ENGL 584 Feature Story Writing (3 Credit Hours)

Course includes discussion and practice of writing a variety of newspaper and magazine feature stories. Students will write and critique stories on people, places, businesses, trends, and issues. Assistance is given in the marketing of manuscripts.

ENGL 585 Editorial and Persuasive Writing (3 Credit Hours)

A study of the practice and function of writing editorials, commentary, reviews and columns for newspapers and online media. Lectures will focus on the techniques of crafting a persuasive argument, content analyses of Pulitzer Prize-winning editorials and columns, and guest lectures by newspaper editorial writers.

ENGL 586 Media Law and Ethics (3 Credit Hours)

Designed to introduce students to components of communication law that may affect the professional writer or broadcaster. Topics include defamation, constitutional constraints, freedom of information, privacy, copyright, and telecommunications law. Ethical issues relating to the mass media will also be examined.

ENGL 590 Professionalization in English (1-3 Credit Hours)

Advanced study of career opportunities and industry trends across a variety of fields, with a focus on reflection, synthesis, and professional development. Students will prepare a major project—as well as materials for career or educational advancement—and will discuss the nature, purpose, and value of an English degree.

Prerequisites: restricted to MA in English students

ENGL 592 Modern World Drama (3 Credit Hours)

A comparative study of selected major dramatic works of the world, featuring texts drawn from a range of cultures from around the globe. The course will begin in the late nineteenth century and continue to the present. Works written in languages other than English will be read in translation.

ENGL 593 Contemporary World Literature (3 Credit Hours)

Fiction, poetry, and plays written during the last fifty years in nations throughout the world. Most texts will have been written originally in languages other than English. The course will focus on the comparative study of works produced in a variety of cultural contexts, and will explore a range of approaches to defining or circumscribing world literature.

ENGL 595 Topics in English (1-3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, because of their specialized nature, may not be offered regularly. These courses will appear in the course schedule and will be more fully described in information distributed to all academic advisors.

ENGL 596 Topics in English (1-3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, because of their specialized nature, may not be offered regularly. These courses will appear in the course schedule and will be more fully described in information distributed to all academic advisors.

Prerequisites: Permission of the instructor

ENGL 600 Introduction to Research and Criticism (3 Credit Hours)

Required of most graduate students in English, usually in the first semester. Survey of English as an academic discipline; issues and trends in scholarly journals; research strategies and conventions for graduate-level papers and master's theses; critical approaches to literature.

ENGL 615 Shakespeare (3 Credit Hours)

An application of advanced theoretical and critical approaches to Shakespeare's works. May be repeated more than once for credit if different group of works or themes is being studied.

ENGL 642 Nineteenth-Century British Novel (3 Credit Hours)

A study of 19th Century British novels in context of the economic, social, and political issues of the period, emphasizing their formal and aesthetic concerns.

ENGL 650 Creative Writing (3 Credit Hours)

Guided study and practice in writing short stories, novels, poetry, and creative nonfiction, offered in specific sections of Fiction, Poetry, and Nonfiction. This course can be repeated for credit. Students planning to write a creative thesis must take this course at least twice with their thesis director.

Prerequisites: Admission to the MFA program and permission of the instructor

ENGL 659 American Literature 1945-Present (3 Credit Hours)

Intensive study of a variety of texts from several genres reflecting the historical forces, aesthetic movements, social trends, and representative works of the period.

ENGL 660 Craft of Literary Forms (3 Credit Hours)

A detailed study of the techniques of fiction, nonfiction, and poetry with some emphasis given to the various theories informing the genres.

Prerequisites: Graduate standing and permission of instructor

ENGL 661 Craft of Poetry (3 Credit Hours)

A detailed study of the techniques of poetry with some emphasis on the various theories informing the genre.

Prerequisites: Graduate standing and permission of instructor

ENGL 662 Cybercultures and Digital Writing (3 Credit Hours)

In this course, students will explore the social, theoretical, and cultural implications of composing with the ever-evolving digital writing technologies. They will also consider how to study the practices the writers use to compose with these technologies.

Prerequisites: three units of digital writing or instructor's permission

ENGL 664 Teaching College Composition (3 Credit Hours)

An intensive examination of alternative approaches to teaching first-year and advanced composition at the college level, with special attention to current schools of composition theory and research.

ENGL 665 Teaching Writing with Technology (3 Credit Hours)

Students in this course will explore different writing environments and educational applications and learn how they are designed to help writers compose, collaborate, research, and think. Students will assess the values and theoretical assumptions underlying those applications and learn to articulate their own philosophies of using technologies in the writing classroom.

Prerequisites: ENGL 539 and either ENGL 555 or ENGL 664

ENGL 668 Graduate Internship and Project in Professional Writing (1-3 Credit Hours)

Structured work experience involving extensive writing and editing in a professional setting. The result of the internship is an analytic paper and a portfolio of written work.

Prerequisites: 15 graduate credits in English

ENGL 670 Methods and Materials in TESOL (3 Credit Hours)

The course is a practical introduction to methods, materials, and course organization in Teaching English to Speakers of Other Languages (TESOL). It includes topics such as teaching language skills (reading, writing, speaking, and listening), language assessment, teaching language in its cultural context, technology-enhanced language teaching and learning, and others.

ENGL 671 Phonology (3 Credit Hours)

The course is an introduction to the sounds and sound systems of natural languages with a particular focus on how sounds are produced and how they interact with one another in a stream of speech. It examines a variety of prosodic features of speech, including syllable structure, tone and stress, and connects the application of various phonological theories to language learning and teaching.

Pre- or corequisite: ENGL 540 is recommended

ENGL 672 Language Structure Analysis (3 Credit Hours)

The course is a survey of the structure of mainstream English and focuses on language structure analyses in relation to the context of use and the speakers/writers who use it. It is based on a descriptive approach to the study of English across registers and genres and addresses language issues that may be problematic for English language users.

Pre- or corequisite: ENGL 540 is strongly recommended

ENGL 673 Discourse Analysis (3 Credit Hours)

The course is a survey of approaches to the analysis of spoken and written discourse. Readings and assignments emphasize issues related to transcription methods, conversational discourse, narrative, social interaction, the influence of prior discourses on texts, and relationships between discourse and power.

ENGL 674 Internship in Applied Linguistics (3 Credit Hours)

A structured work experience involving teaching or work in applied linguistics in a professional setting. To be documented by a portfolio of written work.

Prerequisites: 12 graduate credits in linguistics

ENGL 675 Practicum in TESOL (3 Credit Hours)

Supervised practice in teaching English to speakers of other languages. Available to those enrolled in the M.A. in Applied Linguistics or TESOL Certificate who have completed core courses.

Prerequisites: ENGL 670 and permission of the instructor

ENGL 677 Language and Communication Across Cultures (3 Credit Hours)

This course addresses the connections between language and culture both in terms of the ways in which language may encode aspects of culture similarly or differently as well as how cultural assumptions are often made based on linguistic differences across cultures. Readings and discussions also address the effects of culture on intercultural communication.

ENGL 678 Sociolinguistics (3 Credit Hours)

Sociolinguistics is the study of language in its social context with emphasis on ethnography and other qualitative methods, quantitative methods, and linguistic and social differentiation between individuals and groups.

ENGL 679 First and Second Language Acquisition (3 Credit Hours)

The course is an overview of first and second language acquisition with an emphasis on examining evidence about second language learning which supports or fails to support different approaches to teaching other languages. It outlines the complexities and the interdisciplinarity of the field of language acquisition and introduces various research methods used in this area of inquiry.

ENGL 681 Contemporary Classics: The Thesis Reading List (3 Credit Hours)

This course offers students enrolled in the MFA in Creative Writing program the opportunity for rigorous study of contemporary master works in a particular genre. Designed to provide students with the opportunity to deeply investigate contemporary works for the required thesis reading list, this course counts as one of the literature requirements for the MFA degree. The course is best suited for students in the second year of the program; however, any MFA student may register. The course cannot be repeated for credit.

Prerequisites: Graduate standing and permission of instructor

ENGL 682 Literature for Writers (3 Credit Hours)

This course is designed to guide MFA creative writing students in an investigation of the historical works for the required thesis reading lists. Most course work will be individualized and flexible. Students in all genres will define the literary traditions they are operating in and study some of the foundational texts that inform those traditions.

Prerequisites: Graduate standing and permission of instructor

ENGL 683 Literary Editing and Publishing (3 Credit Hours)

This course is for MFA Creative Writing students, and is meant to provide basic concepts of literary editing and publishing, theoretical and practical frameworks, and hands-on/internship types of experiences managing/reading/editing for the MFA program's literary journal, Barely South Review. This course can count once toward elective credit in the MFA curriculum and may not be repeated for credit.

Prerequisites: Students must be in good graduate standing and must have earned at least 9 credit hours in the MFA program

Pre- or corequisite: This course is a corequisite for actual internship work in the journal, though students who take this course are NOT automatically guaranteed a staff position in the journal

ENGL 685 Writing Research (3 Credit Hours)

This course explores current methods and methodologies in writing research. Students will design and carry out original studies of academic, professional, or personal writing as it is practiced in classrooms, work places, and other settings.

Prerequisites: 6 graduate credits in English

ENGL 686 Introduction to Rhetoric and Writing Studies (3 Credit Hours)

This course presents key concepts, principles, traditions, and conversations that define the field of rhetoric and composition, surveying major texts, movements, issues, and methodologies. This course is designed primarily to prepare students for advanced courses in professional writing; however, it will also benefit any student who is interested in gaining insights about language, knowledge, and power from the perspective of rhetoric.

ENGL 687 Colloquium for Teachers of English (3 Credit Hours)

This course discusses theories of teaching, writing and literature and helps explore the challenges facing 21st century educators in terms of finding ways to reach the 21st century student. The course investigates ways to help students understand the inherent value of reading and writing. Additionally, the course looks at pedagogical models and examines how they can be applied to individual areas of expertise. May be repeated for credit when topic varies.

ENGL 694 Thesis Colloquium (3 Credit Hours)

All MFA students are required to take ENGL 694 before their final semester. The course brings together all genres in a collaborative focus in which students discuss specific thesis projects, format requirements, publishing opportunities and reading lists for the 10-page prefatory essay required for their defense.

Prerequisites: May be taken after 24 graduate hours have been completed

ENGL 695 Topics (1-3 Credit Hours)

The advanced study of a selected topic in English. Topics courses will appear in the course schedule and will be more fully described in information distributed to all academic advisors.

ENGL 696 Independent Readings (3 Credit Hours)

Designed for the advanced student (15-20 hours) who wants to study in-depth a sharply focused area of literature, linguistics, or pedagogy. Before registering for the course, the student must make out a prospectus with the instructor and submit it. No graduate student is permitted to take more than two independent readings courses.

ENGL 697 Portfolio Preparation (3 Credit Hours)

Preparatory course designed to assist students in the development of a professional or teaching portfolio. Students will consult regularly with their committee.

Prerequisites: 21 credit hours of course work completed

ENGL 698 Thesis Research (1-9 Credit Hours)

Preparatory course designed to assist students in the writing of a thesis. Students will consult regularly with the faculty.

Prerequisites: Instructor approval and completion of 30 hours of course work required

ENGL 699 Thesis (1-9 Credit Hours)

Writing of the creative thesis.

Prerequisites: Instructor approval and completion of 30 hours of course work required

ENGL 701 Texts and Technologies (3 Credit Hours)

Tracing the development of writing technologies from Ancient Greece through contemporary blogs and wikis, this course focuses on the relationships between a text's physical qualities and its composition, production, and reception.

ENGL 703 Technologies of the Book (3 Credit Hours)

This course explores the history and future of the book, print technology, the way books are made, shared, collected, preserved, and discarded, and the status of the book within larger information systems—archives, libraries, and private collections—in the digital age. How do we reconceive the book and its place in the increasingly digital cultural archive?

ENGL 705 Discourse and Rhetoric Across Cultures (3 Credit Hours)

The course is a survey of language use both within and across cultures. Topics include relationships between language and conceptualization (linguistic relativity); description and interpretation of linguistic and rhetorical patterns; the organization, expression, and analysis of cultural meaning (e.g. frames, cultural models, narratives); relational aspects of language use; and literacy practices.

ENGL 706 Visual Rhetoric and Document Design (3 Credit Hours)

This course focuses on how visual elements work within different types of documents. Theory and research in visual rhetoric and technical communication will be used to develop models for how people process visual information in a variety of social and cultural contexts.

ENGL 710 Major Debates in English Studies (3 Credit Hours)

This course introduces students to the principal questions and concerns of the field and includes a comparison and contrast of the specialties in English, including how they form and address key issues.

Prerequisites: Reserved for degree seeking students in the PhD in English program

ENGL 715 Technical Communication Theories and Practices (3 Credit Hours)

This course surveys the history of technical communication and explores competing theories and research methodologies in the field. The tensions between workplace practices, technical communication scholarship, and technical communication pedagogy will also be explored.

ENGL 717 Teaching Professional and Technical Writing (3 Credit Hours)

This course introduces students to the field of technical communication by way of classroom practice with the goal of professionalizing students as teachers of technical communication (or technical writing). Students are asked to design undergraduate course materials and projects, which will be informed by exploration of the extensive boundaries of the field and critical consideration of the most pressing questions facing technical communication scholars and the most common problems facing technical communication practitioners today.

Prerequisites: ENGL 715 recommended

ENGL 720 Pedagogy and Instructional Design (3 Credit Hours)

Students in this course will be prepared to develop pedagogical plans, teach and assess writing in four instructional areas: advanced and professional writing courses, writing across the curriculum, workplace instruction, and distributed learning. New pedagogical tools, especially computer-based technologies, will be taught, analyzed and tested.

ENGL 721 Compositions as Applied Rhetoric (3 Credit Hours)

Students will examine how the field of rhetoric has shaped composition pedagogy in the United States from its inception at Harvard to postmodern possibilities of today's writing classroom.

Prerequisites: 3 credits of a graduate level rhetoric or composition course or instructor's permission

ENGL 722 Multilingualism and Writing Instruction (3 Credit Hours)

Examines the social and institutional contexts that shape the expectations placed on writing instruction, the cross-cultural issues that affect how multilingual students compose English texts, and the curricular strategies for designing assignments and assessing multilingual writers' work.

ENGL 724 Online Writing Instructions (3 Credit Hours)

Students will learn how to negotiate the intersection between online instruction and writing pedagogy by exploring and interrogating the ways that various means of course mediation shapes the literacy pedagogy an instructor can develop. ENGL 664 is recommended as a prerequisite.

ENGL 725 Scholarly Editing and Textual Scholarship (3 Credit Hours)

Surveys the theory and practice of scholarly editing, of the physical description of texts as material artifacts, and of the historical and social contextualization of texts as material artifacts. Focus is on texts produced in manuscripts and print, but consideration is given to oral texts and digital texts.

Prerequisites: Instructor approval required

ENGL 726 The British Periodical Press (3 Credit Hours)

A study of the British periodical press from the 1700s to c.1900 as an archival object revealing the life and culture of the Enlightenment, Romantic, and Victorian Eras. The course considers the sociocultural function of newspapers, monthlies, annuals, and serial novels, and critiques material and digital archival work.

ENGL 727 London Calling: 20th and 21st Century British Literature (3 Credit Hours)

Studies of major poets, dramatists and prose writers. Some attention will be given to the movements, trends, forces, and ideas of the period. The course coheres around a pertinent theme, historical moment, genre, or theoretical inquiry.

ENGL 728 Eighteenth Century British Literature (3 Credit Hours)

A study of the literature written in the British Isles from the “Glorious Revolution” of 1688 until 1800, focusing on how the flowering of satire and the emergence of new literary forms such as periodical journalism, the novel, and “mock heroic” poetry interacted with the growth of distinctly modern institutions and philosophies such as a free, commercial press, market capitalism, colonialism, political radicalism, and industrialism.

ENGL 730 The Digital Humanities (3 Credit Hours)

Taking historical, cultural, and theoretical views, this course bridges literary studies with new media. How has technology historically affected literature and culture? Can the democratization of information accelerate literary development? Topics will include digital archives, intellectual property in the information age, and electronic textuality.

ENGL 732 Digital Activisms (3 Credit Hours)

An exploration of the diffuse and disparate methods and practices of contemporary digital activism.

ENGL 734 Theories of Networks (3 Credit Hours)

An increasing amount of scholarship in English studies focuses on the networked interactions between texts and other texts, people, technologies, etc. To account for these various types of relationships between different types of objects a number of theories of networks have emerged. This course considers key theoretical discussions that work to define nodes, relationships between them, and how networks emerge, grow, and/or dissolve.

ENGL 735 Postcolonial Literature and Theory (3 Credit Hours)

An examination of the discourse of postcolonial critical theory literature produced in postcolonial, diasporic and global contexts.

Prerequisites: Any equivalent graduate level critical theory course or instructor permission

ENGL 736 (Against) World Literature (3 Credit Hours)

Analyzes world literature's disciplinary affordances and limitations and considers world literature's tensions with comparative literature. Students examine a theme, genre, or other literary topic as it appears in the literature of several countries. All works are assigned in English translation if not originally written in English.

ENGL 737 Narratology (3 Credit Hours)

A study of the various theories that have emerged since the early twentieth century about the form, history, and cultural significance of narrative as a specific discursive mode. Theories will range from structuralist approaches to narrative elements like plot, perspective, and voice, to politically-engaged theories like Marxist, Feminist, and Queer narratology, as well as to more recent theories such as Storyworld/Possible Worlds theory. The focus will be on linguistic, “literary” narratives, but narratives in other media (such as film or graphic novels) and other genres (such as historiography) will be also be studied.

ENGL 740 Empirical Research Methods and Project Design (3 Credit Hours)

This course focuses on the theory and design of empirical research conducted in academic and nonacademic settings. Students will examine the methodological complexities of several different approaches and conduct empirical research projects in English studies.

Prerequisites: Reserved for degree seeking students in the PhD in English program

ENGL 741 Nineteenth Century British Literature (3 Credit Hours)

A study of a selection of the literature written in Britain during the romantic and Victorian ages, focusing on the social, historical, and ideological contexts informing its production. Texts analyzed include poetry, fiction, and nonfiction.

ENGL 750 Service Learning in English Studies (3 Credit Hours)

Students will engage in service-learning activities and apply various concepts and skills from their experience and coursework to identify and respond to the needs in the community. An analytical paper and portfolio of service-learning materials are required.

Prerequisites: Instructor approval required

ENGL 751 American Literature to 1810 (3 Credit Hours)

Intensive study of a variety of texts from several genres reflecting the historical forces, aesthetic movements, social trends, and representative works of the period.

ENGL 753 Queer of Color Critique (3 Credit Hours)

This course works in and between the complex intersectional crossroads of critical race and sexuality studies, Black queer/quare studies, and performance studies. Insisting upon the inextricability of racial subjectivity, gender expression, and sexual orientation, it offers a study of critique, literature, and performance at the intersections of Black/Latinx social identities and movements in a US context, while remaining attentive to diasporic and global networks of people and power.

ENGL 754 Cultural Studies (3 Credit Hours)

A study of the historical formation of cultural studies and the theoretical principles that underwrote its emergence, development, and institutional adaptation.

ENGL 755 Critical Race Theory (3 Credit Hours)

The goal of this course is to examine various approaches to Critical Race Studies and, in light of its theoretical commitments, explore its problems, possibilities, and limitations. How might we better understand our history and contemporary politics through the methodologies of critical race theory? Does critical race theory open up new areas for exploration or does it make our understanding of race and ethnicity more indefinite? Such an exploration will require us to think carefully about race and racism, but also other forms of identity like gender, class, and sexuality.

ENGL 756 Pocahontas Unplugged: Jamestown, Pocahontas and the Forging of American Identity (3 Credit Hours)

An investigation of the cultural discourse surrounding the figure of Pocahontas in Early American literature and history, observing its construction within the dominant archive and its performance over a period of four centuries. Also seeks to understand Pocahontas from within local indigenous traditions and a larger network of indigenous agency.

ENGL 757 American Literature 1810-1870 (3 Credit Hours)

An intensive study of a variety of texts from several genres reflecting the historical forces, aesthetic movements, social trends, and representative works of the period.

ENGL 758 American Literature 1870-1946 (3 Credit Hours)

Intensive study of a variety of texts from several genres reflecting the historical forces, aesthetic movements, social trends, and representative works of the period.

ENGL 760 Classical Rhetoric and Theory Building (3 Credit Hours)

Analysis and discussion of classical theories of rhetoric, with attention to how rhetoric describes discourse in the public sphere.

ENGL 763 Seminar in Discourse Analysis (3 Credit Hours)

This course introduces students to the methodological and analytical approaches to discourse analysis. Students explore what it means to engage in meaningful, grounded, data-driven research through an examination of original research articles and by designing and conducting their own discourse analysis research project.

ENGL 764 Theories of Literature (3 Credit Hours)

An in-depth study of selected theories about the form, history, and cultural significance of literature, such as narrative theory, poststructuralism, Marxism, and feminism. Specific topics may vary by semester, but all sections will engage comprehensively with a body of theoretical texts and concerns.

ENGL 765 Modern Rhetoric and Theory Building (3 Credit Hours)

This course concerns the development of rhetoric as an academic discipline in the twentieth century, in particular how rhetoric has distinguished itself from literary, historical, philosophical, and linguistic modes of inquiry.

ENGL 766 New Media Theory and Practice I (3 Credit Hours)

This course involves hands-on instruction in a variety of software packages used to create websites and multi-media projects. Students will explore the rhetorical, literary, and technical aspects of their own projects as well as other web-based and multi-media compositions/products.

ENGL 770 Research Methods in Language Analysis (3 Credit Hours)

The course introduces general concepts, research methods, and techniques used in language analysis. Both quantitative and qualitative approaches are discussed, including the use of surveys, case studies, and experimental study designs. Two main goals are emphasized: To become a better reader of research reports and to develop research and analytical skills applicable to the analyses of spoken and written language. Previous research-oriented coursework or experience is strongly recommended.

ENGL 771 New Media Theory and Practice II (3 Credit Hours)

This course builds on the study of new media textual production and consumption in English Studies begun in New Media Theory and Practice I and gives students the opportunity to engage in more advanced theoretical and production work. This course will focus on the integration of multiple modes and media using a variety of software and hardware.

Prerequisites: ENGL 766

ENGL 775 Seminar in English Studies - Pedagogy and Curriculum Design (3 Credit Hours)

This course introduces students to literacy theory and challenges them to apply it in specific disciplines within English Studies.

Prerequisites: ENGL 720 or ENGL 820 recommended

ENGL 778 Seminar in Sociolinguistics (3 Credit Hours)

This seminar focuses on language in society, with emphasis on the everyday types of speech that people use to situate themselves in social worlds. Topics include ethnography of communication, language ideologies, linguistic style and stance, social and regional variation, and qualitative and quantitative methods of analysis.

ENGL 780 Corpus Use, Research, and Material Design (3 Credit Hours)

The course provides a hands-on introduction to the use of corpora in language studies, register, and genre analysis in combination with other methodologies. It is a survey of existing English language corpora and the central concepts and methods of corpus-based language analysis and material design. The main focus is on the use of corpora as a resource for research, teaching, and learning.

ENGL 783 Seminar in Professional Writing (3 Credit Hours)

This course will provide an intensive examination of a specific topic or issue in professional writing and serve as a field course for Professional Writing and New Media.

Prerequisites: Instructor approval

ENGL 790 Seminar in Textual Studies (3 Credit Hours)

This course will provide an intensive examination of a specific topic or issue in textual studies and serve as a field course for Rhetoric and Textual Studies.

Prerequisites: Instructor approval

ENGL 791 Seminar in Literary Studies (3 Credit Hours)

Intensive seminar in a variable topic within literary or literary/cultural studies.

ENGL 793 Seminar in Rhetoric (3 Credit Hours)

This course will provide an intensive examination of a specific topic or issue in rhetoric and serve as a field course for rhetoric and textual studies.

Prerequisites: Must be enrolled in a graduate program

ENGL 794 Seminar in New Media (3 Credit Hours)

This course will provide an intensive examination of a specific topic or issue in new media and serve as a field course for Professional Writing and New Media.

Prerequisites: Instructor approval

ENGL 795 Topics (3 Credit Hours)

Variable course material for students in the Ph.D. in English degree program.

Prerequisites: must be enrolled in a graduate program

ENGL 797 Independent Study in English (3 Credit Hours)

Provides opportunities for doctoral students to do independent research in areas of their interests. Hours to be arranged.

Prerequisites: graduate standing

ENGL 801 Texts and Technologies (3 Credit Hours)

Tracing the development of writing technologies from Ancient Greece through contemporary blogs and wikis, this course focuses on the relationships between a text's physical qualities and its composition, production, and reception.

ENGL 803 Technologies of the Book (3 Credit Hours)

This course explores the history and future of the book, print technology, the way books are made, shared, collected, preserved, and discarded, and the status of the book within larger information systems—archives, libraries, and private collections—in the digital age. How do we reconceive the book and its place in the increasingly digital cultural archive?

ENGL 805 Discourse and Rhetoric Across Cultures (3 Credit Hours)

The course is a survey of language use both within and across cultures. Topics include relationships between language and conceptualization (linguistic relativity); description and interpretation of linguistic and rhetorical patterns; the organization, expression, and analysis of cultural meaning (e.g. frames, cultural models, narratives); relational aspects of language use; and literacy practices.

ENGL 806 Visual Rhetoric and Document Design (3 Credit Hours)

This course focuses on how visual elements work within different types of documents. Theory and research in visual rhetoric and technical communication will be used to develop models for how people process visual information in a variety of social and cultural contexts.

ENGL 810 Major Debates in English Studies (3 Credit Hours)

This course introduces students to the principal questions and concerns of the field and includes a comparison and contrast of the specialties in English, including how they form and address key issues

Prerequisites: Reserved for degree seeking students in the PhD in English program

ENGL 815 Technical Communication Theories and Practices (3 Credit Hours)

This course surveys the history of technical communication and explores competing theories and research methodologies in the field. The tensions between workplace practices, technical communication scholarship, and technical communication pedagogy will also be explored.

ENGL 817 Teaching Professional and Technical Writing (3 Credit Hours)

This course introduces students to the field of technical communication by way of classroom practice with the goal of professionalizing students as teachers of technical communication (or technical writing). Students are asked to design undergraduate course materials and projects, which will be informed by exploration of the extensive boundaries of the field and critical consideration of the most pressing questions facing technical communication scholars and the most common problems facing technical communication practitioners today.

ENGL 820 Pedagogy and Instructional Design (3 Credit Hours)

Students in this course will be prepared to develop pedagogical plans, teach and assess writing in four instructional areas: advanced and professional writing courses, writing across the curriculum, workplace instruction, and distributed learning. New pedagogical tools, especially computer-based technologies, will be taught, analyzed and tested.

ENGL 821 Compositions as Applied Rhetoric (3 Credit Hours)

Students will examine how the field of rhetoric has shaped composition pedagogy in the United States from its inception at Harvard to postmodern possibilities of today's writing classroom.

Prerequisites: 3 credits of a graduate level rhetoric or composition course or instructor's permission

ENGL 822 Multilingualism and Writing Instruction (3 Credit Hours)

Examines the social and institutional contexts that shape the expectations placed on writing instruction, the cross-cultural issues that affect how multilingual students compose English texts, and the curricular strategies for designing assignments and assessing multilingual writers' work.

ENGL 824 Online Writing Instruction (3 Credit Hours)

Students will learn how to negotiate the intersection between online instruction and writing pedagogy by exploring and interrogating the ways that various means of course mediation shapes the literacy pedagogy an instructor can develop.

ENGL 825 Scholarly Editing and Textual Scholarship (3 Credit Hours)

Surveys the theory and practice of scholarly editing, of the physical description of texts as material artifacts, and of the historical and social contextualization of texts as material artifacts. Focus is on texts produced in manuscripts and print, but consideration is given to oral texts and digital texts.

Prerequisites: Instructor approval required

ENGL 826 The British Periodical Press (3 Credit Hours)

A study of the British periodical press from the 1700s to c.1900 as an archival object revealing the life and culture of the Enlightenment, Romantic, and Victorian Eras. The course considers the sociocultural function of newspapers, monthlies, annuals, and serial novels, and critiques material and digital archival work.

ENGL 827 London Calling: 20th and 21st Century British Literature (3 Credit Hours)

Studies of major poets, dramatists and prose writers. Some attention will be given to the movements, trends, forces, and ideas of the period. The course coheres around a pertinent theme, historical moment, genre, or theoretical inquiry.

ENGL 828 Eighteenth Century British Literature (3 Credit Hours)

A study of the literature written in the British Isles from the “Glorious Revolution” of 1688 until 1800, focusing on how the flowering of satire and the emergence of new literary forms such as periodical journalism, the novel, and “mock heroic” poetry interacted with the growth of distinctly modern institutions and philosophies such as a free, commercial press, market capitalism, colonialism, political radicalism, and industrialism.

ENGL 830 The Digital Humanities (3 Credit Hours)

Taking historical, cultural, and theoretical views, this course bridges literary studies with new media. How has technology historically affected literature and culture? Can the democratization of information accelerate literary development? Topics will include digital archives, intellectual property in the information age, and electronic textuality.

ENGL 832 Digital Activisms (3 Credit Hours)

An exploration of the diffuse and disparate methods and practices of contemporary digital activism.

ENGL 834 Theories of Networks (3 Credit Hours)

An increasing amount of scholarship in English studies focuses on the networked interactions between texts and other texts, people, technologies, etc. To account for these various types of relationships between different types of objects a number of theories of networks have emerged. This course considers key theoretical discussions that work to define nodes, relationships between them, and how networks emerge, grow, and/or dissolve.

ENGL 835 Postcolonial Literature and Theory (3 Credit Hours)

An examination of the discourse of postcolonial critical theory literature produced in postcolonial, diasporic and global contexts.

Prerequisites: Any equivalent graduate level critical theory course or instructor permission

ENGL 836 (Against) World Literature (3 Credit Hours)

This course analyzes world literature's disciplinary affordances and limitations and considers world literature's tensions with comparative literature. Students examine a theme, genre, or other literary topic as it appears in the literature of several countries. All works are assigned in English translation if not originally written in English.

ENGL 837 Narratology (3 Credit Hours)

A study of the various theories that have emerged since the early twentieth century about the form, history, and cultural significance of narrative as a specific discursive mode. Theories will range from structuralist approaches to narrative elements like plot, perspective, and voice, to politically-engaged theories like Marxist, Feminist, and Queer narratology, as well as to more recent theories such as Storyworld/Possible Worlds theory. The focus will be on linguistic, "literary" narratives, but narratives in other media (such as film or graphic novels) and other genres (such as historiography) will be also be studied.

ENGL 840 Empirical Research Methods and Project Design (3 Credit Hours)

This course focuses on the theory and design of empirical research conducted in academic and nonacademic settings. Students will examine the methodological complexities of several different approaches and conduct empirical research projects in English studies.

Prerequisites: Reserved for degree seeking students in the PhD in English program

ENGL 841 Nineteenth Century British Literature (3 Credit Hours)

A study of a selection of the literature written in Britain during the romantic and Victorian ages, focusing on the social, historical, and ideological contexts informing its production. Texts analyzed include poetry, fiction, and nonfiction.

ENGL 850 Service Learning in English Studies (3 Credit Hours)

Students will engage in service-learning activities and apply various concepts and skills from their experience and coursework to identify and respond to the needs in the community. An analytical paper and portfolio of service-learning materials are required.

Prerequisites: Instructor approval required

ENGL 851 American Literature to 1810 (3 Credit Hours)

Intensive study of a variety of texts from several genres reflecting the historical forces, aesthetic movements, social trends, and representative works of the period.

ENGL 853 Queer of Color Critique (3 Credit Hours)

This course works in and between the complex intersectional crossroads of critical race and sexuality studies, Black queer/quare studies, and performance studies. Insisting upon the inextricability of racial subjectivity, gender expression, and sexual orientation, it offers a study of critique, literature, and performance at the intersections of Black/Latinx social identities and movements in a US context, while remaining attentive to diasporic and global networks of people and power.

ENGL 854 Cultural Studies (3 Credit Hours)

A study of the historical formation of cultural studies and the theoretical principles that underwrote its emergence, development, and institutional adaptation.

ENGL 855 Critical Race Theory (3 Credit Hours)

The goal of this course is to examine various approaches to Critical Race Studies and, in light of its theoretical commitments, explore its problems, possibilities, and limitations. How might we better understand our history and contemporary politics through the methodologies of critical race theory? Does critical race theory open up new areas for exploration or does it make our understanding of race and ethnicity more indefinite? Such an exploration will require us to think carefully about race and racism, but also other forms of identity like gender, class, and sexuality.

ENGL 856 Pocahontas Unplugged: Jamestown, Pocahontas and the Forging of American Identity (3 Credit Hours)

An investigation of the cultural discourse surrounding the figure of Pocahontas in Early American literature and history, observing its construction within the dominant archive and its performance over a period of four centuries. Also seeks to understand Pocahontas from within local indigenous traditions and a larger network of indigenous agency.

ENGL 857 American Literature 1810-1870 (3 Credit Hours)

An intensive study of a variety of texts from several genres reflecting the historical forces, aesthetic movements, social trends, and representative works of the period.

ENGL 858 American Literature 1870-1945 (3 Credit Hours)

Intensive study of a variety of texts from several genres reflecting the historical forces, aesthetic movements, social trends, and representative works of the period.

ENGL 860 Classical Rhetoric and Theory Building (3 Credit Hours)

Analysis and discussion of classical theories of rhetoric, with attention to how rhetoric describes discourse in the public sphere.

ENGL 863 Seminar in Discourse Analysis (3 Credit Hours)

This course introduces students to the methodological and analytical approaches to discourse analysis. Students explore what it means to engage in meaningful, grounded, data-driven research through an examination of original research articles and by designing and conducting their own discourse analysis research project.

ENGL 864 Theories of Literature (3 Credit Hours)

An in-depth study of selected theories about the form, history, and cultural significance of literature, such as narrative theory, poststructuralism, Marxism, and feminism. Specific topics may vary by semester, but all sections will engage comprehensively with a body of theoretical texts and concerns.

ENGL 865 Modern Rhetoric and Theory Building (3 Credit Hours)

This course concerns the development of rhetoric as an academic discipline in the twentieth century, in particular how rhetoric has distinguished itself from literary, historical, philosophical, and linguistic modes of inquiry.

ENGL 866 New Media Theory and Practice I (3 Credit Hours)

This course involves hands-on instruction in a variety of software packages used to create websites and multi-media projects. Students will explore the rhetorical, literary, and technical aspects of their own projects as well as other web-based and multi-media compositions/products.

ENGL 870 Research Methods in Language Analysis (3 Credit Hours)

The course introduces general concepts, research methods, and techniques used in language analysis. Both quantitative and qualitative approaches are discussed, including the use of surveys, case studies, and experimental study designs. Two main goals are emphasized: To become a better reader of research reports and to develop research and analytical skills applicable to the analyses of spoken and written language. Previous research-oriented coursework or experience is strongly recommended.

ENGL 871 New Media Theory and Practice II (3 Credit Hours)

This course builds on the study of new media textual production and consumption in English Studies begun in New Media Theory and Practice I and gives students the opportunity to engage in more advanced theoretical and production work. This course will focus on the integration of multiple modes and media using a variety of software and hardware.

Prerequisites: ENGL 866

ENGL 875 Seminar in English Studies - Pedagogy and Curriculum Design (3 Credit Hours)

This course introduces students to literacy theory and challenges them to apply it in specific disciplines within English Studies.

Prerequisites: ENGL 720 or ENGL 820 recommended

ENGL 878 Seminar in Sociolinguistics (3 Credit Hours)

This seminar focuses on language in society, with emphasis on the everyday types of speech that people use to situate themselves in social worlds. Topics include ethnography of communication, language ideologies, linguistic style and stance, social and regional variation, and qualitative and quantitative methods of analysis.

ENGL 880 Corpus Use, Research, and Material Design (3 Credit Hours)

The course provides a hands-on introduction to the use of corpora in language studies, register, and genre analysis in combination with other methodologies. It is a survey of existing English language corpora and the central concepts and methods of corpus-based language analysis and material design. The main focus is on the use of corpora as a resource for research, teaching, and learning.

ENGL 883 Seminar in Professional Writing (3 Credit Hours)

This course will provide an intensive examination of a specific topic or issue in professional writing and serve as a field course for Professional Writing and New Media.

Prerequisites: Instructor approval

ENGL 890 Seminar in Textual Studies (3 Credit Hours)

This course will provide an intensive examination of a specific topic or issue in textual studies and serve as a field course for Rhetoric and Textual Studies.

Prerequisites: Instructor approval

ENGL 891 Seminar in Literary Studies (3 Credit Hours)

Intensive seminar in a variable topic within literary or literary/cultural studies.

Prerequisites: Student must be enrolled in doctoral program to take this course

ENGL 892 Dissertation Seminar (3 Credit Hours)

This course is taken prior to doctoral candidacy exams. It enables students to develop and refine a topic for the dissertation, do preliminary research, and construct a bibliography under the guidance of a faculty mentor. Students will also use the seminar to prepare bibliographies to be used in candidacy exams.

Prerequisites: All core, field, and elective coursework must be completed prior to enrollment

ENGL 893 Seminar in Rhetoric (3 Credit Hours)

This course will provide an intensive examination of a specific topic or issue in rhetoric and serve as a field course for rhetoric and textual studies.

Prerequisites: Must be enrolled in a graduate program

ENGL 894 Seminar in New Media (3 Credit Hours)

This course will provide an intensive examination of a specific topic or issue in new media and serve as a field course for Professional Writing and New Media.

Prerequisites: Instructor approval

ENGL 895 Topics (3 Credit Hours)

Variable course material for students in the Ph.D. in English degree program.

Prerequisites: must be enrolled in a graduate program

ENGL 897 Independent Study in English (1-3 Credit Hours)

Provides opportunities for doctoral students to do independent research in areas of their interests. Hours to be arranged.

Prerequisites: graduate standing

ENGL 898 Directed Research (1-9 Credit Hours)

This course can be taken as a supplement to the Dissertation Seminar for independent investigation in the topic for dissertation.

Prerequisites: instructor approval

ENGL 899 Dissertation (1-9 Credit Hours)

This course is to be taken only by students who have passed the candidacy exams for the purpose of researching and writing the dissertation.

Prerequisites: ENGL 892 and passing Candidacy examination

ENGL 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

ENGL 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

ENGN - Engineering

ENGN 620 The Entrepreneurial Engineer (2 Credit Hours)

This course is designed to provide engineers and engineering technologists with the knowledge, skills and experience needed to create products and services that will be attractive to consumer markets and to bring those products and services to market in new commercial ventures. Topics covered include: how to evaluate entrepreneurial opportunities in the engineering field; elements of a viable business plan; governance models; management succession planning; use of social media; and creating an ethical engineering enterprise in the global economy.

ENGN 623 Leadership and Human Dynamics for the Entrepreneurial Engineer (2 Credit Hours)

This course covers the concepts, skills, and characteristics of effective and successful entrepreneurial leaders in the 21st century. The course covers leadership for entrepreneurial engineers through case studies and literature review in areas such as the fundamentals of leadership, ethical leadership, social capital, emotional intelligence, and three-dimensional leadership.

ENGN 625 Business Planning for Entrepreneurial Engineers (2 Credit Hours)

This course is the capstone of the Entrepreneurship and Innovation graduate certificate for engineers. With data and expertise through prior certificate coursework, students develop and present a comprehensive and viable entrepreneurial business plan in engineering. Topics covered include: Product lifecycle management, marketing and strategic planning, entrepreneurial finance, and effective presentation techniques. The final presentation is delivered to a panel of ODU faculty and engineering practitioners who provide sound feedback to the student.

ENGN 630 Advanced Bioelectrics (3 Credit Hours)

A one-semester course covering advanced topics in bioelectrics. The course will cover advanced application of pulsed power and plasma in the medical, biological and environmental fields. (Cross-listed with ECE 630).

Prerequisites: bachelor's degree in physics, engineering or biology

ENGN 671 Carbon-Free Clean Energy (3 Credit Hours)

Nuclear power and nuclear energy; solar energy; wind energy; geothermal energy; hydroelectric power; hydrogen as energy resource; hydrogen fuel cells; hybrid technologies; global economics and environmental impacts of carbon-free energy.

ENGN 672 Energy Systems Management (3 Credit Hours)

System management principles; energy systems safety and security; automation and control; environmental effects and comparative risk assessment; energy storage; carbon sequestration; energy systems scale up issues; energy systems integration; hybrid systems; energy systems optimization; effects of public policies on energy systems management.

ENGN 695 Multidisciplinary Topics in Engineering (1-3 Credit Hours)

Special interdisciplinary or multidisciplinary topics of interest with emphasis on emerging areas in engineering.

ENGN 697 Independent Study in Energy Engineering (3 Credit Hours)

Individual analytical, experimental, computational and/or design study selected by the student and supervised by the course instructor.

ENGN 811 Methodologies for Advanced Engineering Projects (3 Credit Hours)

Critical evaluation of published literature; experimental design and analysis; optimization methods; pre-project planning; definition of scope, projects risks, technical, economical, social, and political constraints; execution strategies; effective proposal development.

Prerequisites: Graduate standing

ENGN 812 Engineering Leadership (3 Credit Hours)

Effective communication techniques, strategic planning, building collaborative relationships, conflict management, building high-performance teams, risk management, managing innovations.

Prerequisites: Graduate standing

ENGN 813 Engineering Ethics (3 Credit Hours)

Scope of engineering ethics, moral reasoning and ethical theories, the engineer's responsibility for safety, responsibilities to the employer, responsibilities to the public, rights of engineers, global issues, professional codes of ethics, case studies.

Prerequisites: Graduate standing

ENGN 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

ENMA - Engineering Management

ENMA 510 Agile Project Management (3 Credit Hours)

This course focuses the management of projects using an agile approach to respond to the continuous changes that affect project capabilities and performance. Although any project can be manage using agile project management, projects with high degree of uncertainty obtain the most benefits from this approach (e.g., R&D projects). The course covers Scrum and expands it by articulating the human and business factors that make successful agile project management. Case studies and/or short-projects are required.

Prerequisites: ENMA 401 or equivalent

ENMA 515 Introduction to Systems Engineering (3 Credit Hours)

Introduces the principles, concepts and process of systems engineering. Examination of problem formulation, analysis, and interpretation as they apply to the study of complex systems. Emphasizes the design nature of systems engineering problem solving, and includes case studies stressing realistic problems. Development of system requirements, system objectives, and the evaluation of system alternatives.

ENMA 595 Topics in Engineering Management (1-6 Credit Hours)

Special topics with emphasis placed on the recent developments in engineering management.

Prerequisites: permission of the instructor

ENMA 600 Cost Estimating and Financial Analysis (3 Credit Hours)

Introduction to the monetary aspects of engineering projects, including accounting principles; financial reports and analysis; capital budgeting; cost estimation and control; inventory management; depreciation; investment decisions. Knowledge of probability and statistics (ENMA 420 or equivalent) is assumed. Case studies and a term project are required.

Pre- or corequisite: ENMA 420 or equivalent

ENMA 601 Analysis of Organizational Systems (3 Credit Hours)

This course introduces the student to fundamental concepts in the analysis of organizations. A systems approach is taken in the examination of social, structural, procedural and environmental aspects that are of consequence to technical professionals and managers. Modules covered include: History and Systems of Organizations and Management; Basic Organizational Systems and Models emphasizing rational, natural and open systems; Organizational Behavior Models; Organizational Structure Models; Integration of Systems Perspectives.

ENMA 602 Systems Engineering Management (3 Credit Hours)

Students develop a comprehensive set of techniques and methods to design, maintain and evolve the systems engineering function in support of strategic enterprise objectives and operations.

ENMA 603 Operations Research (3 Credit Hours)

Deterministic and stochastic models for decision making. Topics include: optimization methods; linear and other programming models; network analysis; inventory analysis; queuing theory. Knowledge of probability and statistics (ENMA 420 or equivalent) is assumed.

ENMA 604 Project Management (3 Credit Hours)

Exploration of the systems approach to planning, scheduling, control, design, evaluation, and leadership of projects in technology-based organizations. The fundamental tools and techniques of project management; role of the project manager; project management systems; project selection; project life cycle; project monitoring and control; project management evaluation and auditing; project risk and failure analysis; contextual nature of project management; project knowledge.

ENMA 605 Program Capstone (1 Credit Hour)

A written, comprehensive demonstration of the candidate's competence in the fields covered by the program of study that is intended to fulfill the non-thesis master's examination requirement.

Prerequisites: Completion of minimum of the 18 core credit hours in program of study

ENMA 606 Engineering Law (3 Credit Hours)

Basic legal concepts and procedures for understanding the implications of engineering management decisions. Major emphasis on contracts and liability.

ENMA 607 Stochastic Decision Methods (3 Credit Hours)

Introduction to decision analysis and stochastic models; risk and uncertainty in decision making; probabilistic inventory problems; queuing theory; Markov processes; dynamic programming; Monte Carlo simulation of dynamic systems. Knowledge of probability and statistics (ENMA 420 or equivalent) is assumed.

ENMA 613 Logistics and Supply Chain Management (3 Credit Hours)

Studying how logistical decisions impact the performance of the firm and the entire supply chain. Topics include strategic planning, facilities location and analysis, distribution and transportation networks, forecasting, inventory management, and information systems for supply chains. Knowledge of probability and statistics (ENMA 420 or equivalent) is assumed. The course includes case studies and/or a project.

Prerequisites: ENMA 603; ENMA 420 or equivalent

ENMA 614 Quality Systems Design (3 Credit Hours)

Integrated analysis of the process quality assurance and improvement function. Quality Deming's way. Scientific sampling and control charting for quality assurance and control; the quality cost concept and economic aspects of quality decisions. Organization of the quality function for process quality improvement. Knowledge of probability and statistics (ENMA 420 or equivalent) is assumed.

Prerequisites: ENMA 420 or equivalent

ENMA 616 The Entrepreneurial Engineering Manager (3 Credit Hours)

Globalization has increased competition among the planet's enterprises. The quality of products and services has dramatically improved while prices have plummeted. Consumer expectations have risen to very high levels. This phenomenon has accelerated the need for large technical enterprises to become more agile, flexible and responsive to consumer demands. Government agencies are not exempt from this trend: U.S. Government agencies are now required to establish strategic plans for their enterprises and to develop business plans that illustrate the future directions of the enterprise and to define the resources required to realize the vision and strategy of the enterprise. This course introduces Engineering Management students to a wide range of approaches designed to facilitate start-up, enable growth and ensure the continued capability of emerging and mature technical enterprises.

ENMA 625 Introduction to Homeland Security Logistics (3 Credit Hours)

This course introduces the student to essential concepts of Homeland Security and principles of all-hazards risk management. It emphasizes understanding (1) the right balance among different hazards in mitigation, preparedness, response, and recovery; (2) the impacts of illegal and legal immigration on the economic and social stability of our communities; and (3) the emergence and evolving threats in cybersecurity, averting cybercrime, and shielding critical infrastructure. Participants will learn critical decision-making concepts and tools and techniques to improve decision-making in the interinstitutional homeland security decision space.

ENMA 641 Requirements Management, Verification and Validation (3 Credit Hours)

Comprehensive treatment of the nature and utility of requirements, verification, and validation in systems engineering processes. Topics include: establishing user requirements; traceability; baseline and evolving requirements; governing standards; requirements management; issues in requirements for complex systems; role and methods for verification and validation in systems engineering; data treatment and analysis; standards, practices, and issues for verification and validation in systems engineering.

ENMA 645 Preparation for Systems Engineering Professional Certification (3 Credit Hours)

A comprehensive treatment and review of the International Council on Systems Engineering (INCOSE) Systems Engineering Handbook v4 in preparation for INCOSE Systems Engineering Professional (SEP) Certification. This course should be taken in the final semester in which the student will graduate.

ENMA 646 Information Science for Systems and Engineering Management (3 Credit Hours)

This course aims to prepare students with the general knowledge and skills for the on-going digital transformation. The course covers: (1) preliminaries of information and informatics; (2) information and knowledge modeling; (3) fundamental concepts, models, tools, and applications of Big Data; and (4) digital mechanisms of trust and security, including: digital asset access control, digital signature, digital certification, Public Key Infrastructures, and Blockchains.

ENMA 656 Mathematical and Computational Modeling in Systems Engineering (3 Credit Hours)

The course introduces some of the mathematical structures and methods used within systems engineering. The course will cover probability theory, scheduling, critical path analysis, systems dynamics, decision analysis, and simulation. Students will be introduced to computer programming to implement the ideas in the course using the R programming language.

ENMA 660 Systems Architectures (3 Credit Hours)

Students learn the essential aspects of the systems architecture paradigm through development and analysis of multiple architecture frameworks and enterprise engineering. Emphasis is placed on systems modeling and enterprise engineering.

ENMA 661 Systems Engineering Design (3 Credit Hours)

This course covers modern modeling paradigms for deterministic and stochastic complex and dynamic systems. This includes, but is not limited to, Discrete Simulation, Queuing Systems, and Agent-based models among others. Focus will be on system analysis using different developed models in different domains such as production, logistics, security, and service, military and social.

Prerequisites: ENMA 420 or equivalent and ENMA 515 or equivalent

ENMA 667 Cooperative Education (1-3 Credit Hours)

Available for pass/fail grading only. Student participation for credit based on academic relevance of the work experience, criteria, and evaluative procedures as formally determined by the department and the Cooperative Education program prior to the semester in which the work experience is to take place.

ENMA 668 Internship (1-3 Credit Hours)

Academic requirements will be established by the graduate program director and will vary with the amount of credit desired. Allows students an opportunity to gain short-duration career-related experience. Meant to be used for one-time experience. Work may or may not be paid. Project is completed during the term.

ENMA 669 Practicum (1-3 Credit Hours)

Academic requirements will be established by the department and will vary with the amount of credit desired. Allows students an opportunity to gain short duration career related experience. Student is usually already employed - this is an additional project in the organization.

Prerequisites: Approval by department is required; Additional support may be provided by the Monarch Internship and Co-Op Office in the semester prior to enrollment

ENMA 670 Cyber Systems Engineering (3 Credit Hours)

This course provides an overview of functioning of cyber systems including how a computer interacts with the outside world. The composition of critical infrastructure and functioning of different engineered systems that form critical infrastructure are discussed. Mutual dependence and interactions between cyber systems and other engineered and the resulting security risks are also explored.

Prerequisites: Undergraduate students in STEM fields or graduate students of STEM degree or instructor's approval

ENMA 690 Systems Engineering Capstone (1 Credit Hour)

A written, comprehensive demonstration of the candidate's competence in the fields covered by the systems engineering program that is intended to fulfill the non-thesis master's examination requirement.

ENMA 695 Topics in Engineering Management (1-3 Credit Hours)

Special topics of interest with emphasis placed on recent developments in engineering management.

Prerequisites: Permission of the instructor

ENMA 696 Topics in Engineering Management (1-3 Credit Hours)

Special topics of interest with emphasis placed on recent developments in engineering management.

Prerequisites: Permission of the instructor

ENMA 697 Independent Study in Engineering Management (3 Credit Hours)

Individual study selected by the student. Supervised and approved by a faculty member with the approval of the Graduate Program Director.

Prerequisites: Permission of Graduate Program Director

ENMA 698 Master's Project (1-3 Credit Hours)

The master's project is guided under the supervision of the course instructor. Projects must be approved by the Graduate Program Advisor.

Prerequisites: Graduate Program Director permission is required

ENMA 699 Thesis (1-6 Credit Hours)

Research leading to a Master of Science thesis.

Prerequisites: ENMA 721 and permission of the Graduate Program Director

ENMA 700 Economic Analysis of Capital Projects (3 Credit Hours)

This course is targeted at engineering managers who actively participate in the capital budgeting process and project justification. Topics include capital budgeting techniques (including multi-attribute decision making), utility theory, justification of new technologies, and current research in engineering economics. Reading and application of current research in the field is stressed. Case studies are used. Oral presentations and term project required.

Prerequisites: ENMA 600

ENMA 701 Digital Systems Engineering (3 Credit Hours)

Digital systems engineering applies digital technologies to the systems engineering processes and principles. This course provides students with knowledge and skills on necessary digital technologies, such as Artificial Intelligence and Machine Learning, Big Data, Blockchain, and computational modeling. The course covers: (1) preliminaries of digitalization and digital technologies; (2) data and knowledge modeling; (3) logical approach to MBSE (Model-Based Systems Engineering); (4) application of Big Data and Machine Learning in Systems Engineering; and (5) digital mechanisms of trust and security for digital engineering.

Prerequisites: ENMA 646

ENMA 702 Systemic Decision Making (3 Credit Hours)

As machine age problems have given way to systems age messes, the underlying complexity associated with understanding these situations has increased exponentially. Accordingly, the methods we use to address these situations must evolve as well. This course will introduce students to a method for thinking holistically about problems and messes conceptually founded in systems theory. This paradigm, known as systemic thinking, will be contrasted with traditional systematic thinking, and practical guidelines for the deployment of a systemic thinking approach will be provided. This paradigm will increase the student's ability to make rational decisions in complex environments.

ENMA 703 Optimization Methods (3 Credit Hours)

Covers advanced methods in Operations Research and Optimization. Focus will be on developing models and their applications in different domains including manufacturing and service. Modern optimization tools will be used to implement models for case studies, projects and research papers. The knowledge of programming and spreadsheets is expected. Contact instructor for more details.

ENMA 705 Financial Engineering (3 Credit Hours)

This course covers concepts in complex investments, how to deal with uncertainty in today's global markets, and how to engineer and manage financial decisions. The main topics include: cash flows, portfolio theory, capital management, securities, hedge funds, optimal investment and financial engineering evaluations among others.

ENMA 711 Engineering Research Methodology (3 Credit Hours)

This course prepares engineering practitioners to produce systemic applied research or robust project solutions. In the applied research track, students will learn and apply the methods, tools, and concepts required for specifying the research purpose, proposal preparation, understanding the current state of the discipline, selecting and executing the appropriate research methodology, analyzing and synthesizing results, and preparing defensible publications. In the engineering project track, students will learn problem definition and scoping, project proposal preparation, methods for establishing the current state of the problem, analytical and experimental designs for testing proposed solutions, robust methods for solution optimization, and solution validation.

ENMA 712 Multi-Criteria Decision Analysis and Decision Support Systems (3 Credit Hours)

Currently, complex engineering-economic-societal decisions are made by involving numerous sometimes conflicting criteria and attributes, different decision rules and in the presence of various stakeholders with individual preferences who are willing to go into negotiation procedures. A number of multi-criteria decisions tools involving quantitative as well as qualitative methods, together with adequate decision support tools will be introduced. Case studies on a variety of engineering, environmental and security related aspects will also be considered.

ENMA 715 Systems Analysis (3 Credit Hours)

The course is designed to provide an understanding of the interdisciplinary aspects of systems development, operation, and support. The course focuses on the application of scientific and engineering efforts to transform an operational need into a defined system configuration through the interactive process of design, test, and evaluation.

ENMA 716 Complex Adaptive Situations Environment (3 Credit Hours)

The course focuses on the manner in which information, knowledge, and awareness are processed to facilitate decision making, management and engineering in complex adaptive situations. Topics include: knowledge acquisition, formation of technical and contextual awareness, and the role of understanding.

ENMA 717 Cost Engineering (3 Credit Hours)

Introduction to parametric cost modeling techniques and methodologies; generation and application of statistical relationships between life cycle costs and measurable attributes of complex systems; sources of supporting data; quality function deployment; technology forecasting. Special emphasis on life cycle design for cost; cost risk analysis; and design optimization on cost bases. Case studies and a semester project.

ENMA 720 Multivariate Statistics for Engineering (3 Credit Hours)

Introduction to modeling multivariate structural and residual variation, using exploratory data analysis, nonparametric regression, dependence regression, and factor analytic models, with a goal of producing robust, generalizable multivariate models that support research findings. Statistical analyses will be performed in the free general public licensed R statistical software with references to Minitab and SPSS.

ENMA 721 Foundations of Research (3 Credit Hours)

This course is intended to prepare students to undertake substantiated, rigorous, scholarly research, particularly theses or dissertations. The course will focus on the approaches necessary to integrate research intent, techniques and constraints. A variety of research approaches will be investigated. Emphasis will be placed on problem formulation, literature review, proposal preparation, oral presentation, experimentation and accepted canons of research. Knowledge of probability and statistics (ENMA 420 or equivalent) is assumed. Research paper required.

ENMA 724 Risk Analysis (3 Credit Hours)

Approaches to the management of risk; probability assessment methods; risk modeling; use of software packages; extensions of decision analysis, including stochastic dominance and multiattribute methods; applications to project management, scheduling, and cost estimation.

ENMA 725 System Risk and Failure Analysis (3 Credit Hours)

This course is about the modeling of system dependencies using functional dependency network analysis to support the design of new and failure analysis of existing engineering systems. At the end of this course, students will be able to model and measure the operability and performance of today's highly networked and richly interconnected systems.

ENMA 735 Team Performance and Decision Making in Engineering (3 Credit Hours)

This course explores and models the use of teams in organizations with a specific focus on the role of teams in decision making and problem solving. Key areas include team building, assessment of team outcomes, team learning, virtual teams and team decision making. Actual work on teams is required including team deliverables.

ENMA 743 Reliability and Maintainability (3 Credit Hours)

An introduction to the theory and practice of reliability engineering, maintainability and availability. Reliability evaluation models and techniques, failure data collection and analysis, reliability testing and modeling, maintained systems, and mechanical system reliability will be discussed, culminating in a semester-length project.

Prerequisites: ENMA 420 or equivalent

ENMA 750 System of Systems Engineering (3 Credit Hours)

Comprehensive treatment of System of Systems Engineering (SoSE), including; fundamental systems principles, concepts, and governing laws; complex and simple systems; underlying paradigms, methodologies and essential methods for SoSE analysis, design, and transformation; complex system transformation; current state of SoSE research and application challenges. Explores the range of technological, human/social, organizational/managerial, policy, and political dimensions of the SoSE problem domain.

ENMA 751 Complexity, Engineering and Management (3 Credit Hours)

This course examines management and engineering of complex systems as it is undertaken in complex situations. The student will develop an understanding of the unconditional attributes of complex systems and situations that become foundational in the development of robust methods to deal with the practical reality of working in dynamic, uncertain environments. Topics will include Complexity, Complex Systems, Complex Adaptive Systems, Complex Responsive Processes, Complex Adaptive Situations Methodology, SOSE, Reciprocity, and Sociotechnical Systems.

ENMA 754 Big Data Fundamentals (3 Credit Hours)

The objectives of the course are to provide fundamental knowledge and skills of Big Data for the new generation of researchers, engineers, project managers and business managers in the emerging data-driven science and engineering paradigm. Topics to be covered include data analytics, cloud platforms and tools for Big Data, and innovative applications of Big Data.

ENMA 755 Human System Engineering (3 Credit Hours)

This course introduces concepts of Human System Engineering, focusing on designing systems that include human components. Human System Integration and Human Factors Engineering are discussed, as well as other human centered design approaches. The role of human data in systems and systems of systems design is explored, and methods to capture and represent human data, including architecture frameworks, are presented. Modeling and analysis of human centered systems is done through hands-on projects.

ENMA 756 Mission Analysis and Engineering (3 Credit Hours)

The course provides an overview of mission engineering and the role of mission engineering and the mission engineer in government acquisitions. The course presents the theoretical foundations that enable a fuller representation of complex problem as well as the required engineering and management approaches needed to deal with the high level of complexity and uncertainty. It applies the theoretical facets to specific engineering problems/cases and explores robust approaches given the conditions of the problem. Developments, on-going research, as well as gaps in knowledge and know-how are discussed.

Prerequisites: ENMA 415 or ENMA 515 or instructor approval

ENMA 760 Advanced Architectures and Tools (3 Credit Hours)

This course is designed to expand on system architectures concepts through both theory and practice. Topics include the role of architectures in system engineering, alternative methods for architecture development, tools and techniques for architecture design, and various conceptual and technical issues in the architecture development process. Class periods are equally divided between traditional lectures and practice oriented exercises.

ENMA 763 Robust Engineering Design (3 Credit Hours)

A robust design approach based on "Taguchi Methods," including off-line quality engineering and applied design-of-experiments methods, full factorial and fractional factorial designs, and response surface methods. The course is designed to enable engineers and engineering managers from all disciplines to recognize potential applications, formulate problems, plan experiments, and analyze data. Knowledge of probability and statistics (ENMA 420 or equivalent) is assumed. Students will engage in case studies, culminating in a semester-long project.

Prerequisites: ENMA 420 or equivalent

ENMA 771 Risk and Vulnerability Management of Complex Interdependent Systems (3 Credit Hours)

Seminar discussions and team projects. A systematic approach to basic principles of design, economics and management of critical infrastructure systems, including issues of risk, vulnerability and risk governance. Development of advanced methodologies, e.g. system of systems, by use of complexity analysis, dynamic/chaotic behavior, threat analysis, resilient design and management under normal and stress conditions. Adopting an agent based modeling approach under conditions of uncertainty, dysfunctionality, malicious attacks and/or presence of natural perils.

ENMA 777 Complex System Governance (3 Credit Hours)

Students will be prepared to better design, execute, evaluate, and evolve governance for complex systems. This preparation includes development of marketable capabilities to more effectively deal with governance systems and their emergent problems through: (1) development of capabilities to effectively design, analyze, and execute complex system governance, (2) identification and development of more effective intervention strategies to address underlying governance problems in operational systems, (3) employment of a range of methods, tools, and techniques, and (4) development of capabilities for generating novel insights and improvements to address systemic deficiencies in governance systems.

ENMA 780 Leadership for Engineering Managers (3 Credit Hours)

Seminar discussions and team projects. This course is designed to expose students to the concepts, skills, characteristics and emotional composition of effective and successful leaders in the 21st century. The course is intensive and requires students to immerse themselves in the course material and classroom discussion to derive meaning and value from the topics. The course objectives will be achieved by classroom discussion of the assigned material, candid self-assessment, experiential exercises and analysis of the actions of leaders, as described in case studies and literature. Areas of exploration include the fundamentals of leadership, ethical leadership, social capital, emotional intelligence and three-dimensional leadership. Ethical leadership practices is a cross-cutting theme in this course.

Prerequisites: ENMA 601 or Ph.D. status

ENMA 795 Topics in Engineering Management (3 Credit Hours)

Special topics of interest with emphasis placed on recent developments in engineering management.

ENMA 796 Topics in Engineering Management (3 Credit Hours)

Special topics of interest with emphasis placed on recent developments in engineering management.

ENMA 797 Independent Study in Engineering Management (1-3 Credit Hours)

Designed for advanced individualized study into an engineering management topic area. Independent study projects will be related to engineering management and completed under the supervision of a certified faculty member.

Prerequisites: Permission of the instructor and Graduate Program Director

ENMA 800 Economic Analysis of Capital Projects (3 Credit Hours)

It is targeted at engineering managers who actively participate in the capital budgeting process and project justification. Topics include capital budgeting techniques (including multi-attribute decision making), utility theory, justification of new technologies, and current research in engineering economics. Reading and application of current research in the field is stressed. Case studies are used. Oral presentations and term project required.

Prerequisites: ENMA 600

ENMA 801 Digital Systems Engineering (3 Credit Hours)

Digital systems engineering applies digital technologies to the systems engineering processes and principles. This course provides students with knowledge and skills on necessary digital technologies, such as Artificial Intelligence and Machine Learning, Big Data, Blockchain, and computational modeling. The course covers: (1) preliminaries of digitalization and digital technologies; (2) data and knowledge modeling; (3) logical approach to MBSE (Model-Based Systems Engineering); (4) application of Big Data and Machine Learning in Systems Engineering; and (5) digital mechanisms of trust and security for digital engineering.

Prerequisites: ENMA 646

ENMA 802 Systemic Decision Making (3 Credit Hours)

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ENMA 820 Multivariate Statistics for Engineering (3 Credit Hours)

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An introduction to the theory and practice of reliability engineering, maintainability and availability. Reliability evaluation models and techniques, failure data collection and analysis, reliability testing and modeling, maintained systems, and mechanical system reliability will be discussed, culminating in a semester-length project.

Prerequisites: ENMA 420 or equivalent

ENMA 850 System of Systems Engineering (3 Credit Hours)

Comprehensive treatment of System of Systems Engineering (SoSE), including; fundamental systems principles, concepts, and governing laws; complex and simple systems; underlying paradigms, methodologies and essential methods for SoSE analysis, design, and transformation; complex system transformation; current state of SoSE research and application challenges. Explores the range of technological, human/social, organizational/managerial, policy, and political dimensions of the SoSE problem domain.

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ENMA 854 Big Data Fundamentals (3 Credit Hours)

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Prerequisites: ENMA 415 or ENMA 515 or instructor approval

ENMA 860 Advanced Architectures and Tools (3 Credit Hours)

This course is designed to expand on system architectures concepts through both theory and practice. Topics include the role of architectures in system engineering, alternative methods for architecture development, tools and techniques for architecture design, and various conceptual and technical issues in the architecture development process. Class periods are equally divided between traditional lectures and practice oriented exercises.

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Prerequisites: ENMA 420 or equivalent

ENMA 871 Risk and Vulnerability Management of Complex Interdependent Systems (3 Credit Hours)

Seminar discussions and team projects. A systematic approach to basic principles of design, economics and management of critical infrastructure systems, including issues of risk, vulnerability and risk governance. Development of advanced methodologies, e.g. system of systems, by use of complexity analysis, dynamic/chaotic behavior, threat analysis, resilient design and management under normal and stress conditions. Adopting an agent based modeling approach under conditions of uncertainty, dysfunctionality, malicious attacks and/or presence of natural perils.

Prerequisites: Permission of the instructor

ENMA 877 Complex System Governance (3 Credit Hours)

Students will be prepared to better design, execute, evaluate, and evolve governance for complex systems. This preparation includes development of marketable capabilities to more effectively deal with governance systems and their emergent problems through: (1) development of capabilities to effectively design, analyze, and execute complex system governance, (2) identification and development of more effective intervention strategies to address underlying governance problems in operational systems, (3) employment of a range of methods, tools, and techniques, and (4) development capabilities for generating novel insights and improvements to address systemic deficiencies in governance systems.

ENMA 880 Leadership for Engineering Managers (3 Credit Hours)

Seminar discussions and team projects. This course is designed to expose students to the concepts, skills, characteristics and emotional composition of effective and successful leaders in the 21st century. The course is intensive and requires students to immerse themselves in the course material and classroom discussion to derive meaning and value from the topics. The course objectives will be achieved by classroom discussion of the assigned material, candid self-assessment, experiential exercises and analysis of the actions of leaders, as described in case studies and literature. Areas of exploration include the fundamentals of leadership, ethical leadership, social capital, emotional intelligence and three-dimensional leadership. Ethical leadership practices is a cross-cutting theme in this course.

Prerequisites: ENMA 601 or Ph.D. standing

ENMA 888 Ph.D. Seminar (1 Credit Hour)

Discussion of research projects, topics, and problems of Engineering Management faculty, researchers, and students. A weekly exchange of ideas and issues between faculty and Ph.D. students focused on doctoral research.

ENMA 892 Doctor of Engineering Project (1-12 Credit Hours)

Directed individual study applying advanced-level technical knowledge to identify, formulate, and solve a complex, novel problem in Engineering Management.

ENMA 895 Topics in Engineering Management (3 Credit Hours)

Special topics of interest with emphasis placed on recent developments in engineering management.

ENMA 896 Topics in Engineering Management (3 Credit Hours)

Special topics of interest with emphasis placed on recent developments in engineering management.

ENMA 897 Independent Study in Engineering Management (1-3 Credit Hours)

Designed for advanced individualized study into an engineering management topic area. Independent study projects will be related to engineering management and completed under the supervision of a certified faculty member.

Prerequisites: Permission of the instructor and Graduate Program Director

ENMA 898 Research in Engineering Management (1-12 Credit Hours)

Supervised research prior to passing Ph.D. candidacy exam.

Prerequisites: ENMA 721/ENMA 821 and permission of Graduate Program Director

ENMA 899 Doctoral Research (1-12 Credit Hours)

Doctoral research hours. After successfully passing the candidacy examination, all doctoral students are required to be registered for at least one graduate credit each term until the degree is complete.

Prerequisites: ENMA 821 and permission of instructor

ENMA 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

ENMA 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

ENTR - Entrepreneurship

ENTR 576 Social Entrepreneurship (3 Credit Hours)

The class draws students from all disciplines to collaborate with each other, faculty and community members as they co-design project-based solutions to pertinent social issues. Topics related to social entrepreneurship vary each year. Guided by distinguished faculty, students analyze their topic through in-depth classroom and field research, readings and off-campus trips.

ENTR 577 Design Thinking (3 Credit Hours)

Design thinking is a human-centered approach to innovation that uses design methods and tools to integrate the needs of people and organizations, the opportunities of technology, and the requirements for personal, organizational, and business success. The design thinking course introduces students to a robust process for understanding problems, ideation, innovation, and entrepreneurship. This course is facilitated using workshops where students will work in project teams in a design thinking innovation challenge.

ENVH - Environmental Health

ENVH 501 Occupational Health (3 Credit Hours)

An introduction to the industrial environment relative to health problems and the etiologically related agents.

ENVH 502 Environmental Health Administration and Law (3 Credit Hours)

A review of the concepts and practice of administering environmental health control programs within agencies at the federal, state and local levels. The principles of administration and leadership of programs in the private sector are also discussed. The constitutional, statutory and administrative law bases for organizing and conducting such programs and developing environmental policy as well as the legal implications of enforcement will be addressed. A review of all major environmental statutes and their agencies that enforce them will be addressed.

ENVH 506 Principles of Occupational Safety and Health (3 Credit Hours)

A broad overview of the field of safety. A study of the factors influencing the occurrence of accidents and incidents is set in the context of safety legislation, current issues in the practice of safety and the ethical and professional responsibilities of the safety practitioner. The course also includes discussions of product safety, fire prevention and protection systems safety and human elements in loss prevention.

ENVH 507 Occupational Safety Standards, Laws and Regulations (3 Credit Hours)

A review of the important Occupational Safety and Health Standards and Codes with particular emphasis on application of these codes to typical work situations. Governmental enforcement methodologies are also discussed.

ENVH 520 Communicable Diseases (3 Credit Hours)

An in-depth study of the communicable disease processes as they pertain to environmental sources. A detailed discussion of specific communicable diseases that are manifested by various environmental etiologic agents. Various environmental control measures to prevent the incidence of communicable diseases are presented.

ENVH 521 Food Safety (3 Credit Hours)

A comprehensive study of food and milk production, processing and preservation and controls exercised for the prevention of foodborne illnesses and spoilage.

ENVH 522 Water and Wastewater Technology (3 Credit Hours)

Introduction to water quality management and wastewater treatment technology. Topics include the effect of organic, inorganic and thermal pollutants in water quality streams, waterborne diseases, monitoring concepts, methods of water quality management, regulatory considerations, theory and application of wastewater treatment concepts, wastewater characterization, and treatment methods and disposal methods.

ENVH 523 Vector-Borne Diseases and Their Control (3 Credit Hours)

Vector-borne diseases affect the health and well-being of humans and other animals in a wide variety of ways. Arthropod vectors (e.g., mosquitoes, filth flies, ticks and related groups) transmit numerous debilitating infectious diseases that oftentimes impose significant burden on healthcare systems. This course provides insight on the ways in which arthropods impact global health and economic growth through the diseases they transmit.

ENVH 524 Residential and Institutional Environments (3 Credit Hours)

A study of the physical aspects of housing and institutions as they relate to human health and well-being. Coverage is also given to infection control in health-care facilities.

ENVH 525 Occupational Safety and Health Program Management (3 Credit Hours)

The establishment, implementation and maintenance of occupational safety and health programs. Paradigms of safety, techniques for safety training and creation of value for safety among business managers and employees are emphasized.

ENVH 526 Physical Hazards and Their Control (3 Credit Hours)

An in-depth examination of the varied types of physical hazards in the work environment and the methods of prevention, recognition and control.

ENVH 538 Environmental Emergencies and Disasters (3 Credit Hours)

This course uses a multi-disciplinary approach and draws on theory, case studies, research, and field experience to examine the global problem of environmental emergencies and disasters. Particular attention is devoted to the public health challenges posed by chemical and radiological contamination situations. Students discuss contemporary issues and controversies, complete a paper exploring current issues in the field, and spend time working in teams to craft solutions to key emergency preparedness problems.

ENVH 540 Principles of Ergonomics (3 Credit Hours)

An introduction to the terminology, concepts and applications of physiology, anthropometry, biomechanics and engineering to workplace and work methods design. Emphasis will be given to workplace design and work methods for job safety and health.

ENVH 541 Industrial Hygiene (3 Credit Hours)

An in-depth study of the chemical and physical agents responsible for occupational illness and the methods used for their measurement, evaluation and control.

ENVH 542 Industrial Hygiene Sampling Methods (3 Credit Hours)

An introduction to the detection and sampling alternatives used for estimating worker exposure to hazardous chemical, physical and biological agents in the occupational environment. Field and class activities are intended to simulate select occupational exposure situations and provide a basis for selection of the best evaluation techniques. Emphasis is on quantitative and qualitative methods typically used when estimating employee exposure to hazardous agents and the subjective decision making process.

Pre- or corequisite: ENVH 541 or permission of the instructor

ENVH 545 Air Pollution and Its Control (3 Credit Hours)

The study of air pollution in relation to air quality criteria, pollutant production, atmospheric evolution, measurement and control techniques.

ENVH 546 Physical Hazards Laboratory (2 Credit Hours)

Use and application of sampling methods and equipment for measurement of physical hazards in the work environment. Includes aspects such as ergonomics, noise, vibration and radiation.

Prerequisites: ENVH 541 or permission of the instructor

ENVH 548 Epidemiology and Biostatistics (1-3 Credit Hours)

An introductory course in the principles and practices of epidemiology and the application of statistical and mathematical design and analysis of health research studies for the understanding and control of population health and disease with emphasis on environmental applications.

ENVH 561 Hazardous Waste Management (3 Credit Hours)

Description of the hazardous waste problem, the fundamentals of the chemistry involved with hazardous waste transport, methods of identification, assessment, control, and disposal of toxic and hazardous waste are discussed. In addition the relevant legal statutes, risk assessment emergency response and case studies are presented. Introduction to the toxicological effects of exposure to hazardous waste is discussed.

ENVH 565 Hazardous Materials Management (3 Credit Hours)

The management of hazardous materials includes a wide array of interlocking regulations addressing use, manufacturing, exposure, storage, shipping and disposal. A life cycle review of hazardous materials highlighting best practices and legislation is presented. Useful in preparation for CHMM examination.

ENVH 570 Industrial Environmental Management (3 Credit Hours)

Course addresses day-to-day technical and management aspects of environmental compliance, as well as regulatory issues faced in industrial applications. Includes audits and inspections, air and water pollution and hazardous waste.

ENVH 595 Topics in Environmental Health (1-3 Credit Hours)

Advanced study of selected topics.

ENVH 598 Independent Study in Environmental Health (1-3 Credit Hours)

An opportunity is afforded students to undertake independent study under the direction of a faculty member.

Prerequisites: permission of the Program Director

ENVH 600 Principles of Environmental Health Science and Protection (3 Credit Hours)

An introduction to the chemical, physical and biological factors affecting human health and well being. The emphasis is on the application of controls to prevent disease and maximize environmental quality. (Cross-listed with CHP 602)

ENVH 603 Environmental Epidemiology (3 Credit Hours)

Collection methods, analysis and interpretation of epidemiologic data with environmental and occupational disease emphasis.

ENVH 610 Food Microbiology (4 Credit Hours)

An in-depth examination of requirements for growth of food borne disease organisms. Includes hazard analysis and critical control point methodology.

ENVH 611 Water Pollution Control (4 Credit Hours)

A study of the chemical, physical and biological causes of surface and groundwater pollution. Emphasis is given to onsite wastewater systems and protection of groundwater supplies.

ENVH 621 Advanced Toxicology I (4 Credit Hours)

An in-depth study of the adverse interaction of environmental and occupational chemical agents with humans. Students critically review articles from the current toxicology literature with regard to scientific content, methods and conclusions. Each student presents at least two reviews during the semester.

Prerequisites: ENVH 543

ENVH 632 Environmental and Occupational Health Risk Assessment (3 Credit Hours)

This course is an introduction to quantitative and qualitative risk analysis and examines the fundamental aspects of risk, focusing on environmental, occupational, and public health risks. Hazard identification, exposure assessment, dose-response evaluation, risk characterization, and risk communication are emphasized.

ENVH 643 Principles of Toxicology (3 Credit Hours)

An introduction to the fundamentals of toxicology with emphasis on the interaction of environmental and industrial chemicals with humans are studied. Exposure, dose response, kinetics and distribution of toxicants, metabolism of toxic agents, factors that affect toxicity and introductory chemical carcinogenesis are discussed.

ENVH 695 Selected Topics in Environmental Health (1-3 Credit Hours)

The study of selected topics that may not offered regularly. Special topics will appear in the schedule of classes each semester.

ENVH 722 Control of Hazards in the Workplace (3 Credit Hours)

Advanced methods for evaluation and control of hazards in the workplace.

ENVH 795 Selected Topics in Environmental Health (1-3 Credit Hours)

The study of selected topics that may not be offered regularly. Special topics will appear in the schedule of classes each semester.

Prerequisites: permission of the instructor

ENVH 822 Control of Hazards in the Workplace (3 Credit Hours)

Advanced methods for evaluation and control of hazards in the workplace.

ENVH 895 Selected Topics in Environmental Health (1-3 Credit Hours)

The study of selected topics that may not be offered regularly. Special topics will appear in the schedule of classes each semester.

Prerequisites: permission of the instructor

ENVH 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

EXSC - Exercise Science

EXSC 508 Nutrition for Fitness and Sport (3 Credit Hours)

Emphasizes the role of nutrition as a means to enhance health and performance in sport. Topics covered include energy metabolism and nutrients, regulation of metabolism by vitamins and minerals, and weight control.

EXSC 515 Exercise Testing for Normal and Special Populations (4 Credit Hours)

The application of different methodologies in the measurement of physiologic responses to exercise. Emphasis is placed on understanding American College of Sports Medicine guidelines, appropriate experimental techniques, and equipment necessary to evaluate changes in body composition and various metabolic, cardiovascular, and respiratory adjustments during exercise.

EXSC 517 Biomechanics (4 Credit Hours)

Application of physical laws and mechanical principles to the human musculoskeletal system.

Prerequisites: BIOL 240 or BIOL 250 and MATH 102M or higher with a C or better; PHYS 111N with a C- or better; EXSC 322

EXSC 521 Strength and Conditioning Applications (3 Credit Hours)

A study of the principles and techniques utilized in optimizing physical performance and reducing injury through proper and effective strength and conditioning programs. Special emphasis will be placed on current research findings, breakthrough techniques, advanced weight training techniques, and popular conditioning practices.

EXSC 528 Exercise Prescription for Chronic Disease (3 Credit Hours)

A study of pathophysiology of common diseases with concentration in the design, implementation and administration of exercise prescription for a variety of chronic diseases.

EXSC 531 Wellness Programming and Administration (3 Credit Hours)

An introduction to the principles of administration and implementation of fitness and wellness programs to individuals, groups, centers and corporate settings.

EXSC 580 Exercise Psychology (3 Credit Hours)

Exercise Psychology examines the dynamic influences that psychological factors, environmental factors, and exercise behaviors exert upon one another. The field of exercise psychology actively promotes evidence-based interventions guided by theory and behavior change techniques. Utilization of the scientist-practitioner model involves the ability to consume and appropriately apply contemporary theory and scientific findings to the practice of applied exercise psychology. The content and assignments emphasize the theoretical and applied perspectives on the science and practice of exercise psychology.

EXSC 612 Applied Research Methods in Exercise and Health Science (3 Credit Hours)

This course will prepare students to read, analyze, and apply research related to exercise science, performance, and health. Students will acquire experience in designing research proposals and gain fundamental knowledge related to research methodology. Specific topics covered may include experimental, quasi-experimental and observational research; validity and reliability; sampling strategies; principles of measurement; statistical analysis; and ethics of research.

EXSC 630 Exercise Physiology (3 Credit Hours)

Review of current physiological literature related to muscular exercise including the cardiovascular-respiratory system, metabolic effects of exercise, neuromuscular relationships, and the effects of training or diet, environment, ergogenic aids, temperature, attitude, and other factors on performance and health.

Prerequisites: HPE 509 or equivalent

EXSC 636 Research Problems in Exercise Science (3 Credit Hours)

Practice in the use of statistical and analytical techniques in solving problems in exercise science; supervised student research.

EXSC 642 Clinical Exercise Testing and Prescription (3 Credit Hours)

Principles of diagnostic exercise assessment, cardiovascular physiology, electrocardiography, ACSM guidelines to exercise testing and prescription for symptomatic and asymptomatic populations. Course includes laboratory assignments.

Prerequisites: EXSC 630 or permission of instructor

EXSC 661 Nutrition for Sports and Health (3 Credit Hours)

This course is an in-depth analysis of the role of nutrition in health and human physical and athletic performance. General areas covered include the role of the six major classes of nutrients in health and sport, physiologic and metabolic interrelationships, malnutrition, nutrition in growing and aging, and diet and nutrition in the prevention of disease.

EXSC 668 Internship in Exercise Science (6 Credit Hours)

Designed to provide detailed practical experience (200 clock hours) in an exercise science field setting.

Prerequisites: completion of 18 credit hours of graduate coursework, a minimum graduate GPA of at least 3.0, and permission of the instructor

EXSC 695 Topics in Exercise Science (1-3 Credit Hours)

Selected topic courses in exercise science and wellness.

EXSC 697 Independent Study in Exercise Science (1-3 Credit Hours)

Investigations in exercise science. Problems approved in advance are investigated under the supervision of the faculty advisor.

EXSC 698 Thesis Research in Exercise Science (3-6 Credit Hours)

Master's level thesis research in topics related to Exercise Science.

Prerequisites: permission of the advisor and committee

EXSC 699 Thesis in Exercise Science (3-6 Credit Hours)

Preparation and writing of the master's thesis.

Prerequisites: Permission of the advisor and committee

EXSC 727 Advanced Biomechanics (3 Credit Hours)

Study of the relationships among mechanics, energetics and control of human movement. Emphasis will be placed on the application of mechanical concepts in biomechanics research. Course includes laboratory assignments.

Prerequisites: EXSC 417 or EXSC 517

EXSC 730 Advanced Cardiovascular Exercise Physiology (3 Credit Hours)

A study of the physiology and pathophysiology of the cardiovascular system. Effects of exercise on the system will also be discussed.

Prerequisites: EXSC 630

EXSC 738 Exercise Endocrinology (3 Credit Hours)

This course will focus on the endocrine responses to acute and chronic exercise and how neuroendocrine function relates to health and athletic performance. Emphasis is placed on the role of the endocrine system in regulating substrate utilization during exercise, energy balance, skeletal muscle plasticity, reproductive function, and the aging process.

Prerequisites: EXSC 630

EXSC 740 Ergogenic Aids in Sport and Human Performance (3 Credit Hours)

An ergogenic aid is any technique or substance (nutritional, drug, etc.) used to enhance mental or physical performance. This course introduces students to the various classes of ergogenic aids and critically explores scientific research regarding their use, prevalence, physiological effects, and safety, as well as ethical concerns.

EXSC 827 Advanced Biomechanics (3 Credit Hours)

Study of the relationships among mechanics, energetics and control of human movement. Emphasis will be placed on the application of mechanical concepts in biomechanics research. Course includes laboratory assignments.

Prerequisites: EXSC 417 or EXSC 517

EXSC 830 Advanced Cardiovascular Exercise Physiology (3 Credit Hours)

A study of the physiology and pathophysiology of the cardiovascular system. Effects of exercise on the system will also be discussed.

Prerequisites: EXSC 630

EXSC 838 Exercise Endocrinology (3 Credit Hours)

This course will focus on the endocrine responses to acute and chronic exercise and how neuroendocrine function relates to health and athletic performance. Emphasis is placed on the role of the endocrine system in regulating substrate utilization during exercise, energy balance, skeletal muscle plasticity, reproductive function, and the aging process.

Prerequisites: EXSC 630

EXSC 840 Ergogenic Aids in Sport and Human Performance (3 Credit Hours)

An ergogenic aid is any technique or substance (nutritional, drug, etc.) used to enhance mental or physical performance. This course introduces students to the various classes of ergogenic aids and critically explores scientific research regarding their use, prevalence, physiological effects, and safety, as well as ethical concerns.

EXSC 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

FIN - Finance

FIN 610 Principles of Risk and Insurance (3 Credit Hours)

Risk theory as applied to the various fields of insurance, including life, health, property-liability and employee benefits.

Prerequisites: graduate standing and permission of the graduate program director

FIN 633 The Legal Environment of Business and the Age of Electronic Commerce (3 Credit Hours)

An understanding of the traditional legal environment of business issues is essential for management to successively utilize e-commerce and respond to legal problems that it will present. The course therefore examines dispute resolution, constitutional, tort, criminal, contract and property law, both in the context of traditional business practice and as applied to e-commerce.

Prerequisites: graduate standing

FIN 660 Corporate Finance: Value Management and Creation (3 Credit Hours)

This course focuses on the time value of money; the valuation of securities; an understanding of the types of risk and how it gets factored into a required return; appropriate criteria for evaluating the acquisition of capital assets; determining the proper mix of financing (capital structure), and financial planning. Emphasis will be on integrating accounting and other internally generated information with external economic information to develop a framework for planning and valuing a company and the securities it may issue. The key perspective will be on decision making from the perspective of the impact of management decisions on the value of a company.

Prerequisites: ECON 620 or instructor approval

Pre- or corequisite: ACCT 645 OR ACCT 609 and ACCT 611 OR instructor approval

FIN 668 Finance Internship (1-3 Credit Hours)

The course is a practicum in the field of finance, applying theories, concepts, and financial management tools in a business environment.

Prerequisites: FIN 605, graduate standing, and permission of the department chair

FIN 697 Selected Topics in Finance (1-3 Credit Hours)

Study designed for students who have had one or more of the required courses waived, or for students desiring additional work in a finance area of particular interest.

Prerequisites: permission from the department chair and the graduate program director

FIN 698 Selected Topics in Real Estate (3 Credit Hours)

Study designed for students who have had one or more of the required courses waived, or for students desiring additional work in a finance area of particular interest.

Prerequisites: permission from the department chair and the graduate program director

FIN 699 Selected Topics in Insurance (3 Credit Hours)

Study designed for students who have had one or more of the required courses waived, or for students desiring additional work in an insurance area of particular interest.

Prerequisites: permission from the department chair and the graduate program director

FIN 735 Portfolio Analysis (3 Credit Hours)

A mathematical analysis of modern investment theory. Analyzes return and risk characteristics of individual securities and portfolios and develops valuation models of various financial instruments.

Prerequisites: FIN 605

FIN 737 International Financial Management (3 Credit Hours)

Examines such topics as the financial aspects of international business including financing and hedging activities of firms involved in international transfer of goods and services and decision making in connection with the asset management financing activities of multinational corporations.

Prerequisites: FIN 605

FIN 740 Futures and Options (3 Credit Hours)

In no area of finance is the interface between academic theory and real-world practice as close as in the case of futures and options. We have now reached a stage where it is essential that all finance professionals understand how these markets work, how they can be used, and what determines prices in them. This course addresses all these issues.

Prerequisites: FIN 605

FIN 741 Corporate Financial Policy and Control (3 Credit Hours)

The course will comprise mainly cases but there will be some lecturing particularly on material not covered in FIN 605.

Prerequisites: FIN 605

FIN 795 Selected Topics in Finance (3 Credit Hours)

Designed to provide the advanced student with an opportunity to study independently or in small groups and investigate specific topics of current interest in the field of finance.

Prerequisites: Ph.D. standing and permission of the chair and coordinator

FIN 835 Portfolio Analysis (3 Credit Hours)

A mathematical analysis of modern investment theory. Analyzes return and risk characteristics of individual securities and portfolios and develops valuation models of various financial instruments.

Prerequisites: FIN 605

FIN 837 International Financial Management (3 Credit Hours)

Examines such topics as the financial aspects of international business including financing and hedging activities of firms involved in international transfer of goods and services and decision making in connection with the asset management financing activities of multinational corporations.

Prerequisites: FIN 605

FIN 860 Advanced Financial Theory (3 Credit Hours)

This course discusses the building blocks which much of financial theory is based on. In addition, a number of current topics in the literature are analyzed. Students are expected to read many of the original journal articles.

FIN 861 Seminar in Investments (3 Credit Hours)

The purpose of this course is to be acquainted with recent theoretical and empirical literature on investments, portfolio management and speculative instruments. Emphasis will be placed on the development of methodological approaches to the various research problems.

FIN 862 Seminar in International Finance (3 Credit Hours)

This course is designed to provide an in-depth understanding of the key issues of international financial management. Topics covered include balance of payments, interest rates, international capital flows/markets and asset pricing, foreign exchange risk management, and international capital budgeting.

FIN 863 Seminar in Current Financial Topics (3 Credit Hours)

This course is structured to provide the student with research developments that lie on the frontier of corporate financial management. Topics covered include optimal investment and financing decisions, cost of capital, option pricing theory, equilibrium valuation models, efficient capital markets, capital structure, dividend policy, mergers and acquisitions and international financial management.

FIN 864 Empirical Asset Pricing (3 Credit Hours)

This course represents an advanced study of empirical research methods in finance. It focuses on the empirical techniques used most often in the analysis of financial markets and how they are applied to actual market data. Topics includes: statistical properties of asset returns, nonlinear dynamics, and volatility modeling of financial assets.

FIN 865 Financial Econometrics Methods (3 Credit Hours)

This course is designed to provide an in-depth discussion of econometrics methods used to study financial markets with a focus on time series analysis.

Prerequisites: FIN 864

FIN 895 Selected Topics in Finance (3 Credit Hours)

Designed to provide the advanced student with an opportunity to study independently or in small groups and investigate specific topics of current interest in the field of finance.

Prerequisites: Ph.D. standing and permission of the chair and coordinator

FIN 899 Dissertation (1-12 Credit Hours)

An approved research project, written under the supervision of a faculty advisor, in which the student demonstrates the ability to conduct original research. The complete project must be approved by the dissertation committee.

Prerequisites: FIN 863

FIN 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

FOUN - Foundations of Education

FOUN 611 Introduction to Research Methods in Education (3 Credit Hours)

The primary goal of the course is to provide students with the knowledge and skills to access, evaluate, and synthesize empirical research. The course examines types of educational research and criteria for evaluating empirical studies. It introduces various types of research questions and associated research designs, components of research reports, sampling, validity of measures, threats to internal and external validity, and simple statistics.

Prerequisites: Students in the graduate Counseling program must take COUN 601 before taking this course

FOUN 612 Applied Research Methods in Education (3 Credit Hours)

The primary goal of this course is to provide students with the knowledge and skills to write a research proposal and conduct research. It is intended for those students who are completing a thesis to meet their program requirements, those planning on pursuing a doctoral degree, or those who anticipate conducting research for any other reasons. The course examines types of educational research and criteria for selection of topics for research projects; describes criteria for effective collection and organization of data; review of literature, analysis of data and proposal writing.

FOUN 640 Fundamentals of Measurement and Assessment (3 Credit Hours)

This course stresses the use of measurement and assessment for evaluation and decision making focusing on basic concepts applicable to all types of assessment: statistical concepts, reliability, validity, and interpretive frameworks for cognitive and non-cognitive measures.

FOUN 641 Assessment and Evaluation of Student Learning (3 Credit Hours)

The valid use of formative and summative assessment and evaluation principles for monitoring and promoting students' learning and development will be addressed. Students will learn how to construct and use a variety of formal and informal teacher assessment procedures.

FOUN 650 Human Development and Student Learning (3 Credit Hours)

This course will focus on understanding children's and adolescents' physical, social, emotional, intellectual, and speech/language development; integrating and incorporating children and adolescent differences (economic, social, racial, ethnic, religious, physical, and mental) into understanding developmental issues as they relate to instruction, including the identification and instruction of students with exceptionalities as well as special needs. Research related to the classroom application of these theories is examined and evaluated based on principles of research design and interpretation. Student must be a participant in the Teacher Residency Grant.

FOUN 722 Introduction to Applied Statistics and Data Analysis (3 Credit Hours)

Introduction to basic topics in statistical analysis, including descriptive statistics and simple inferential statistics such as correlation, regression, t-tests, one-way analysis of variance, and chi-square.

FOUN 812 Research Design and Analysis (3 Credit Hours)

This course focuses on the application of advanced research design as it is applied in various educational disciplines. It provides an in-depth examination of quantitative research approaches, sampling techniques, threats to validity, ethical considerations and reviewing, writing quantitative methodology descriptions for research proposals and reports.

FOUN 813 Program Evaluation in Education (3 Credit Hours)

Examines procedures and problems in the design and utilization of program evaluation in education. Identifies evaluation purposes and the methods of evaluation especially as affected by organizational behavior, ethical considerations, and political influences. Evaluation methodology includes, but is not limited to, design considerations, data utilization, and teacher evaluation. Both quantitative and qualitative strategies will be covered.

FOUN 816 Single Subject Research Designs (3 Credit Hours)

This course is designed to provide the student knowledge and skills that relate to single subject methodology. It includes an overview of historical and philosophical foundations, basic issues in behavioral assessment, and single subject research and design methodology, including trend and statistical analysis in single subject research. Students will analyze critically empirical research and be able to plan, implement, and evaluate original research.

FOUN 817 Mixed Methods Research in Education (3 Credit Hours)

This course will provide an overview of mixed methods research, with an emphasis on its application in education. The course will begin with a discussion of the history and philosophy of mixed methods research, and will maintain a focus on the epistemological underpinnings of both mixed methods designs and their component parts. Consideration will be given to a number of research traditions that can be subsumed under the general headings of 'quantitative' and 'qualitative' methods, including surveys, in-depth qualitative interviewing, ethnography, and social network analysis. Methods for collecting, analyzing, integrating, and reporting data from multiple sources will be discussed. The course will have an applied focus and will include lectures, presentations of applied mixed methods research by guest experts, applied and methodological readings, and student presentations.

Prerequisites: FOUN 812 and TLCI 814

FOUN 818 Analysis with Large Datasets (3 Credit Hours)

This course concentrates on sample designs, design-based estimation/inference, data preparation, and analysis of complex survey data in education.

Prerequisites: FOUN 822

FOUN 822 Applied Linear Models in Educational Research (3 Credit Hours)

Introduction to the general linear model with emphasis on concepts and applications of multiple linear regression (MLR) to problems in educational research. Topics include estimation and interpretation of MLR models, relationships between MLR and analysis of variance (ANOVA), logistic regression analysis, and trend analysis.

Prerequisites: FOUN 722

FOUN 823 Analysis of Variance Applied to Educational Research (3 Credit Hours)

Introduction of analysis of variance models as applied in education and human services, including two-way and three-way factorial designs, analysis of covariance, repeated-measures, and mixed-model analysis.

Prerequisites: FOUN 722

FOUN 824 Design and Analysis for Causal Inference in Educational Contexts (3 Credit Hours)

Introduction to research design and statistical analysis for studies intended to support causal inferences. Topics include experimental, quasi-experimental, and ex post facto design and appropriate models for data analysis.

Prerequisites: FOUN 822 and FOUN 823 or permission of instructor

FOUN 825 Applied Multilevel Modeling in Educational Research (3 Credit Hours)

This course focuses on advanced applications of statistics that are used in educational research in various educational disciplines. Specifically, the course will offer an introduction to hierarchical linear modeling (HLM) of nested data as applied to education. Topics include conceptual and statistical background of two- and three-level designs, cross-level interaction effects, and application of multilevel models for repeated measures designs. Emphasis is on estimation, interpretation, and diagnostics for multilevel models of continuous outcomes.

Prerequisites: FOUN 822 and FOUN 823 or instructor permission

FOUN 826 Applied Structural Equation Modeling in Educational Research (3 Credit Hours)

Introduction to structural equation modeling and related multivariate procedures applied to research problems in education. Topics include a brief review of exploratory factor analysis, confirmatory (structural) factor analysis, path analysis, and structural equation modeling with observed and latent variables.

Prerequisites: FOUN 822 and FOUN 823 or permission of instructor

FOUN 827 Applied Logistic Regression (3 Credit Hours)

A practical and conceptual introduction to applying logistic and probit regression models to typical questions in the social sciences. Will utilize SPSS for practical applications covering simple and multiple regression models, interactions and curvilinear effects, multinomial models, testing of assumptions, and select advanced applications such as propensity score matching and missing data analysis.

Prerequisites: FOUN 822 and FOUN 823 or permission of instructor

FOUN 830 Theories of Learning and Instruction (3 Credit Hours)

The course consists of critical discussion and analysis of major learning theories that have influenced learning and instruction in today's schools. Applications of current research to instructional design will be emphasized.

FOUN 831 Human Development in Education (3 Credit Hours)

This course introduces the domain of human development to education students by promoting their construction of a developmental perspective and adoption of a developmental theory to understand education-relevant phenomena. The course will cover central tenets of the developmental psychological perspective, several contemporary developmental approaches, and contexts of development relevant to educational processes. Furthermore, the course aims to promote students' skills in pursuing scientific knowledge about educational topics of interest in human development. The course will address life-span processes; however, the primary emphasis will be on processes and ages associated with formal educational settings (K-16).

Prerequisites: FOUN 830

FOUN 835 Motivation in Education (3 Credit Hours)

The course consists of critical discussion and analysis of major theories of motivation and research supporting these theories. Applications to education and classroom instruction will be emphasized. Equity concerns related to how to motivate students placed at risk will also be examined.

FOUN 836 Metacognition and Self-Regulated Learning (3 Credit Hours)

The course consists of critical discussion and analysis of major theories and research on metacognition and self-regulated learning. Applications to education and classroom instruction will be emphasized. Strategies to promote self-regulated learning among diverse and at-risk students will also be examined.

FOUN 840 Educational Measurement and Assessment (3 Credit Hours)

Overview of advanced educational measurement and assessment ideologies as well as methods. Students will identify, critique, construct and administer educational measures. Psychometric topics such as reliability and validity will be explored as well as advanced assessment issues such as scale construction and item response theory.

FOUN 848 Assessment and Evaluation in Content Areas (3 Credit Hours)

Lecture 3 hours, 3 credits.

FOUN 850 Sociological and Philosophical Foundations of Education (3 Credit Hours)

Students examine the relationship between education and society by reviewing a variety of theoretical perspectives and empirical studies. Topics include: social mobility and stratification; social reproduction; the dynamics of race, class, and gender in education; social capital; the student-teacher relationship; teaching as a profession; and higher education.

FOUN 867 Teaching and Research Practicum (3 Credit Hours)

Advanced graduate students in the Ph.D. Educational Psychology, Research and Evaluation program or other Ph.D. programs will have the opportunity to participate in research, consulting, an internship, or assisting in teaching research and statistics courses.

Prerequisites: FOUN 822 and FOUN 823

FOUN 869 Teaching Statistics Practicum (3 Credit Hours)

Advanced graduate students in the Ph.D. Educational Research, Evaluation and Educational Psychology concentration or other Ph.D. concentrations will have the opportunity to participate in research, consulting, internship, or assisting in teaching research methods and statistics courses.

Prerequisites: FOUN 822 and FOUN 823

FOUN 870 Formative Assessment of Student Learning (3 Credit Hours)

Educators in various leadership and instructional roles need strong skills and knowledge in contemporary assessment of student learning. This course addresses a wide range of student assessment topics which makes connections among assessment practices, self-regulated learning, motivation, feedback, and engagement at the classroom and school levels. Students will learn how to develop, build and sustain formative assessment programs.

FOUN 881 Dissertation Seminar (3 Credit Hours)

Instructor approval required. The primary goal of the course is to develop a dissertation proposal. It is intended for doctoral students who have completed all other coursework. The course covers literature reviews, proposal writing, and obtaining approval from Human Subjects committees. Outlets for disseminating the research findings will be explored.

Prerequisites: FOUN 812, FOUN 814 and FOUN 822 or FOUN 823

FOUN 895 Special Topics in Educational Psychology and Program Evaluation (3 Credit Hours)

Study of selected topics in Educational Psychology and/or Program Evaluation.

FOUN 897 Independent Study (1-3 Credit Hours)

This course will be used for independent studies with Educational Psychology and Program Evaluation faculty members.

FOUN 899 Dissertation (1-12 Credit Hours)

Dissertation credit.

FOUN 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

FR - French

FR 507 Advanced Grammar and Syntax (3 Credit Hours)

This class is designed to solidify and refine students' working knowledge of written skills in the language, with an emphasis on increasing their written sophistication. Focus is on analysis of vocabulary, grammar, and cultural nuances in the syntax to examine how language reflects the ways of life and beliefs of its speakers, contrasted with the extent of language's influence on culture. Students will refine their skills in written inter-cultural communication, paying attention to idioms and the fine points of 'cultural grammar,' communicative competence and specialized discourse to develop excellent communication skills. This course is intended to prepare students for using their knowledge of language and culture in professional settings.

FR 510 Berlin and Paris: Crucibles of European Ideas (3 Credit Hours)

This course explores the cultural movements that have characterized the German-French commonalities and differences from the early 1900s through the 1990s in cross-disciplinary discourses such as film, literature, art, politics, and economics. Cross-listed with WCS 410/WCS 510.

Prerequisites: German and French students must read and write in the target language

FR 515 Applied Phonetics (3 Credit Hours)

This class is a skills-based, laboratory class on French phonetics designed to develop students' mastery of spoken French. Students will acquire a more native-like French accent and see clear correspondences between orthography and pronunciation. By using oral texts with social and cultural themes students acquire knowledge of French pronunciation in a culturally relevant way. Students additionally investigate non-standard accents from Quebec, the south of French, and Belgium.

FR 520 Francophone Civilization (3 Credit Hours)

This seminar traces the historical narratives of French colonialism up until contemporary times, examining the roots of unrest in the Maghreb and other ex-French colonies through representative political, literary, and cinematic texts relating to today's political flashpoints in the Maghreb and West Africa as well as other former French colonies. It also approaches different aspects of France's colonial and post-colonial legacy through a historical lens as students explore texts from such revolutionary leaders as Césaire, Senghor, Memmi and others. Examination of both the revolutionary movements that propelled France's ex-colonies towards independence and France's shifting perspectives from ex-colonizer to Francophone ally.

FR 527 Studies in Seventeenth-Century French Literature (3 Credit Hours)

Following a preparatory period, the political stability of the French monarchy ushers in the golden age of classicism. Representative works from comic and dramatic theater, philosophy, poetry and the evolving novel.

FR 528 Studies in Eighteenth-Century French Literature (3 Credit Hours)

A study of the two main currents of ideas of the Age of Reason or Enlightenment; the rationalistic drive to question established authority, exemplified by the 'Encyclopedie' and leading to the Revolution of 1789; and the Rousseauistic return to nature and emotivity. Representative readings.

FR 537 Studies in Nineteenth-Century French Literature (3 Credit Hours)

A study of the post-Revolutionary (1789) literary movements: Romanticism, Realism, Naturalism, Symbolism, which opened new horizons of modern science and culture in France. Representative works.

FR 538 Studies in Twentieth-Century French Literature (3 Credit Hours)

A survey of representative works and movements in 20th century French and Francophone literature.

Prerequisites: FR 312W or permission of the instructor

FR 569 A History of French Cinema (3 Credit Hours)

This course will function as a survey of French film classics from the birth of cinema through contemporary times, and also shed light on various French cultural and literary movements as they are represented in film (Surrealism, WWII, Nouvelle Vague, decolonization).

Prerequisites: FR 312W or permission of instructor

FR 595 Topics in French (1-3 Credit Hours)

The advanced study of the selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule and will be more fully described by academic advisors.

FR 596 Topics in French (1-3 Credit Hours)

The advanced study of the selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule and will be more fully described by academic advisors.

FR 695 Topics in French (1-9 Credit Hours)

Advanced study of selected topics which may not be offered regularly. These courses appear in the course schedule and are more fully described in a supplement distributed to graduate program directors.

FR 696 Topics in French (1-9 Credit Hours)

Advanced study of selected topics which may not be offered regularly. These courses appear in the course schedule booklet and are more fully described in a supplement distributed to graduate program directors.

FR 697 Tutorial Work Topics in French (1-3 Credit Hours)

This course will allow an individual student to pursue a special topic or project under the guidance of a professor.

Prerequisites: Approval of project

FR 698 Tutorial Work Topics in French (1-3 Credit Hours)

This course will allow an individual student to pursue a special topic or project under the guidance of a professor.

Prerequisites: Approval of project

FR 795 (3 Credit Hours)

The advanced study of the selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule and will be more fully described by academic advisors.

GDES - Graphic Design

GDES 697 Tutorial in Graphic Design (3 Credit Hours)

Tutorial is a self-directed learning experience where students work on a project of their devising under the supervision of a faculty member.

Prerequisites: Instructor permission required

GEOG - Geography

GEOG 500 Seminar in Geography (3 Credit Hours)

Advanced study of a specialized topic in geography. The choice of the topic may vary according to the availability of faculty expertise and student interest.

GEOG 501 Global Environmental Policy (3 Credit Hours)

This course analyzes the causes, severity, potential consequences, and proposed solutions regarding global ecological issues with special attention to the scientific debate and the political and policy process. It examines environmental policies of national governments, regional/international organizations and global conferences.

Prerequisites: GEOG 100S or GEOG 101S or GEOG 102T or POLS 100S or POLS 101S or POLS 102S or permission of the instructor

GEOG 502 Geographic Information Systems (3 Credit Hours)

A study of the conceptual basis of GIS as a tool for manipulating spatial information. The course focuses on how geographic information can be input and organized within the framework of a GIS. Students will work on a computer-based GIS to gain a greater understanding of spatial database structures and analytical operations.

Prerequisites: Junior standing, GEOG 102T, or permission of instructor

GEOG 504 Digital Techniques for Remote Sensing (3 Credit Hours)

Study of the theory and application of remote sensing, emphasizing environmental applications and aerial and satellite imagery. Covers the fundamentals of multispectral digital image processing, including sensors pre-processing, enhancement, classification, accuracy assessment, and GIS data integration.

Prerequisites: Junior standing, GEOG 102T, or permission of instructor

GEOG 505 Seminar in International Resource Management (3 Credit Hours)

Discussion of the ecological and management principles underlying international resource management and the goal of attaining a sustainable, ecologically balanced world.

GEOG 508 Cartography (3 Credit Hours)

Computer-assisted methods and techniques employed in the design, construction, and use of maps and other graphics as tools for data analysis and communication.

GEOG 509 Drone Applications Proseminar (3 Credit Hours)

Survey of the state-of-the-art geospatial applications of small Uncrewed Autonomous Systems (sUAS) mapping, surveying, and modeling. Course combines seminars spanning application sectors of research and professional practice; lectures on mission planning, operations, analysis and regulations; and hands-on practical exercises incorporating risk management, safety, ethics, and legal issues.

Prerequisites: GEOG 502 or permission of instructor

GEOG 510 Seminar in Urban Geography (3 Credit Hours)

Discussion of specific urban and metropolitan problems based on outside readings and individually selected research topics.

GEOG 511 Urban and Regional Planning (3 Credit Hours)

A study of planning concepts and principles used to guide contemporary metropolitan growth and development. Emphasis is on the application of planning tools and methods that guide the planning process from conception to execution.

GEOG 512 Cities of the World (3 Credit Hours)

An examination of cities of the world's major cultural realms with an emphasis on the urban landscape as it varies between developed and developing countries.

GEOG 517 GIS for Planning and Public Policy (3 Credit Hours)

Geographic Information Systems (GIS) and science are an essential tool for urban planners and policy makers who have special interests in places and who need this kind of knowledge for decision making. The purpose of this course is to teach students the foundations of GIS and how it is applied in urban planning and other related disciplines. The course combines lectures, discussion of readings, and hands-on exercises in the computer lab.

Prerequisites: GEOG 402 or GEOG 502 or permission of the instructor

GEOG 519 Spatial Analysis of Coastal Environments (3 Credit Hours)

The course integrates remotely sensed and field techniques for scientific investigation and practical management of coastal environmental systems. Spatial modeling of coastal processes and management tools using Geographic Information System (GIS).

Prerequisites: GEOG 300, GEOG 402 or GEOG 502, or permission of instructor

GEOG 520 Marine Geography (3 Credit Hours)

An analysis of the environmental geography and resources of the ocean, with particular emphasis on geospatial analysis of the seafloor, hydrography, climate change, fisheries, ocean pollution, maritime activity spaces and management.

Prerequisites: GEOG 502 or permission of the instructor

GEOG 522 Coastal Geography (3 Credit Hours)

An examination of the physical and human geography of the coastal zone. Considers problems of managing coastal resources with an emphasis on North America. Lectures focus on coastal patterns, processes, and problems at the global, national, and local scales. Students investigate a section of the local coastline and write a report on the physical and human geography on the basis of field study, library, and internet research.

GEOG 524 Weather, Climate, and Society (3 Credit Hours)

Weather and climate play a pivotal role in nearly every aspect of life. How does temperature relate to health outcomes? What impact does El Niño have on Peruvian farmers? How is the issue of climate change reflected in national security policy? Why? Topics also include the energy balance equation, remote sensing techniques, and climatological data acquisition and analysis. Beyond an understanding of the complex processes that dictate the flow of the atmosphere, the course analyzes the socioeconomic, political, and cultural perspectives of climate and weather. The course also provides a framework for stewardship and responsibility to the future.

Prerequisites: GEOG 100S, 101S, or permission of the instructor

GEOG 525 Internet Geographic Information Systems (3 Credit Hours)

Theoretical and practical exploration of methods, standards, and policies related to the development and utilization of geographic information systems on the Internet. Students will create and utilize distributed geospatial data and analytical systems using the WWW and the Internet to address geographical problems.

Prerequisites: GEOG 502

GEOG 532 Advanced GIS (3 Credit Hours)

The study of a series of advanced topics in the field of geographic information systems/science. Focus is placed on the development of projects/models and a survey of several advanced techniques. Students will work on a computer based GIS to implement topics from lectures.

Prerequisites: GEOG 502

GEOG 546 Geography, Gender, and Sexuality (3 Credit Hours)

This course examines gender identity and sexuality in all of their diverse forms through a lens of human geography, such as metaphors of space and place, the cultural landscape, and 'mapping territory.' Topics explored include global gender identities; 'queer space; 'locating' gender and sexuality within the arts and tourism; the gendered citizen and the nation; and political economies of gender and sexuality.

GEOG 551 Europe (3 Credit Hours)

A geographical analysis of the interrelationships among physical, cultural, economic, and political factors in Europe.

GEOG 552 Africa (3 Credit Hours)

A geographical analysis of the interrelationships among physical, cultural, economic, and political factors in Africa.

GEOG 553 Asia (3 Credit Hours)

A geographical analysis of the interrelationships among physical, cultural, economic, and political factors in Asia excluding the Middle East and the former USSR.

GEOG 554 Latin America (3 Credit Hours)

A geographical analysis of the interrelationships among physical, cultural, economic, and political factors in Latin America.

GEOG 555 The Middle East (3 Credit Hours)

A geographical analysis of the interrelationships among physical, cultural, economic, and political factors in the Middle East.

GEOG 558 Geography of Virginia (3 Credit Hours)

An analysis of Virginia's population, resources, and regional landscapes as they have been influenced by physical, cultural, historical, and economic factors.

GEOG 560 Medical Geography (3 Credit Hours)

The course covers a range of topics in medical and health geography, including spatial behaviors of infectious disease and health care access. The focus of the course is on the geographical patterns of health and disease from the population rather than individual scale. In addition to seminar style lectures and discussions, the course enables students to further investigate by learning how to conduct medical/health geography research.

GEOG 562 Advanced Spatial Analysis (3 Credit Hours)

This course introduces the essential theoretical concepts and analytical tools for analyzing spatial process, spatial autocorrelation, spatial patterns, techniques for spatial interpolation, network connectivity, big data, and landscape patterns. The course culminates with students carrying out their own spatial analysis projects. This course assumes that students understand the basic concepts in GIS with some experience in software operation of ArcGIS.

Prerequisites: GEOG 402 or GEOG 502, or permission of the instructor

GEOG 563 GIS Programming (3 Credit Hours)

This course develops students' GIS programming skills. Focus is placed on Python programming in ArcGIS and JavaScript in Web GIS development.

Prerequisites: GEOG 402 or GEOG 600

GEOG 564 Advanced Environmental Geography Seminar (3 Credit Hours)

The objective of the course is to provide students with a deeper understanding of the current concepts and debates in environmental geography. By exploring the ethical and philosophical foundations of the field, the course considers the environment's opportunities and constraints. While topics may include climate change, agricultural security, and renewable energy, the course will be driven by student-led discussions and participation. Critically thinking about complex phenomenon, the seminar will include various weekly readings, discussions, and writing assignments.

GEOG 573 Geographic Information Systems for Emergency Management (3 Credit Hours)

Students will demonstrate advanced skills and techniques using spatial data to prevent, mitigate, respond to, and recover from intentional, natural, and accidental homeland security threats and emergencies. This course demonstrates the importance of rapidly disseminating spatial information towards the prevention and response of various organizations to homeland security events. This course will provide students with the tools and experience required to collect, prepare and manage spatial data and enable students to be prepared to map and analyze the data to quickly and effectively create a coordinated response to real homeland security events.

Prerequisites: GEOG 100S, GEOG 101S, GEOG 102T, or permission of the instructor

GEOG 575 Urban Resiliency (3 Credit Hours)

This course examines the multifaceted interface of built and natural environments and their impacts on land use management at spatial and temporal scales. It evaluates the impact of population pressure on sustainability through a survey of urban areas and analyzes urban planning and management capacities to maintain resilience despite environmental and technological hazards.

Prerequisites: GEOG 100S, 101S, or equivalent or permission of the instructor

GEOG 590 Applied Cartography/GIS (1-3 Credit Hours)

Practical experience in applying the principles of cartography and geographical information systems to the design and construction of maps and other graphics.

GEOG 595 Topics in Geography (1-4 Credit Hours)

The advanced study of selected topics which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule, and will be more fully described in information distributed to academic advisors.

GEOG 596 Topics in Geography (1-4 Credit Hours)

The advanced study of selected topics which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule, and will be more fully described in information distributed to academic advisors.

GEOG 597 Independent Research in Geography (1-3 Credit Hours)
Independent reading and study on a topic to be selected under the direction of the instructor. Conferences and papers as appropriate.

GEOG 598 Tutorial Work in Geography (1-3 Credit Hours)
Independent research under the supervision of a faculty member.

GEOG 600 Geospatial Data Analysis (3 Credit Hours)
Course focuses on the fundamentals of geospatial data science. Students learn the key data models, structures, sources, and application of spatial analysis using GIS software, R, programming, and Earth observations.

GEOG 601 Spatial Statistics and Modeling (3 Credit Hours)
This course covers the foundations of spatial statistics and modeling. Emphasis is placed on point, linear and areal patterns, geostatistics, and model development for a variety of problems using multiple software packages.

GEOG 620 Seminar in Political Geography (3 Credit Hours)
A study of the interrelationships of political and geographic phenomena, and theories of geopolitics; examines in a seminar format the political geography both of specific topics such as the national integration of states, refugees and resources, and of particular regions of the world.

GEOG 668 Internship (1-6 Credit Hours)
Individualized practical experience.

GEOG 695 Selected Topics in Geography (1-3 Credit Hours)
Advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest.

GEOG 696 Selected Topics in Geography (1-3 Credit Hours)
Advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest.

GEOG 697 Independent Research in Geography (1-3 Credit Hours)
Independent research in geography under the supervision of a faculty member.

GEOG 720 Cultural Geography Seminar (3 Credit Hours)
This seminar examines the field of cultural geography with: 1) an emphasis on theories and concepts developed over the past twenty years in 'new' cultural geography, and 2) cultural geography's emphasis on issues such as place, power, landscape and identity.

GER - German

GER 507 Advanced Grammar and Syntax (3 Credit Hours)
This class is designed to solidify and refine students' working knowledge of written skills in the language, with an emphasis on increasing their written sophistication. Focus is on analysis of vocabulary, grammar, and cultural nuances in the syntax to examine how language reflects the ways of life and beliefs of its speakers, contrasted with the extent of language's influence on culture. Students will refine their skills in written inter-cultural communication, paying attention to idioms and the fine points of 'cultural grammar' communicative competence and specialized discourse to develop excellent communication skills. This course is intended to prepare students for using their knowledge of language and culture in professional settings.

GER 508 Conversation and Composition (3 Credit Hours)
This course is designed to further develop the mastery of spoken and written German, review grammar, build vocabulary and fine-tune the student's stylistic proficiency in German. The textbook *Anders gedacht* is an intermediate/advanced reader that covers a wide variety of historical, political and cultural events and developments in contemporary German speaking countries. The *Übungsbuch* accompanies the grammatical and thematic features of the textbook and provides further exercises. The course will be complemented by several video screenings and multi-media presentations covering a variety of aspects in contemporary German speaking culture.

GER 510 Berlin and Paris: Crucibles of European Ideas (3 Credit Hours)
This course explores the cultural movements that have characterized the German-French commonalities and differences from the early 1900s through the 1990s in cross-disciplinary discourses such as film, literature, art, politics, and economics. Cross-listed with FLET 510.
Prerequisites: German and French students must read and write in the target language

GER 520 Masterpieces of German Poetry (3 Credit Hours)
This course will delineate 800 years of German poetry, analyzing exemplary works within their cultural and historical context such as the courtly love tradition of the Middle Ages, the spirituality of the German Reformation, the (meta-)physical passions of the Baroque, the humanist ideals of Weimar Classicism, the profound longings and ultimate ironies of German Romanticism, fin de siècle symbolism and European decadence, the avant-garde of Weimar culture, the legacy of the Third Reich, and the poetics and politics of East/West Germany up to the fall of the Berlin Wall and the unification of Germany. The close readings will be complemented by videos, film clips, slides and musical samples. Readings and discussions in German.

GER 545 German Cinema I (3 Credit Hours)
The first half of the 20th century was the most creative and destructive period in German and European history. Its rich cultural achievements included Viennese psychoanalytical theory of the turn of the century, Art Nouveau, German Expressionism, and the avant garde aesthetics of the Weimar Republic. Conversely, World War I and II exposed the cultural agony and human depravity of modern civilization. This course will trace these various aspects and developments in a variety of exemplary genres. Readings and discussions in German. (Cross-listed with WCS 445/WCS 545 and COMM 444/COMM 544)

GER 546 German Cinema II (3 Credit Hours)
This course will focus on the German cinema from perspectives such as fascism and its legacy, film as historical critique, or Weimar cinema. This survey course covers major German movies in film history from the 1970's to the present. (Cross-listed with WCS 445/WCS 545 and COMM 444/COMM 544)

GER 550 German Satires and Parodies (3 Credit Hours)
A study of comical and satirical features in exemplary literary and visual texts ranging from late medieval broad sheets and moralistic narratives to postmodern parodies in literature, music, film and graphic design. Students will study a wide variety of texts and analyze them as critical reflections of their social and cultural contexts, which include the spiritual conflicts and religious challenges of the Age of Renaissance and Reformation, anti-Nazi collages, and the permanent quest for pleasure and entertainment in our present-day multi-media Spassgesellschaft (fun society). Readings and discussions in German.

GER 555 Germany 1900-1945: From High Culture to Holocaust (3 Credit Hours)
The first half of the 20th century was the most creative and destructive period in German and European history. Its rich culture achievements included Viennese psychoanalytical theory of the turn of the century, Art Nouveau, German Expressionism in painting and poetry, and the avant garde aesthetics of the Weimar Republic (film, dance, cabaret, architecture etc). They played a central part in the evolution of a modern and postmodern sensibility. Conversely, World War I and World War II exposed the cultural agony and human depravity of modern Civilization. This course will trace these various aspects and developments in a variety of exemplary verbal and visual texts, including the genres of poetry, novella, drama, painting and film. Readings and discussions in German.

GER 570 Post World War II Germany (3 Credit Hours)
The course will cover representative literary texts and cultural events of divided and united Germany, including Heinrich Böll, Günter Grass, Max Frisch, Christa Wolf, Doris Dörrie et al, as well as film, painting, popular music, the culture of memory and German Jewish relations after the Shoah.

GER 576 German-Jewish Literature and Culture (3 Credit Hours)
A survey of seminal texts by German-Jewish philosophers and writers from the Enlightenment to the present day, including Marx, Kafka, Freud, Schnitzler and Arendt. (cross-listed with WCS 476/WCS 576).

GER 578 German Drama (3 Credit Hours)

This course provides a survey of representative examples from 200 years of German drama. Texts include plays from Weimar Classicism, Young Germany, Naturalism and Symbolism, fin de siècle Vienna, German Expressionism, Weimar Modernism, Exile Literature, "Vergangenheitsbewältigung" (texts of coming to terms with the past), and post-modern experimentalism. The course will focus on issues such as mythology, psychopathology, sexual morality, epic theater, Marxist ideology, fascism and guilt, and feminist politics and aesthetics. The readings will be complemented by screenings of various film adaptations. All readings and discussions are in German.

Prerequisites: GER 311 and GER 312W

GER 595 Topics in German (1-3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule.

Prerequisites: appropriate survey course or permission of the instructor

GER 596 Topics in German (1-3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule.

Prerequisites: appropriate survey course or permission of the instructor

GER 695 Topics in German (1-9 Credit Hours)

Advanced study of selected topics which may not be offered regularly. These appear in the course schedule and are more fully described in a supplement distributed to graduate program directors.

GER 696 Topics in German (1-9 Credit Hours)

Advanced study of selected topics which may not be offered regularly. These appear in the course schedule and are more fully described in a supplement distributed to graduate program directors.

GER 697 Tutorial Work in German (3 Credit Hours)

This course will allow an individual student to pursue a special topic or project under the guidance of a professor.

Prerequisites: approval of project

GER 698 Tutorial Work in German (3 Credit Hours)

This course will allow an individual student to pursue a special topic or project under the guidance of a professor.

Prerequisites: approval of project

GRAD - Graduate

GRAD 668 Graduate Internship (0 Credit Hours)

Student participation in a professional work experience for which credit will not apply to the degree. Approval for enrollment is determined by Monarch Internship and Co-Op Office (MICO). Experience must be related to the student's major or career area of interest, include adequate supervision by a professional, and include at least an average of 8 hours per week.

Prerequisites: Good academic standing (Graduate GPA of at least 3)

GRAD 700 Professional Development (1 Credit Hour)

This course is a professional development course for graduate students that will better prepare them for success in graduate school and subsequently in their careers and the academy. It focuses on establishing a multidisciplinary community of scholars, and encouraging joint exploration of the academy and its expectations, socialization and networking, future career paths, and other relevant issues. Students will develop a professional portfolio to integrate learning, document progress along their professional development plan, and showcase their academic and professional achievements.

HADM - Healthcare Administration

HADM 600 Introduction to Health Care Systems (3 Credit Hours)

This course is designed to help students learn about essential aspects of the organization, financing and delivery of healthcare in the United States. Students will acquire an enhanced understanding of the complex US health care system. The course has a macro-level orientation; however, the material necessitates considering how the many facets of the US healthcare system affect communities, families and individuals. The US healthcare system is like an ecosystem with various sub-components that interact with each other and with broader social, economic and political forces to create a complex, dynamic and intricate system. We can change the healthcare system, but we need to consider how proposed changes will affect other components of the system and broader society as well as what resistance various stakeholders will likely put forth.

HADM 601 Policy and Politics of Health (3 Credit Hours)

Policy and Politics of Health, explores the development, implementation, and evaluation of health policies in the United States. Health policies include those that address the organization, financing, provision, and evaluation of both personal and public health services. The tension between government's role in providing for the general welfare and protecting the public's health while recognizing the privacy rights of the individual will receive considerable attention as will the provision of healthcare within the context of a federal system of government. The long-term trend toward a more expansive role for governmental institutions and the media and the differential impact of economic, cultural and social factors, interest groups, social disparities and public opinion will be addressed in some detail. Students will develop an understanding of the policy process and the most common approach to policy research. The course includes exercises that will lead to a more comprehensive understanding of the most important types of public policy in the US healthcare system and the capacity to conduct a reasoned analysis of a policy issue.

HADM 602 Organizational Management (3 Credit Hours)

A study of management theory, organizational management and behavior as related to leadership, organizational design, culture, processes, workforce strategy and change management with an emphasis on the application of theory and research to organizational management and behavior. This course provides an opportunity to explore conceptual frameworks addressing organizational behavior, development, leadership, strategy and management of change.

HADM 605 Health Law and Ethics (3 Credit Hours)

This course examines legal, regulatory and ethical issues health professionals are likely to confront. In this course, we will examine the legal principles needed to analyze regulatory and liability issues. We will study selected principles and policies under-girding health the American system of health law, including common law principles of liability and federal/state legislation regulating health professionals and operations. We will also discuss the impact of state and federal law on the operation of various health-related organizations.

HADM 606 Health Economics (3 Credit Hours)

This is an introductory health economics course designed to provide students with a basic understanding of concepts in economic theory and analysis applied to healthcare delivery in the US. Health economics offers a conceptual framework and analytic tools for assessing the inter-relationships among healthcare resources, providers, consumers and markets. In other words, we will study how scarce health-related resources are allocated along with various incentives and structural frameworks that can impact those allocations.

HADM 607 Effective Information Technology for Healthcare Organizations (3 Credit Hours)

This course provides the key concepts related to information technology within healthcare organizations. The course explores how information technologies are used as a tool to enhance performance within healthcare organizations for positive health outcomes. Topic areas include various information technologies used in the healthcare sector; methods for assessing and ensuring information technology value; laws, regulations and standards to guide the practice; achieving effectiveness through information technology; and the latest developments including business and clinical intelligence and telemedicine.

HADM 610 Financing Healthcare (3 Credit Hours)

This course covers financial management in healthcare organizations including, but not limited to, financial decision-making using accounting information, operation of business units, principles of economics and capital budgeting processes along with budgetary and financial controls. Financial performance will be analyzed along with revenue determination and profitability. General accounting foundations and terminology will be covered.

HADM 611 Operations Management and Performance Improvement (3 Credit Hours)

To achieve performance improvements in the areas of cost, clinical quality, functional outcomes and service quality, healthcare managers must focus on the design, execution and management of operations. This course covers analytical techniques to support quantitative managerial decision-making in healthcare. Building on a 'system-based' approach to the healthcare environment, analytical tools are examined to aid problem solving and decision-making in healthcare organizations.

HADM 612 Administrative Introduction (1 Credit Hour)

The administrative introduction course provides students with no previous work experience in healthcare with a supervised experience in an approved organization. The introduction will expose the student to different aspects of working in a healthcare care environment, such as working with different professionals and gaining a deeper understanding of the complex nature of healthcare.

HADM 700 Leadership (3 Credit Hours)

The emphasis of this course is on the practice of leadership. The course will equip the student with the basic managerial background, fundamentals and the theories which will be applicable at any level in management and in a leadership position. Students will be exposed to the interaction of leadership, change, communication and power as seen in the healthcare environment. This course will examine the traits of leadership, developing leadership skill, creating a vision and managing conflicts and obstacles in an organization.

HADM 701 Supply Chain Management (3 Credit Hours)

This course focuses on the preparation of healthcare administrators for supply chain management. The concentrations for the course include healthcare value analysis, contract management, purchasing, warehouse management, equipment management, product standardization, just-in-time approaches and biomedical engineering.

HADM 702 Healthcare Marketing (3 Credit Hours)

This course examines marketing principles, concepts and skills applied to healthcare organizations and healthcare networks. Students will examine marketing methodologies and principles for evaluating consumer decision making actions for healthcare services. The course will place emphasis on social media and electronic forms of marketing healthcare services. The course will culminate with the development of a strategic healthcare marketing plan.

HADM 705 Conflict Analysis & Negotiations (3 Credit Hours)

This course will provide students with advanced knowledge and skills in the theory of conflict analysis and resolution, including but not necessarily limited to: Skill development and collaborative problem solving at the individual, group, and organizational level; and conceptual and practical skills in negotiation that are essential for managers. Third-party conflict intervention, which can assume a number of forms such as fact-finding, conciliation, mediation and arbitration.

HADM 706 Healthcare Strategy (3 Credit Hours)

This course is designed to help students learn about essential aspects of strategic planning and strategic management in the context of healthcare service organizations. Students will acquire an enhanced understanding of the complex US healthcare system, apply planning concepts to formulate mission and vision statements, and formulate goals and objectives as part of a strategic plan. The course content will also address aspects of organizational leadership, along with the importance of implementation and monitoring progress to achieve continuous quality improvement and to 'close the loop' with strategic planning initiatives.

HADM 715 Administrative Residency (3 Credit Hours)

The residency provides students with an in-depth supervised experience in an approved organization. The residency will require students to complete a project related to an actual healthcare administration issue that is a focus within the organization. The purpose of the graduate Administrative Residency is to provide an opportunity for the student to apply, in a practice setting and under the direction of a Preceptor, the competencies, knowledge and skills they have acquired through their healthcare administration course work. It requires the student integrates and synthesizes knowledge and skills through the application of health administration theories and principles to the development and implementation of a special project in a selected domain of professional health administration practice.

HIED - Higher Education

HIED 708 Foundations of Higher Education (3 Credit Hours)

An examination of the historical foundations and contemporary challenges facing higher education leaders. Coursework encourages students to explore linkages between research, theory, and practice, promoting a nuanced understanding of differing perspectives on complex and evolving issues. Development of graduate-level writing is emphasized.

HIED 710 Student Affairs Administration (3 Credit Hours)

An overview of the student affairs function across diverse institutions, by connecting the history of higher education with contemporary issues facing student affairs professionals. Students will spend time exploring various student affairs functions, connecting the importance of student learning and development outside the classroom. In addition, students will explore the dynamics of student affairs organizations while identifying personal long- and short-term student affairs career goals.

Prerequisites: COUN 707

HIED 712 Strategic Planning (3 Credit Hours)

This course provides the necessary knowledge and skills for administrators to both participate in and lead a strategic planning effort. Students will explore the role of strategic planning and institutional effectiveness in the context of changes in funding and demands for accountability.

HIED 720 The Private College and University (3 Credit Hours)

The U.S. Higher Education system contains great diversity due to the inclusion of private institutions. This course will examine the structure and organization of Higher Education in the U.S. as well as differences and similarities between private and public institutions.

HIED 725 Higher Education Politics and Policy (3 Credit Hours)

This course examines policy-in-action to help students understand how policies are developed at the organizational, state, and national levels, while gaining an understanding of the interplay of public perception and policymaking that can impact university operations. Students will explore the process by which policies are made, and they will consider why some problems are escalated to the public agenda, why some solutions are adopted and others rejected, and why some policies appear to succeed while others seem to fail.

HIED 733 Professional Helping Skills in Higher Education (3 Credit Hours)

This course explores the benefits of developing student response and support skills and how they affect the day-to-day role of a student affairs professional. Students will work in small groups to acquire the knowledge, skills, and attitudes necessary to provide support, direction, and guidance to individuals and groups. Guest speakers currently working in student affairs roles will be featured.

HIED 743 Campus Internationalization (3 Credit Hours)

This course examines the four key professional practices of campus internationalization: comprehensive internationalization, international student enrollment, international student and scholar services, and education abroad. Students learn the importance of aligning internationalization on-campus through courses, curriculum, international students, and internationalization programs, all of which help to connect the institution to the changing local and global community. Guest speakers will address competencies for international educators and provide insights on functional areas in international education.

HIED 744 Global Higher Education Systems: A Comparative Approach (1-3 Credit Hours)

An examination of the development of the three primary systems of higher education in the world today: the U.S., British and European (Continental) systems. The course will also examine, as appropriate, other systems of higher education from around the world. A study abroad component is required, for which additional costs will apply.

HIED 745 Today's College Student (3 Credit Hours)

A survey of college student experiences, with an emphasis on growth and development. Coursework will encourage students to apply theory to practice.

HIED 752 The Law of Higher Education (3 Credit Hours)

An exploration of the legal issues facing higher education in the United States. Topics to be discussed include the foundations from which higher education law emerges, current case law, state and federal statutory law, and contract law, as well as risk management and liability issues. Students may have the opportunity to visit the Supreme Court and to view oral arguments. Additionally, the course will address the ethical issues faced when shaping and implementing institutional policy, curriculum, and procedures.

HIED 756 Institutional Finance and Resource Management (3 Credit Hours)

This course examines the budget process in colleges and universities, as well as the impact of budget activities on all areas of planning and operations within an institution. It will cover elements of educational finance, including budgeting and resource management, with a focus on process and environmental factors that affect how institutions operate. Students will develop and enhance their abilities to write and speak effectively about finance-related issues.

HIED 757 Learning Environment Design and Assessment (3 Credit Hours)

This course provides students with skills to design educational experiences, plan educational programs, and conduct research on a variety of teaching and learning-related questions. Participants will consider the meaning of learning and the various contextual factors that influence the learning process in higher education, as well as the application of the learning sciences to the design of learning environments. Students will focus on creating inclusive, diverse, and equitable educational environments and use their insights to improve the practices through assessment.

HIED 758 Higher Education Leadership (3 Credit Hours)

This course provides students with the basic theory, knowledge and skills needed to be an effective leader within higher education institutions. Classes are designed for those who intend to pursue careers as higher education practitioners. Course assignments will take a practical approach to applying theoretical principles and identifying students' personal leadership styles.

HIED 761 Higher Education Capstone (3 Credit Hours)

The culminating experience for the master's degree, intended to integrate and apply the knowledge gained in the degree program to complex issues regarding policy and practice in higher education. Groups of students address a real world problem currently faced by a department or unit on campus and work on comprehensive portfolios.

HIED 762 Institutional Advancement (3 Credit Hours)

An exploration of institutional advancement in the areas of institutional marketing, event management, campaign development, social media, donor identification and cultivation, planned giving, corporate partnership development, and foundation management.

HIED 763 Topical Issues in Higher Education (3 Credit Hours)

This course provides a thorough analysis and dissection of a rotating, current issue in higher education, covering a broad range of higher education administrative areas. For each issue, students will examine relevant benchmark law, contemporary issues, historical perspectives, political realities, institutional missions and cultures, ethical considerations, leadership and management approaches, and courses of action available to decision-makers.

HIED 764 College and the University Presidency (3 Credit Hours)

This course is designed to provide greater understanding of the leadership role of college and university presidents and the multiplex of issues associated with the office of the presidency at the various types of American institutions. The course will utilize case study analysis, guest presentation, and review of the literature. There will be rigorous discussion, readings, and analyses in a collegial and reciprocal learning environment.

HIED 765 Adult and Continuing Education (3 Credit Hours)

An advanced seminar emphasizing the historical, philosophical, and institutional analyses of the development and status of adult and continuing education within the higher education community.

HIED 768 Internship in Higher Education Administration (3 Credit Hours)

The University advisor and site supervisor work together with students to develop and implement a set of objectives intended to familiarize them with the operation of an administrative area within an institution of higher education, to assist them in acquiring the practical skills necessary for the operation of that office, and to develop skills that are transferable to other administrative areas.

HIED 770 External and Internal Relations for Higher Education (3 Credit Hours)

This course serves as an introduction for prospective and current administrators to the social and political context of the higher education environment and its various constituencies. It will teach them to recognize the impact of politics, socioeconomic situations, diversity, media, monetary issues, and equity issues on their leadership practices.

HIED 771 Global and Intercultural Perspectives in Higher Education (3 Credit Hours)

This course explores global and intercultural issues for higher education leaders. Students examine issues encountered by student affairs and higher education professionals from global and intercultural perspectives, including program design and evaluation, partnerships between individuals and organizations worldwide, and budgeting and staff management. The course will prepare students with knowledge and skills that can be used to promote internationally-oriented practice, professional dialogue, and research.

HIED 793 History of Higher Education (3 Credit Hours)

An examination of the history of higher education and its connection to current higher education events. The course provides an understanding of the foundations of higher education, including European influences, societal forces, and economic factors.

HIED 794 Governance, Organization, and Administration of Higher Education (3 Credit Hours)

An exploration of how organizational structures, behavior, culture, and context influence institutional governance and administration. In-class activities examine the approaches institutions use in decision-making. Through discussion of assigned readings, current events, and guest lectures, students learn how institutions govern themselves and the effects of various governance practices. Case studies, role playing, and active discussion allow students to apply theoretical perspectives to the practical workings of higher education administration.

HIED 795 Topics in Higher Education Administration (1-6 Credit Hours)

Study of selected topics in higher education administration.

Prerequisites: permission of the instructor

HIED 797 Independent Study (1-3 Credit Hours)

Independent study of special topics in higher education for master's students.

Prerequisites: Permission of the instructor

HIED 805 Contemporary Issues in Higher Education (3 Credit Hours)

Explores issues of contemporary concern among practitioner-scholars in American higher education. The course utilizes a historical perspective to establish the background for the discussion of the issues influencing higher education today. Coursework and readings provide a nuanced understanding of differing perspectives on complex issues. Research and professional practice are examined through an issues based format that challenges students to develop and support their perspectives on the issues discussed. Doctoral-level writing is emphasized.

HIED 808 Foundations of Higher Education (3 Credit Hours)

An examination of the historical foundations and contemporary challenges facing higher education leaders. Coursework encourages students to explore linkages between research, theory, and practice, promoting a nuanced understanding of differing perspectives on complex and evolving issues. Development of graduate-level writing is emphasized.

HIED 809 Proseminar in Doctoral Studies (1-3 Credit Hours)

This course is designed to be taken in three parts throughout the program. It provides information on the doctoral process to help students successfully navigate their programs. It helps doctoral students enhance their abilities to search the scholarly literature; narrow their research topics; and improve their critical reading and inquiry, critical thinking and analysis, and writing. It focuses on approaches to scholarly writing in the field, strategies for inviting and providing peer review and feedback, and skills useful in analytical reading of scholarly work.

HIED 810 Student Affairs Administration (3 Credit Hours)

An overview of the student affairs function across diverse institutions, by connecting the history of higher education with contemporary issues facing student affairs professionals. Students will spend time exploring various student affairs functions, connecting the importance of student learning and development outside the classroom. In addition, students will explore the dynamics of student affairs organizations while identifying personal long- and short-term student affairs career goals.

HIED 812 Strategic Planning (3 Credit Hours)

This course provides the necessary knowledge and skills for administrators both to participate in and lead a meaningful strategic planning effort. Students will explore the role of strategic planning and institutional effectiveness in the context of changes in funding and demands for accountability.

HIED 820 The Private College and University (3 Credit Hours)

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An advanced seminar emphasizing the historical, philosophical, and institutional analyses of the development and status of adult and continuing education within the higher education community.

HIED 868 Internship in Higher Education Administration (3 Credit Hours)

The University advisor and site supervisor work together with students to develop and implement a set of objectives intended to familiarize them with the operation of an administrative area within an institution of higher education, to assist them in acquiring the practical skills necessary for the operation of that office, and to develop skills that are transferable to other administrative areas.

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An exploration of how organizational structures, behavior, culture, and context influence institutional governance and administration. In-class activities examine the approaches institutions use in decision-making. Through discussion of assigned readings, current events, and guest lectures, students learn how institutions govern themselves and the effects of various governance practices. Case studies, role playing, and active discussion allow students to apply theoretical perspectives to the practical workings of higher education administration.

HIED 895 Topics in Higher Education Administration (1-6 Credit Hours)

Study of selected topics in higher education administration.

Prerequisites: permission of the instructor

HIED 897 Independent Study (1-3 Credit Hours)

Independent study of special topics in higher education for doctoral students.

Prerequisites: Permission of the instructor

HIED 899 Dissertation (1-12 Credit Hours)

Work on dissertation under the direction of dissertation chair.

Prerequisites: Permission of faculty advisor

HIED 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

HIED 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after advancement to candidacy. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

HIST - History

HIST 595 Topics in History (1-3 Credit Hours)

The course is an advanced study of selected topics designed for small groups of qualified students to work on subjects of mutual interest which may not be offered regularly. These courses appear in the course schedule, and will be more fully described in information distributed to academic advisors.

HIST 600 Historical Theory and Practice (3 Credit Hours)

Analysis of the development of historical theories, principles and methods and their application to historical research and writing. Required of all graduate students in history.

HIST 602 Readings in Early American History (3 Credit Hours)

This course offers an introduction to the principal writings and interpretations of American history from the period of European colonization of America to the beginning of the American Revolution. Readings and discussions focus on the development of American cultures and identities and on the formation of American social, political, and economic life.

HIST 607 A People's Contest: Civil War and Reconstruction (3 Credit Hours)

An advanced course designed to familiarize students with the principal historiographical problems besetting the field of studies of the American Civil War and Reconstruction.

HIST 609 Melting Pot? Readings in Immigration History (3 Credit Hours)

This course examines the history of immigration to the U.S., focusing particularly on the late 19th and early 20th centuries. It critiques the "melting pot" metaphor through key themes, including transnationalism; the influences of class, race, gender, and nationality; working class and race relations; formal and informal economies; and popular and consumer culture.

HIST 610 Edible History: Food and Drink in the U.S. and Global History (3 Credit Hours)

This course explores the history of food and drink in the U.S. and the world as a way to examine the cultural, social, and political meanings about and consequences of producing and consuming food. This course will explore an array of topics including food as an essential element of identities and power relations, commodity chains, eating trends, and global security.

HIST 611 The Military in America (3 Credit Hours)

This course is designed to familiarize students with the principal historiographical problems besetting the field of U.S. military history from the pre-Revolutionary period to the present day.

HIST 617 The Long Civil Rights Movement (3 Credit Hours)

This course examines the historiography of the Long Civil Rights Movement, the struggle for civil rights stretching from the nineteenth century to the present day and encompassing multiple movements that sought to achieve the basic rights of citizenship for a number of different groups.

HIST 619 United States Labor and Working Class History (3 Credit Hours)

This course provides a historiographical survey of U.S. labor and working class history, focusing on the period after the Civil War. Work as a reflection of everyday life, class formation and class consciousness and the development of unions and other labor organizations are examined through a variety of different methodologies and in the contexts of citizenship and civil rights.

HIST 621 The Atlantic World and Early America (3 Credit Hours)

This course explores the Atlantic World as a place, a process, and a new field of historical inquiry. It examines the global processes of imperial, economic, and demographic expansion that drew British North America into transnational networks that spanned the Atlantic Ocean and brought European, African, and American inhabitants together.

HIST 622 The Atlantic Slave Trade (3 Credit Hours)

The course explores the trans-Atlantic slave trade from its beginnings in the 15th century to its suppression in the 19th century. It examines the historical literature on Africa, the Atlantic slave trade and the New World to provide students with a general orientation to the broad context of the Atlantic slave trade.

HIST 628 History of the U.S. Mexico Borderlands (3 Credit Hours)

This course examines the historiography of the U.S.-Mexico borderlands. Key themes include the slow, uneven and often unsuccessful integration of the region into centralizing states in Mexico and the United States; the changing nature of migration and commerce across the international boundary; and the importance of violence and social conflict in shaping the region.

HIST 635 Modern British History (3 Credit Hours)

This course focuses on the social and cultural history of nineteenth- and twentieth-century Britain. It explores broad themes of social conflict, class divisions, race and racism, and gender dynamics presented in recent historiography. Topics include politics, culture, leisure, entertainment, arts, economy, and the impact of the Empire on Britain.

HIST 636 The British Empire (3 Credit Hours)

This course explores British imperialism and colonialism in the early modern and modern periods, from the Caribbean to Australia with emphasis on the "second British empire" of the nineteenth and twentieth centuries. Key themes will include: webs of power and communication, labor, gender, race, and colony/metropole relations.

HIST 641 Individual & Society in Ancient Greece (3 Credit Hours)

This seminar delves into literary and archaeological sources to examine the development of ancient Greece in the archaic, classical and Hellenistic periods. It traces the development of Greece's vibrant culture, the struggles between Athens and Sparta, and the subsequent alliances forced by Phillip II and Alexander the Great.

HIST 642 Ancient Rome: Text and Artifact (3 Credit Hours)

Using historical texts and archaeological remains as sources, this course considers Ancient Rome from the city's mythological foundation stories to its decline in late Antiquity. It will study Roman history and historiography exploring topics including the economy, the military, women's roles, religion, art and architecture in the Republic and the Principate.

HIST 643 Religion, Culture, and Empire in Greco-Roman Palestine (3 Credit Hours)

This seminar focuses on the development of Greco-Roman Palestine, from its encounter with Hellenism to its conquest by Rome, and ultimately to its transformation into the Christian Holy Land under the patronage of Constantine and Helen.

HIST 646 Studies in Russian History (3 Credit Hours)

Research in Soviet archives in the past decade has enriched and enlarged the study of Stalin's era (1924-1953). This reading seminar samples new literature on traditional topics, such as Stalin's rise to power, methods of rule, and foreign policies, as well as scholarship in newly emerging fields. These areas include social history, gender and the family, cinema and popular culture, nationalities, patron-client relations, and the history of science.

HIST 647 Studies in Maritime History (3 Credit Hours)

The seminar explores recent maritime historiography and demonstrates how maritime history presents unique understandings of human history and also works within or redefines broader historical constructs. Students will analyze sources related to specific topics of maritime history.

HIST 648 France and the Sea (3 Credit Hours)

This course examines the complex ways in which the French viewed the Atlantic Ocean and other bodies of water and the opportunities water travel provided them from the sixteenth to the twentieth centuries. Emphasis is placed on the Atlantic as a zone of interaction and on the French global trading networks and the development of overseas empires.

HIST 655 Early Modern Europe: Religion, Reform, and Violence (3 Credit Hours)

This course examines the religious, political and civil strife as well as the ramifications of social change in sixteenth and seventeenth century Europe. Emphasis will be on religiosity and how early modern peoples understood and experienced religious life and how the "reformations" altered gender relations, sexual dynamics, everyday life, and intellectual thought in Western Europe.

HIST 657 Old Regime and French Revolution (3 Credit Hours)

This course introduces students to the interpretive methodologies of questions of "Enlightenment" and the French Revolution that drive much of the historiography in European intellectual history today.

HIST 662 North Atlantic Resources (3 Credit Hours)

This class examines how coastal societies around the North Atlantic have developed their use of fish stocks and other marine resources since the late medieval period and analyzes how and why over-fishing of nearly all major species took place and how international agreements sought to address the issue of sustainable, biological oceanic resources.

HIST 668 Internships in History (3 Credit Hours)

Students work to gain field experience with professionals in such areas as museum management, archives administration, historical editing, historical preservation, electronic records management, archaeology, or oral history. Students are supervised by graduate faculty members who assign academic reading and written work to contextualize and enhance the field experience. Individually arranged. Minimum of 120 hours.

HIST 674 Holocaust History and Memory (3 Credit Hours)

This course examines the complex history of the Holocaust, beginning with the rise of anti-Semitism in the 1930s. It will explore issues of resistance and collaboration as well as ambivalence. It will also examine aspects of postwar Holocaust denial and the memory of the Holocaust as well as its representation in the historiography to the present.

HIST 675 M.A. Exam Preparation and Research (3 Credit Hours)

This advanced seminar integrates the skills needed to pass the M.A. exam in history. Exercises include designing examination reading lists, learning the historiography of the exam fields, preparing for orals, and writing and evaluating a practice exam. This course is not open to students pursuing the thesis option.

Prerequisites: permission of the graduate program director

HIST 676 Degree Option Transition (1 Credit Hour)

This course prepares students transitioning from one degree option--examinations, portfolio, or thesis--to another.

Prerequisites: HIST 675, HIST 677, or HIST 698

HIST 677 Portfolio Option Preparation (3 Credit Hours)

This advanced seminar integrates the skills needed to construct the Portfolio Option for the M.A. in history. Exercises include conducting research and writing for a research paper, learning the historiography of a single examination field, preparing teaching materials, working on an applied history project, and preparing for the oral defense. This course is not open to students pursuing the thesis or examination option.

HIST 683 History of the Global 1960s (3 Credit Hours)

Through the work of historians around the world, this course examines the nature of events in the 1960s. It explores global commonalities and local particularities, focusing on the simultaneous and interrelated phenomena of anti-colonial struggle, youth activism, and culture of dissent. It also looks at the countervailing pressures and groups that emerged in opposition.

HIST 694 Guided Research (1-3 Credit Hours)

Instruction for students continuing with research and preparation for thesis, portfolio, or examinations.

HIST 695 Topics in History (1-3 Credit Hours)

The course is an advanced study of selected topics designed for small groups of qualified students to work on subjects of mutual interest which may not be offered regularly.

HIST 696 Tutorial in Maritime History (3 Credit Hours)

Individually arranged with appropriate professor and with permission of the graduate program director.

Prerequisites: HIST 647

HIST 697 Tutorials in History (1-3 Credit Hours)

Individually arranged with appropriate professor and with the permission of the graduate program director.

HIST 698 Thesis (3 Credit Hours)

3 credits.

HIST 699 Thesis (3-9 Credit Hours)

3-9 credits.

HIST 718 Mao's China (3 Credit Hours)

This reading seminar will focus on the changes of the Chinese society since the beginning of the 20th century. It will examine the pivotal historical events that led to the Chinese revolution, which put Mao's Communist regime in power and has changed Chinese society ever since. While studying the history chronologically, students will identify issues and factors that affect the Chinese political system and society, and examine the legacies of Mao's revolution from social and individual perspectives. The course will also focus on political formation and transformation of the government, social structure and upheavals, economic reforms, and foreign policies. (cross listed with IS 718 and IS 818)

HIST 795 Selected Topics in International Studies (1-3 Credit Hours)

The advanced historical study of selected topics in international studies.

HIST 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

HIST 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

HLSC - Health Sciences

HLSC 525 Health Aspects of Aging (3 Credit Hours)

Identifies major issues and problems in meeting health care needs of the aged. Emphasis on role of social assets and supports in determining effects of life changes on the aging process.

Prerequisites: Permission of the instructor

HLSC 530 Community Health Resources and Health Promotion (3 Credit Hours)

Designed to provide information about community health resources and health promotion theory.

Prerequisites: Permission of the instructor

HLSC 540 Finance and Budgeting in Healthcare (3 Credit Hours)

This course covers financial management functions in healthcare organizations including operating and capital budgeting processes along with budgeting and financial controls.

Prerequisites: Permission of the instructor

HLSC 545 Health Sciences Research Methods (3 Credit Hours)

This course focuses on the principles and statistical procedures used in health sciences research and its application in health care settings.

Prerequisites: STAT 130M or permission of the instructor

HLSC 550 Public and Community Health Administration (3 Credit Hours)

A review of the principles and practice of administering public and community health organizations and programs at federal, state, and local levels. Constitutional, statutory and administrative bases for organizing and conducting public/community health programs will be discussed.

Prerequisites: Permission of the instructor

HLSC 561 Managerial Epidemiology (3 Credit Hours)

This course will blend theory and application of epidemiology. This course will also provide a comprehensive introduction to epidemiology and explain how to use epidemiological concepts and tools to improve decisions about the management of health services.

Prerequisites: STAT 130M or permission of the instructor

HLSC 565 Policy and Politics of Health (3 Credit Hours)

This course will explore both health policy and the politics of health. Students will develop an understanding of the systematic and analytical framework for developing health and health care policy issues.

Prerequisites: Permission of the instructor

HLSC 575 Healthcare Marketing (3 Credit Hours)

This course provides a basic understanding of marketing in a health care setting. This course will cover the following: the history of marketing in a health care setting, health care markets, marketing techniques, and leadership skills in managing and supporting the marketing efforts.

Prerequisites: Permission of the instructor

HLSC 580 Health Ethics and the Law (3 Credit Hours)

This course provides the students with a basic knowledge of health law and examines legal issues confronting health services administrators in various health care environments.

Prerequisites: Permission of the instructor

HLSC 583 Artificial Intelligence Applications in Health (3 Credit Hours)

This course offers an exploration of how artificial intelligence (AI) is transforming healthcare delivery and improving patient outcomes. Building on foundational knowledge from AI Ethics and Policy and AI Methods and Models, students will dive deeper into the integration of AI in clinical and operational contexts. Key topics include the role of AI in diagnostics and personalized medicine and other AI implementations in healthcare.

HLSC 585 Health Informatics (3 Credit Hours)

This course focuses on healthcare informatics (information systems) and application in health care organizations. It provides an overview of health information system concepts, management, and integration of technology in healthcare organizations as applicable to the majors in Health Sciences.

Prerequisites: Permission of the instructor

HLSC 595 Topics in Public/Community Health Administration (1-3 Credit Hours)

This course provides the opportunity for the study of selected topics in public/community health under the supervision of a faculty member.

Prerequisites: Permission of the instructor

HLSC 701 Introduction to Health Services (3 Credit Hours)

Focuses on the complexities involved in providing health services to populations. Presents issues related to public health, community health, urban and rural health, healthy people/communities and health care delivery in traditional and non-traditional settings.

HLSC 702 Health Management (3 Credit Hours)

This seminar will provide students with an understanding of health care organizations and effective management. Particular attention will be given to the issues of access, cost and quality.

HLSC 705 Interprofessional Study Abroad on Global Health (1-3 Credit Hours)

This study abroad service learning course will introduce the student to the political, social, cultural, and ethical issues involved in prevention and health promotion globally. Students will travel another country and learn the incidence/prevalence, morbidity/mortality, and identified public health problems in specific regions and countries.

HLSC 706 Leadership in Complex Systems and Organizations (3 Credit Hours)

This course will focus on the leadership that comprises two types: informal and formal leadership. Competencies will include communication, knowledge of health care environment, leadership, professionalism, and business skills.

HLSC 707 Informatics and Healthcare Technology (3 Credit Hours)

This course will cover the use of data in health care as well as other informatics applications. Students will explore healthcare technology used to improve the delivery and evaluation of care.

HLSC 708 Evidence-Based Management for Quality Healthcare (3 Credit Hours)

The focus of the course is on the development of system processes to ensure quality health care. The evidence-based model will be applied to organizational systems.

HLSC 709 Multidisciplinary Approach to Health Services Research (3 Credit Hours)**HLSC 710 Research Design and Application (3 Credit Hours)**

Emphasis is on exploring the advantages/disadvantages and uses of non-experimental, quasi-experimental, and experimental designs in health-related research with application to management, education, and clinical practice.

HLSC 712 Qualitative Research Methods (3 Credit Hours)

An exploration of qualitative research methods including participant observation, ethnography and the generation of grounded theory. Individual interviews and focus group methods will be covered and historical, content analysis, phenomenological and montage approaches will also be discussed. Health related examples of published research in a variety of fields will be utilized to exemplify the methods.

HLSC 713 Measurement of Health Phenomena (3 Credit Hours)

An overview of measurement theory with emphasis on the development, testing, and refinement of norm- and criterion-referenced data collection instruments for health-related research.

HLSC 714 Theory in the Health Sciences (3 Credit Hours)

Introduces the philosophy of science by studying the nature and purposes of theory for the health sciences. Standards for evaluation of theories will be described. Selected theories and supporting research from the health services literature will be discussed and critically evaluated.

HLSC 716 Competitive Resource Design and Utilization (3 Credit Hours)

This course focuses on the competitive design and utilization of organizational and human resources. Emphasis will be placed on the strategic process to ensure that resources are applied in ways to ensure high-quality care and excellent patient outcomes. The course will cover the business models for effective financial and personnel management of healthcare organizations. Analysis of the costs and quality of care will be performed.

HLSC 746 Epidemiology (3 Credit Hours)

This course examines epidemiology as a method for viewing inborn community health problems and as a body of knowledge derived from this method. Skills in using epidemiology as a method and as knowledge to solve community health problems will be included.

HLSC 751 Developmental Neonatal Physiology (2 Credit Hours)

This course provides an in-depth examination of human genetics, embryologic development and normal physiologic functioning of developing body systems. Mechanisms involved in cell division, gametogenesis, and inheritance patterns will be addressed. Basic genetics and epigenetics will be included. The structural and functional development of fetal systems, during critical periods, will be emphasized. Abnormalities and alterations in fetal development will be explored.

HLSC 764 Health Economics (3 Credit Hours)

This course describes the application of economic tools to analyze the operation of markets for health care and insurance. Topics covered include the consumption and costs of health care in the United States, the viewpoints of players in the health care market, and an overview of both supply and demand analysis and cost effectiveness analysis. Complexities of economics unique to health care will be detailed. Further, students will employ these principles in several case studies of current and classic issues in health economics.

HLSC 768 Practicum in Global Health (2 Credit Hours)

Global health related field placement (112 hours).

HLSC 771 Foundations of Advanced Neonatal Care (3 Credit Hours)

The foundations of advanced neonatal care course provides the theoretical and practical knowledge for the neonatal nurse practitioner or physician assistant to manage the health care needs of the neonate in the newborn nursery or level II neonatal intensive care unit.

HLSC 772 Policy and Politics of Health (3 Credit Hours)

This course enables the student to develop a systematic and analytical framework for understanding health care policy issues. The policy process is covered in detail. Timely policy issues also are discussed.

HLSC 773 Pharmacology for Advanced Neonatal Care (3 Credit Hours)

This course offers scientific inquiry into the use of pharmacologic agents in the advanced nursing care of infants, including fetal, neonatal life, and early childhood. Pharmacokinetics, pharmacodynamics, drug use in pregnancy and lactation, pharmacologic agents used in disease prevention and treatment, drug monitoring and drug safety in the home are explored.

HLSC 774 Advanced Neonatal Care: High Risk Management I (3 Credit Hours)

This course develops the students' ability to manage high-risk neonates. This is the second of three sequential management courses that provide the theoretical and practical knowledge for the neonatal nurse practitioner to manage the health care needs of the neonate at the highest level of nursing practice.

HLSC 775 Advanced Neonatal Care: High Risk Management II (3 Credit Hours)

An organ systems approach is used to explore the diagnosis and management of neonates requiring surgery and advanced technologies. Additional topics will include developmental follow-up of the medically fragile infant and withdrawal of life support in the NICU.

HLSC 776 Global Health (3 Credit Hours)

This course will introduce the student to the political, social, cultural and ethical issues involved in disease prevention and health promotion globally. Specific emphasis will be on incidence/prevalence, morbidity/mortality, and identified health problems in specific regions and countries. This course will also identify international health prerogatives aimed at improving health status through education and intervention.

HLSC 778 Global Environmental Health (2-3 Credit Hours)

The goal of this course is to guide students with a public health perspective to develop skills to identify and analyze environmental health problems globally. It is designed to provide knowledge on recognizing and evaluating major environmental health issues and risk factors in developed and developing countries by using group discussions and real-life case studies.

HLSC 780 Monitoring & Evaluating Global Health Programs (2 Credit Hours)

This course familiarizes students with the basic concepts, issues, theories, approaches and models in evaluation in a global public health context. Students in this course will begin to develop technical skills to conceptualize and design evaluations of global public health programs or projects. These practices include determining which evaluation approach to use in a given context, developing an evaluation plan and appropriate evaluation questions, determining the data needed to answer the evaluation questions and establishing reporting processes to provide information to program developers.

HLSC 782 One Health, One Medicine (2 Credit Hours)

This course will teach students the applications of multidisciplinary competencies towards solving human health challenges. The course will identify all areas of global health issues that require human, veterinary and environmental applications for solutions. One Health One Medicine is an important course for all students in Health or Environmental Sciences that are called upon to integrate multidisciplinary competencies as part of their education and career experiences.

HLSC 784 Creating Sustainable Environmental Futures (3 Credit Hours)

This course examines the interrelationships between individual and societal decisions and the global environment, and analyzes the consequences these interrelationships have for public health and sustainability. The course will review food, environmental quality, climate variability, sea-level rise and public health, homes-workplaces-communities, and environmental health and sustainability in the region, the nation and around the world.

HLSC 785 Issues and Opportunities in Global Health Research (3 Credit Hours)

This course focuses on global health research with an emphasis on cultural, political and economic influences on health in various regions and provides students opportunities to engage in inter-professional teamwork to brainstorm problem-based issues and establish research proposals.

HLSC 795 Topics in Health Sciences (1-3 Credit Hours)

Designed to provide the advanced student with an opportunity to study independently or in small groups and investigate specific topics of current interest in health services or health sciences.

HLSC 798 Supervised Research (1-6 Credit Hours)

Supervised research on a specialized topic. Can be repeated.

HLSC 801 Introduction to Health Services (3 Credit Hours)

Focuses on the complexities involved in providing health services to populations. Presents issues related to public health, community health, urban and rural health, healthy people/communities and health care delivery in traditional and non-traditional settings.

HLSC 802 Health Management (3 Credit Hours)

This seminar will provide students with an understanding of health care organizations and effective management. Particular attention will be given to the issues of access, cost and quality.

HLSC 804 Methods of Program Evaluation (3 Credit Hours)

Examination of various methodologies for designing and conducting public health program evaluation and research. Experimental, quasi-experimental and non-experimental procedures will be covered. Departmental approval required.

Prerequisites: HLSC 810 or PAUP 853

HLSC 805 Interprofessional Study Abroad on Global Health (1-3 Credit Hours)

This study abroad service learning course will introduce the student to the political, social, cultural, and ethical issues involved in prevention and health promotion globally. Students will travel another country and learn the incidence/prevalence, morbidity/mortality, and identified public health problems in specific regions and countries.

HLSC 806 Leadership in Complex Systems and Organizations (3 Credit Hours)

This course will focus on the leadership that comprises two types: informal and formal leadership. Competencies will include communication, knowledge of health care environment, leadership, professionalism, and business skills.

HLSC 807 Informatics and Healthcare Technology (3 Credit Hours)

This course will cover the use of data in health care as well as other informatics applications. Students will explore healthcare technology used to improve the delivery and evaluation of care.

HLSC 808 Evidence-Based Management for Quality Healthcare (3 Credit Hours)

The focus of the course is on the development of system processes to ensure quality health care. The evidence-based model will be applied to organizational systems.

HLSC 809 Multidisciplinary Approaches to Health Services Research (3 Credit Hours)

Uses theory and research findings from areas such as Biology, Psychology, Sociology, Economics, Urban Studies, and Health Services to achieve an understanding of health services issues and problems. Emphasizes methods of analysis and of developing alternatives related to multidisciplinary perspectives.

HLSC 810 Research Design and Application (3 Credit Hours)

Emphasis is on exploring the advantages/disadvantages and uses of non-experimental, quasi-experimental, and experimental designs in health-related research with application to management, education, and clinical practice. (cross-listed with PT 810).

Prerequisites: graduate-level courses in research design and statistics or permission of the instructor

HLSC 811 Quantitative Research Methods in Health Care (3 Credit Hours)

An applied approach to the selection and application of bivariate and multivariate statistical techniques in health services research. Emphasis is placed on handling large data sets and the use of a computer for manipulation of quantitative data.

Pre- or corequisite: HLSC 710 or HLSC 810

HLSC 812 Qualitative Research Methods (3 Credit Hours)

An exploration of qualitative research methods including participant observation, ethnography and the generation of grounded theory. Individual interviews and focus group methods will be covered and historical, content analysis, phenomenological and montage approaches will also be discussed. Health related examples of published research in a variety of fields will be utilized to exemplify the methods.

HLSC 813 Health Outcomes Research (3 Credit Hours)

An overview of measurement theory with emphasis on the development, testing, and refinement of norm- and criterion-referenced data collection instruments for health-related research.

Prerequisites: graduate-level courses in research design and statistics or permission of the instructor

HLSC 814 Theory in the Health Sciences (3 Credit Hours)

Introduces the philosophy of science by studying the nature and purposes of theory for the health sciences. Standards for evaluation of theories will be described. Selected theories and supporting research from the health services literature will be discussed and critically evaluated.

HLSC 815 Decision Analysis in Health Care (3 Credit Hours)

This course teaches students the art and science of decision making. It covers expected utility theory, decision tree analysis, cost-benefit analysis, and the psychological aspects of the decision-making process in the context of health policy research.

HLSC 816 Competitive Resource Design and Utilization (3 Credit Hours)

This course focuses on the competitive design and utilization of organizational and human resources. Emphasis will be placed on the strategic process to ensure that resources are applied in ways to ensure high-quality care and excellent patient outcomes. The course will cover the business models for effective financial and personnel management of healthcare organizations. Analysis of the costs and quality of care will be performed.

HLSC 820 Health Care Delivery System (3 Credit Hours)

This course provides the student with an opportunity to analyze the American health care system. The health care system is composed of complex organizational dynamics and structures which predicate the interaction between the major components of the system: personnel who provide service; institutions in which care is provided; financing mechanisms which pay for care; and the government which attempts to regulate it. This course is designed for in-depth analysis and synthesis of all aspects of health care delivery with an emphasis on improving the delivery and access to care.

HLSC 846 Epidemiology (3 Credit Hours)

This course examines epidemiology as a method for viewing inborn community health problems and as a body of knowledge derived from this method. Skills in using epidemiology as a method and as knowledge to solve community health problems will be included.

HLSC 861 Advanced Quantitative Methods (3 Credit Hours)

This course adopts an applied approach to teaching health professions students the necessary competencies and skills in advanced quantitative methods. Topics include handling missing data, survey design and exploratory factor analysis, mediation and moderation analysis, and an introduction to confirmatory factor analysis and structural equation modeling (SEM).

Prerequisites: HLSC 811

HLSC 864 Health Economics (3 Credit Hours)

This course describes the application of economic tools to analyze the operation of markets for health care and insurance. Topics covered include the consumption and costs of health care in the United States, the viewpoints of players in the health care market, and an overview of both supply and demand analysis and cost effectiveness analysis. Complexities of economics unique to health care will be detailed. Further, students will employ these principles in several case studies of current and classic issues in health economics.

HLSC 868 Internship in Health Sciences (3 Credit Hours)

Supervised health services field experiences or health sciences laboratory experiences. A completed research project which is publishable or presentable at a professional conference is required to complete the course.

HLSC 872 Policy and Politics of Health (3 Credit Hours)

This course enables the student to develop a systematic and analytical framework for understanding health care policy issues. The policy process is covered in detail. Timely policy issues are also discussed.

HLSC 873 Planning Proposals and Developing Grants in Health Research (3 Credit Hours)

Designed as a 'hand-on' approach in effective grantsmanship, this course will guide the student from the identification of potential funding sources through proposal development. Highlights include program planning, nonprofit status, governmental/foundation corporate trends, local resources and grants administration.

HLSC 874 Administration in Health Sciences (3 Credit Hours)

This course will provide an overview of health delivery systems, organizational behavior, and theoretical foundations for managerial and executive leadership in health care facilities. Emphasis will be placed on utilizing best practices in leadership to promote motivation and quality improvement, strategic planning, information technology, and cultural awareness.

HLSC 875 Comprehensive Health Planning (3 Credit Hours)

This course emphasizes the principles and processes of program planning, including a consideration of objectives, priorities, policy choices, assessment of resources, implementation, and evaluation. The student will gain practical experience in program development by developing a planning document.

HLSC 876 Global Health (3 Credit Hours)

This course will introduce the student to the political, social, cultural and ethical issues involved in disease prevention and health promotion globally. Specific emphasis will be on incidence/prevalence, morbidity/mortality, and identified health problems in specific regions and countries. This course will also identify international health prerogatives aimed at improving health status through education and intervention.

HLSC 881 Dissertation Seminar (3 Credit Hours)

This course will assist students in developing a dissertation proposal. Steps in the research process will be reviewed as students submit drafts of their proposal for faculty and peer review. Problem formulation, integrating theoretical frameworks, preparing for human subjects review and outlining data analysis techniques for hypothesis testing will be discussed. Students will be introduced to University guidelines related to dissertations and other resources to assist them in their task.

HLSC 889 Colloquium I (1 Credit Hour)

This course is the first in a series of colloquial courses in which doctoral level students receive presentations and present research and current topics of interest in health related professions.

HLSC 890 Colloquium II (1 Credit Hour)

This course is the second in a series of colloquial courses in which doctoral level students receive presentations and present research and current topics of interest in health related professions.

HLSC 891 Colloquium III (1 Credit Hour)

This course is the third in a series of colloquial courses in which doctoral level students receive presentations and present research and current topics of interest in health related professions.

HLSC 892 Colloquium IV (1 Credit Hour)

This course is the fourth in a series of colloquial courses in which doctoral level students receive presentations and present research and current topics of interest in health related professions.

HLSC 895 Topics in Health Sciences (1-3 Credit Hours)

Designed to provide the advanced student with an opportunity to study independently or in small groups and investigate specific topics of current interest in health services.

Prerequisites: Ph.D. standing or permission of the graduate program director

HLSC 897 Independent Study (1-3 Credit Hours)

Individualized study selected by the student in collaboration with a faculty member. Area of study to be supervised and approved by a faculty member with the approval of the graduate program director.

Prerequisites: Admission to Health Services PhD program and permission of graduate program director

HLSC 898 Supervised Research (1-6 Credit Hours)

Supervised research on a specialized topic. Can be repeated.

HLSC 899 Dissertation (1-12 Credit Hours)

Available for pass/fail grading only. An approved research project written under the supervision of a faculty advisor, in which the student demonstrates the capacity to design and complete independent applied research. The completed project must be approved by the dissertation committee.

HLSC 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

HLTH - Health

HLTH 595 Topics in Health (1-3 Credit Hours)**HLTH 697 Independent Study (3 Credit Hours)**

HMS - Human Movement Sciences

HMS 697 Independent Study (1-3 Credit Hours)

Investigations in health, physical education, recreation, and sport. Problems approved in advance are investigated under the supervision of the faculty advisor.

HMS 698 Thesis (3-6 Credit Hours)

3-6 credits.

Prerequisites: permission of the advisor and committee

HMS 699 Thesis (3-6 Credit Hours)

3-6 credits.

Prerequisites: permission of the advisor and committee

HMS 795 Topics in Human Movement Sciences (1-3 Credit Hours)

Selected topic courses in Human Movement Sciences.

Prerequisites: Instructor approval

HMS 815 Introduction to Doctoral Study Seminar (3 Credit Hours)

This course explores current issues and trends in all aspects of human movement science and relates theory to practice.

HMS 816 Research Experience I (3 Credit Hours)

Determination of a research project through the review of literature. Course encompasses formulation of a topic along with the design of a research study.

HMS 817 Research Experience II (3 Credit Hours)

Supervised research implementation, data collection, and project completion of specific topic within curriculum and instruction or applied kinesiology concepts.

HMS 879 Research Residency (3 Credit Hours)

Students will work in consultation with their advisors to conduct a study related to human movement sciences as part of their research residency that will be submitted for presentation at a nationally refereed conference and/or to a refereed journal.

Prerequisites: To be taken after 9 hours of research methods and 18 hours of coursework, and prior to the comprehensive exams (or approval of advisor)

HMS 890 Doctoral Studies Seminar (3 Credit Hours)

Students will be introduced to expectations of conducting research, explore concepts associated with becoming a faculty member or practitioner with an earned doctorate, and become familiar with campus resources. Students will learn and apply concepts related to scientific writing. This course will include extensive reading of research articles, grant applications, and other scholarly work. Also, this course will investigate the need for professional development. This will include familiarizing oneself with appropriate professional organizations, exploring the benefits and challenges of collaboration, interviewing and preparing for job placements, and preparing a curricular vitae and teaching philosophy.

HMS 895 Topics in Human Movement Sciences (1-3 Credit Hours)

Selected topic courses in Human Movement Sciences.

HMS 897 Independent Study in Human Movement Sciences (3 Credit Hours)

Independent reading and study under the direction of a faculty member on a topic in the Human Movement Sciences.

HMS 898 Independent Research in Human Movement Sciences (1-9 Credit Hours)

Independent research project under the direction of a faculty member that will expose students to a broad range of research topics and research environments in the human movement sciences.

HMS 899 Dissertation (1-12 Credit Hours)

Work on pre-selected dissertation topic under the direction of dissertation chair.

Prerequisites: permission of dissertation committee chair

HMS 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of graduation.

HMS 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

HNRS - Honors

HNRS 501 Social Entrepreneurship (3 Credit Hours)

The class draws students from all disciplines to collaborate with each other, faculty and community members as they co-design project-based solutions to pertinent social issues. Topics related to social entrepreneurship vary each year. Guided by distinguished faculty, students analyze their topic through in-depth classroom and field research, readings and off-campus trips.

HPE - Health and Physical Education

HPE 502 Methods and Materials in Health Education (3 Credit Hours)

This course will enable teacher candidates to gain insight into the techniques, methodology, and philosophy of field-based health and physical education. Teacher candidates will be expected to observe and participate in the teaching of simple lessons.

HPE 504 Adapted Physical Education (3 Credit Hours)

Students will become acquainted with the practices and researching of different disabilities, the learning modes of the exceptional child, and IDEA (the law that advocates free and appropriate education). The course will also examine how to work within the ecosystem surrounding a child with disabilities. A vital component of the course will be the practical application of theory.

HPE 506 Tests and Measurement in Physical Education and Health (3 Credit Hours)

This course is designed to acquaint the student with tests and measurement in the fields of health and physical education, test construction, scoring, and methods of using results.

HPE 509 Exercise Physiology (3 Credit Hours)

An investigation into the physiological adjustments of the human organism to exercise, including systematic and biochemical molecular changes. Major areas of concern include neuromuscular, metabolic, and cardiorespiratory changes during exercise and the influence of such variables as nutrition, drugs, environment, age, sex, training and body weight.

Prerequisites: BIOL 240 or BIOL 250

HPE 515 Principles of Coaching Management (3 Credit Hours)

This course is designed to provide students with a basic knowledge of the coaching profession. Special emphasis will be placed on establishing a sound coaching philosophy, selecting a coaching style, desirable qualities of a coach, ethics and the coach, roles of the head coach, planning and organizing for games and practices, coaching pedagogy, off-season planning, final preparations for the season, and issues and problems related to coaching and recruiting athletes.

HPE 530 Nutrition and Fitness Education (3 Credit Hours)

The study of techniques for the teaching of nutrition and health-related fitness. Content to be covered includes nutrition and various aspects of fitness training appropriate for the teaching of PreK-12 physical education and health.

HPE 556 Sports Psychology (3 Credit Hours)

Study of the psychological bases of coaching strategies and methodologies. Emphasis is placed on applying knowledge in field settings.

HPE 569 Practicum Experience and Instructional Planning in Health and Physical Education (3 Credit Hours)

A clinical experience that allows the teaching candidate to teach and observe professionals in a field-based setting. Portfolio development, reflective assessment of teaching, and student assessment techniques will be emphasized. This course requires a completed ODU clearance/background check prior to entering a school or community agency. Visit: www.odu.edu/TES for clearance procedures. If students do not have the clearance by the first week of classes, they will be dropped.

Prerequisites: HPE 200 and admission into teacher education program

HPE 587 Teacher Candidate Seminar (1 Credit Hour)

Study and group discussion of problems growing out of the student teaching (teacher candidate internship) experience. Students must pass Praxis II to complete this course.

Prerequisites: acceptance into teacher education and approval of the program advisor

HPE 601 Adapted Physical Education Design and Supervision (3 Credit Hours)

This course is divided into three sections. The first section deals with learning how to administer and interpret several evaluation tools. The second section concentrates on developing computer, videotaping, and other technology skills for adapted PE. The third section focuses on overall supervision of adapted PE programs in various school and institutional environments.

HPE 607 Movement Analysis of Individual and Team Sports (3 Credit Hours)

This laboratory and methods class focuses on the skills and strategies of teaching individual sports (e.g., bowling, badminton, golf, and tennis) and team sports (e.g., football, basketball, volleyball, and softball), using a tactical approach.

HPE 609 Principles of Movement Analysis in Dance and Rhythmic Activities for Physical Education (3 Credit Hours)

The course is designed to help teachers and coaches improve their skills in analyzing movement skills in dance and rhythmic activities. Such skill analysis is necessary to effectively diagnose movement deficiencies, prescribe techniques for improving performance, and modifying activities for the adaptive program.

HPE 636 Research Problems in Health & Physical Education (3 Credit Hours)

Practice in the use of statistical and analytical techniques in solving problems in health and physical education; supervised student research.

HPE 668 Internship in Health & Physical Education (1-6 Credit Hours)

Designed to provide detailed practical experience (400 clock hours) in a health and physical education field setting.

Prerequisites: completion of 75% of graduate work

HPE 680 Problems in Health Education (3 Credit Hours)

Problems in teaching health education on the elementary and secondary level; family life education, substance use and abuse, and mental and emotional health.

HPE 695 Topics in Health & Physical Education (1-3 Credit Hours)

Selected topic courses in health and physical education.

HPE 697 Independent Study In Health & Physical Education (1-3 Credit Hours)

Investigations in health, physical education. Problems approved in advance are investigated under the supervision of the faculty advisor.

HPE 698 Thesis (3 Credit Hours)

Thesis.

HPE 699 Thesis (3 Credit Hours)

Thesis.

HPE 704 Advanced Studies in Adapted Physical Education (3 Credit Hours)

This course provides experiences of teaching adapted physical education content in lecture and gymnasium settings. Students will develop an understanding of a broad spectrum of disability related content that is applicable to physical education, and gain a deep knowledge of specific topics within disability studies. General and disability specific teaching strategies will be discussed.

HPE 718 Applied Learning and Coaching Theory (3 Credit Hours)

This course examines applied theories of learning and coaching in sport and physical education. Emphasis will be placed on understanding the differing coaching/learning theories and strategies, designing effective practice and game plans, and learning the different learning levels and styles through observing, analyzing, and critiquing skills. Current research and practice will be emphasized.

HPE 719 Planning and Administration in PE and Sport Programs (3 Credit Hours)

This course is designed to provide in-depth information about the planning and administrative aspects of sport/physical education programs. Content includes, but is not limited to, teaching/training planning, safety and injury prevention, behavioral management, field/facility maintenance, budgetary considerations, public relations, and legal and risk management procedures associated with coaching/teaching PE.

HPE 720 Curriculum Development in Physical Education (3 Credit Hours)

A course designed to acquaint the student with the basic principles and practices in curriculum development. Curriculum development methodologies for both K-12 and college curricula will be addressed.

HPE 721 Motivational Issues in Sports (3 Credit Hours)

Motivational and psychological issues relate with sport performance enhancement, athlete/student wellbeing, and clinical issues with specific populations.

HPE 740 Motor Learning and Development (3 Credit Hours)

This course covers a combination of motor development and motor learning topics. The course information and structure are designed to optimize practitioners' effectiveness in the classroom and on the field via practical application of motor behavior theories, concepts and principles. Attention is directed toward understanding the acquisition of skills from the fundamental, initial level to the sport-specific, more advanced level, toward optimal age and skill-level practices and developing appropriate motor skill assessments for infants through older adulthood. Past and current research findings are incorporated into each of the course topics.

HPE 745 Assessment/Evaluation and Technology in Sport/PE (3 Credit Hours)

This course covers assessment/evaluation theory and practices in PE/Sport. Multiple evaluation designs and techniques in different domains such as teaching/coaching, learning, and performance will be discussed along with technology applications in PE/Sport.

HPE 804 Advanced Studies in Adapted Physical Education (3 Credit Hours)

This course provides experiences of teaching adapted physical education content in lecture and gymnasium settings. Students will develop an understanding of a broad spectrum of disability related content that is applicable to physical education, and gain a deep knowledge of specific topics within disability studies. General and disability specific teaching strategies will be discussed.

HPE 805 Advanced Qualitative Research in Adapted Physical Education (3 Credit Hours)

Qualitative research seeks to make sense of, or interpret, the meaning of social phenomena in the natural setting, filtering through the multiple lens of race, social class, ethnicity, language, gender, and ability/disability. The aims of this course are twofold: (1) to highlight the contribution of qualitative inquiry to our understanding of the theory, research, and practice in adapted physical education, and (2) to provide basic skills and understanding necessary for doctoral students in adapted physical education to interpret and conduct qualitative research.

Prerequisites: FOUN 812

HPE 819 Planning and Administration in PE and Sport Programs (3 Credit Hours)

This course is designed to provide in-depth information about the planning and administrative aspects of sport/physical education programs. Content includes, but is not limited to, teaching/training planning, safety and injury prevention, behavioral management, field/facility maintenance, budgetary considerations, public relations, and legal and risk management procedures associated with coaching/teaching PE.

HPE 820 Curriculum Development in Physical Education (3 Credit Hours)

A course designed to acquaint the student with the basic principles and practices in curriculum development. Curriculum development methodologies for both K-12 and college curricula will be addressed.

HPE 840 Motor Learning and Development (3 Credit Hours)

This course covers a combination of motor development and motor learning topics. The course information and structure are designed to optimize practitioners' effectiveness in the classroom and on the field via practical application of motor behavior theories, concepts and principles. Attention is directed toward understanding the acquisition of skills from the fundamental, initial level to the sport-specific, more advanced level, toward optimal age and skill-level practices and developing appropriate motor skill assessments for infants through older adulthood. Past and current research findings are incorporated into each of the course topics.

HPE 845 Assessment/Evaluation and Technology in Sport/PE (3 Credit Hours)

This course covers assessment/evaluation theory and practices in PE/Sport. Multiple evaluation designs and techniques in different domains such as teaching/coaching, learning, and performance will be discussed along with technology applications in PE/Sport.

HPE 846 Advanced Quantitative Research in Adapted Physical Activity (3 Credit Hours)

This quantitative research method course delves into two aspects: (1) to understand the quantitative study design and evidence hierarchy as they relate to research and practices in adapted physical activity, and (2) to provide skills and understanding necessary for doctoral students in adapted physical activity to interpret and conduct quantitative research.

Prerequisites: FOUN 812

HSR - Health Services Research

HSR 706 Leadership in Complex Systems and Organizations (3 Credit Hours)

This course will focus on the leadership that comprises two types: informal and formal leadership. Competencies will include communication, knowledge of health care environment, leadership, professionalism, and business skills.

HSR 746 Epidemiology (3 Credit Hours)

This course examines epidemiology as a method for viewing inborn community health problems and as a body of knowledge derived from this method. Skills in using epidemiology as a method and as knowledge to solve community health problems will be included.

HSR 776 Global Health (3 Credit Hours)

This course will introduce the student to the political, social, cultural and ethical issues involved in disease prevention and health promotion globally. Specific emphasis will be on incidence/prevalence, morbidity/mortality, and identified health problems in specific regions and countries. This course will also identify international health prerogatives aimed at improving health status through education and intervention.

HSR 778 Global Environmental Health (2-3 Credit Hours)

The goal of this course is to guide students with a public health perspective to develop skills to identify and analyze environmental health problems globally. It is designed to provide knowledge on recognizing and evaluating major environmental health issues and risk factors in developed and developing countries by using group discussions and real-life case studies.

HSR 785 Issues and Opportunities in Global Health Research (3 Credit Hours)

This course focuses on global health research with an emphasis on cultural, political and economic influences on health in various regions and provides students opportunities to engage in inter-professional teamwork to brainstorm problem-based issues and establish research proposals.

HSR 801 Introduction to Health Services (3 Credit Hours)

Focuses on the complexities involved in providing health services to populations. Presents issues related to public health, community health, urban and rural health, healthy people/communities and health care delivery in traditional and non-traditional settings.

HSR 802 Health Management (3 Credit Hours)

This seminar will provide students with an understanding of health care organizations and effective management. Particular attention will be given to the issues of access, cost and quality.

HSR 804 Methods of Program Evaluation (3 Credit Hours)

Examination of various methodologies for designing and conducting public health program evaluation and research. Experimental, quasi-experimental and non-experimental procedures will be covered.

HSR 805 Interprofessional Study Abroad on Global Health (1-3 Credit Hours)

This study abroad service learning course will introduce the student to the political, social, cultural, and ethical issues involved in prevention and health promotion globally. Students will travel another country and learn the incidence/prevalence, morbidity/mortality, and identified public health problems in specific regions and countries.

HSR 809 Multidisciplinary Approaches to Health Services Research (3 Credit Hours)

Uses theory and research findings from areas such as Biology, Psychology, Sociology, Economics, Urban Studies, and Health Services to achieve an understanding of health services issues and problems. Emphasizes methods of analysis and of developing alternatives related to multidisciplinary perspectives.

HSR 810 Research Design and Application (3 Credit Hours)

Emphasis is on exploring the advantages/disadvantages and uses of non-experimental, quasi-experimental, and experimental designs in health-related research with application to management, education, and clinical practice.

HSR 811 Quantitative Research Methods in Health Care (3 Credit Hours)

An applied approach to the selection and application of bivariate and multivariate statistical techniques in health services research. Emphasis is placed on handling large data sets and the use of a computer for manipulation of quantitative data.

HSR 812 Qualitative Research Methods (3 Credit Hours)

An exploration of qualitative research methods including participant observation, ethnography and the generation of grounded theory. Individual interviews and focus group methods will be covered and historical, content analysis, phenomenological and montage approaches will also be discussed. Health related examples of published research in a variety of fields will be utilized to exemplify the methods.

HSR 813 Health Outcomes Research (3 Credit Hours)

An overview of measurement theory with emphasis on the development, testing, and refinement of norm- and criterion-referenced data collection instruments for health-related research.

HSR 814 Theory in the Health Sciences (3 Credit Hours)

Introduces the philosophy of science by studying the nature and purposes of theory for the health sciences. Standards for evaluation of theories will be described. Selected theories and supporting research from the health services literature will be discussed and critically evaluated.

HSR 815 Decision Analysis in Health Care (3 Credit Hours)

This course teaches students the art and science of decision making. It covers expected utility theory, decision tree analysis, cost-benefit analysis, and the psychological aspects of the decision-making process in the context of health policy research.

HSR 846 Epidemiology (3 Credit Hours)

This course examines epidemiology as a method for viewing inborn community health problems and as a body of knowledge derived from this method. Skills in using epidemiology as a method and as knowledge to solve community health problems will be included.

HSR 864 Health Economics (3 Credit Hours)

This course describes the application of economic tools to analyze the operation of healthcare and insurance markets. Topics covered include the consumption and costs of healthcare in the United States, the viewpoints of players in the healthcare market, and an overview of supply and demand and cost-effectiveness analyses. The complex economics unique to health care will be discussed in detail. Further, students will employ these principles in several case studies of current and classic issues in health economics.

HSR 872 Policy and Politics of Health (3 Credit Hours)

This course enables the student to develop a systematic and analytical framework for understanding healthcare policy issues. The policy process is covered in detail. Timely policy issues are also discussed.

HSR 873 Planning Proposals and Developing Grants in Health Research (3 Credit Hours)

Designed as a 'hand-on' approach in effective grantsmanship, this course will guide the student from the identification of potential funding sources through proposal development. Highlights include program planning, nonprofit status, governmental/foundation corporate trends, local resources and grants administration.

HSR 889 Colloquium I (1 Credit Hour)

This course is the first in a series of colloquial courses in which doctoral level students receive presentations and present research and current topics of interest in health related professions.

HSR 890 Colloquium II (1 Credit Hour)

This course is the second in a series of colloquial courses in which doctoral level students receive presentations and present research and current topics of interest in health related professions.

HSR 891 Colloquium III (1 Credit Hour)

This course is the third in a series of colloquial courses in which doctoral level students receive presentations and present research and current topics of interest in health related professions.

HSR 892 Colloquium IV (1 Credit Hour)

This course is the fourth in a series of colloquial courses in which doctoral level students receive presentations and present research and current topics of interest in health related professions.

HSR 898 Supervised Research (1-6 Credit Hours)

Supervised research on a specialized topic to prepare students for dissertation study. It can be repeated.

HSR 899 Dissertation (1-12 Credit Hours)

Available for pass/fail grading only. An approved research project written under the supervision of a faculty advisor in which the student demonstrates the capacity to design and complete independent applied research. The completed project must be approved by the dissertation committee.

HUM - Humanities

HUM 595 Topics in Humanities (3 Credit Hours)

A study of selected Humanities topics to be specified in the class schedule each semester. May be repeated for credit as topics vary.

HUM 597 Tutorial Work in Humanities (1-3 Credit Hours)

Independent research on a Humanities topic to be selected under the direction of an instructor. Program director approval required.

HUM 601 Introduction to the Humanities (3 Credit Hours)

This class introduces students to the study of the humanities with a focus on the enduring questions and ideas of human history. These include questions of culture, reality, society, power, truth, communication, and mediation. Students address these questions and ideas by engaging with some of the great works of social theory from the twentieth century.

HUM 602 Critical Methods in Humanities (3 Credit Hours)

This class instructs students in various theoretical and methodological approaches for conducting research within the humanistic disciplines. Students will become familiar with literary theory, critical/cultural studies, historical methods, qualitative social scientific approaches, and visual studies, as well as the conduct of research across disciplinary boundaries.

HUM 603 Strategic Professional Development Pro-Seminar (3 Credit Hours)

This seminar will guide students pursuing academic or non-academic professions to prepare and to build a professional development strategy for various careers using their Humanities degree.

HUM 668 Internship (3 Credit Hours)

This course allows graduate students in Humanities to pursue a structured work experience in a field relevant to a student's course of study. Student will work with a supervisor at the work site and a faculty advisor in Humanities. Requirements include a formal essay connected to the experience, portfolio, and satisfactory evaluation by the supervisor. Permission of Humanities director required. Pass/fail grading only.

HUM 693 Capstone Project (3 Credit Hours)

Option for students who do not want to pursue a traditional thesis. Individual projects must be approved by the program director. The capstone project must include a scholarly paper, but the 'project' component can include creative works, art installations, film and video, interactive and born-digital works, as well as other forms of community engagement. Projects are developed with help of supervisor.

Prerequisites: HUM 601, HUM 602, HUM 603, HUM 698, HUM 704, and program director approval required

HUM 696 Topics in Humanities (3 Credit Hours)

A study of selected Humanities topics to be specified in the class schedule each semester. May be repeated for credit as topics vary.

HUM 697 Tutorial Work in Humanities (1-3 Credit Hours)

Independent research on a Humanities topic to be selected under the direction of an instructor. Program director approval required.

HUM 698 Capstone Project and Thesis Preparation Seminar (3 Credit Hours)

A graduate writing seminar dedicated to workshopping and developing and finalizing students' required long-term creative and research projects.

Prerequisites: HUM 601 and HUM 602

HUM 699 Thesis (1-6 Credit Hours)

Course requirement for thesis option.

HUM 704 Technology and the Humanities (3 Credit Hours)

A seminar providing foundations for and experience in the critical examination of technologies and their human and social impact. Topics will vary and may include AI, innovation, social media, robotics, healthcare, gaming, art, and music.

HUM 795 Topics in Humanities (3 Credit Hours)

A study of selected Humanities topics to be specified in the class schedule each semester. May be repeated for credit as topics vary.

HUM 796 Topics in Humanities (3 Credit Hours)

A study of selected Humanities topics to be specified in the class schedule each semester. May be repeated for credit as topics vary.

HUM 797 Tutorial Work in Humanities (1-3 Credit Hours)

Independent research on a Humanities topic to be selected under the direction of an instructor. Program director approval required.

HUM 895 Topics in Humanities (3 Credit Hours)

A study of selected Humanities topics to be specified in the class schedule each semester. May be repeated for credit as topics vary.

HUM 896 Topics in Humanities (3 Credit Hours)

A study of selected Humanities topics to be specified in the class schedule each semester. May be repeated for credit as topics vary.

HUM 897 Tutorial Work in Humanities (1-3 Credit Hours)

Independent research on a Humanities topic to be selected under the direction of an instructor. Program director approval required.

HUM 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

IDS - Interdisciplinary Studies

IDS 500 Study Abroad (0 Credit Hours)

IDS 596 Topics in Interdisciplinary Studies (3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule and will be more fully described in information distributed to all academic advisors.

Prerequisites: IDS 300W or permission of instructor

IDT - Instructional Design and Technology

IDT 617 Foundations of Instructional Technology (3 Credit Hours)

Required introductory overview to the field of instructional technology. Topics include a history of the field, basic instructional design, generally accepted theoretical practices and major formats of instructional media. Emphasis is given to instructional technology trends as applied to various industries, including K-12, military, industry training, and others.

IDT 618 Digital Age Teaching and Learning (3 Credit Hours)

In this class, contemporary digital tools and Internet resources are used to develop instructional plans and contribute to teaching techniques. The course is designed with three components: effectively integrating technology into the delivery of the curriculum, evidence-based good teaching practices utilizing technology that spans across grades and subject levels, and the technologies that support those practices. Upon completion of this course students should be able to pass, or apply for exemption from their school district's TSIP exam.

IDT 620 Foundations of Artificial Intelligence (AI) in Education and Learning Technologies (3 Credit Hours)

This course introduces students to the foundational concepts of Artificial Intelligence (AI) as applied to education and learning design. Students will explore key AI frameworks and theories within the context of learning design, including the use of AI tools in various educational processes. Topics covered include AI-enhanced course design, AI application in instructional delivery, the role of AI in assessments and personalized feedback, AI in research and evaluation, and AI's impact on academic integrity, as well as additional ethical considerations.

IDT 621 Applications of Artificial Intelligence (AI) in Education and Learning Technologies (3 Credit Hours)

This course focuses on the practical application of AI in designing instructional strategies, activities, and materials. Students will use AI tools to brainstorm various pedagogical techniques as well as to create still images, videos, animations, audio narration, slides-based presentations, gamification, virtual environments, and personal AI learning assistants/chatbots. Through hands-on projects, students will demonstrate mastery of the instructional design process by developing AI-enhanced tools and media to solve real-world instructional problems.

IDT 630 Foundations of Human Performance Technology (3 Credit Hours)

This course will introduce students to the field of Human Performance Technology (HPT). Students will explore what HPT is, why instructional designers should know about it, how performance improvements can be measured, and most critically, how it can be applied in real environments to solve real problems. Students will gain practice in thinking systematically about performance, and they will enhance their value as instructional design professionals by being able to offer solutions to organizational needs that go beyond traditional instruction.

IDT 647 Online Learning (3 Credit Hours)

This course is an applied survey on online instruction, including relevant online learning theory and design considerations, as well as tools and principles, with an emphasis on K-12 education. Topics include theories and principles of online learning, effectively identifying, locating, evaluating, preparing, and using educational technology as instructional resources in an online environment.

IDT 725 Human Performance Assessment (3 Credit Hours)

This course focuses on the theory, design, and evaluation of measurement instruments used to assess individual knowledge, performance, and attitudes. Topics include fundamentals of measurement, reliability, validity, and instrument selection, construction, and use. Students will develop and evaluate instruments for instructional and research purposes.

Prerequisites: FOUN 722 or equivalent

IDT 730 Principles and Practices of Human Performance Technology (3 Credit Hours)

This course explores both the principles and practices of human performance technology, with roughly equal emphasis on both. Students will learn what HPT is, how it's applied in practice, and how and why instructional designers need to know about it. Particular emphasis is given to determining whether or not problems are best amenable to instructional solutions.

IDT 735 Noninstructional Interventions (3 Credit Hours)

This project-based course examines several different non-instructional interventions that can be used to promote performance improvement. Major methodologies common in the field will be explored as a class, and students will also be required to familiarize themselves with other methodologies of their choice. Emphasis will be on the following interventions: job analysis/work design, performance development, human resource development, organizational communication, organizational design and financial systems.

IDT 737 Consulting Skills for Instructional Designers (3 Credit Hours)

This project-based course is designed to develop and enhance the ability of instructional designers to work as partners and consultants to clients and superiors. The focus is on consulting skills per se, and not any particular content. All students will be required to do an individual consulting project, supervised by the instructor.

IDT 739 Needs Analysis and Assessment (3 Credit Hours)

This project-based class will focus on the process of doing a needs analysis and assessment, from start to finish. Although theoretical considerations regarding needs analyses will be explored, the emphasis is on actually conducting the analysis. Students will work in teams under the supervision of the instructor to conduct a needs analysis for an external client.

IDT 746 Foundations of Distance Education (3 Credit Hours)

An analysis of the trends, issues, and theories of distance education in education, business, and military applications. Students will examine various distance education systems, policies and lessons from different perspectives.

IDT 749 Instructional Systems Design (3 Credit Hours)

Students will gain hands-on experience applying a theoretical understanding of instructional design and development to actual projects. Students will learn and use the Instructional Systems Design Process from initial learner profile analysis to design and development through to evaluation. Students will work individually and in teams to gain experience similar to real-world instructional design situations. Students will master the fundamental practices upon which the instructional design process is based.

IDT 751 Computer-Based Multi-Media Design (3 Credit Hours)

This course covers the theory, design, and evaluation of computer-based multimedia instruction. Students will demonstrate a thorough understanding of instructional theory and design strategies for computer-based drills, tutorials, hypermedia, simulations, games, tools, open-ended learning environments, tests, and web-based instruction. Class projects will center on the design and development of instruction utilizing at least two of these methodologies.

Prerequisites: IDT 749 and IDT 849

IDT 752 Diffusion and Adoption of Instructional Technology Innovations (3 Credit Hours)

This course will explore theories, research, and strategies related to the diffusion and adoption of instructional technology innovations in education and training. The course will explore why and how individuals, groups, and organizations adopt or fail to adopt an innovation or change.

IDT 755 Theory and Design of Instructional Simulation (3 Credit Hours)

This course focuses on learning theory, design and evaluation of instructional simulations and simulators. Topics include history, instructional design, validation, and integration of instructional simulations.

IDT 756 Instructional Gaming: Theories and Practice (3 Credit Hours)

Provides both a conceptual framework and experience in the design and development of instructional games. The course introduces the student to the history, research, theory, and practice of instructional games. Topics include discussions of relevant learning theories associated with instructional gaming, analysis and design of games and current research in instructional gaming.

IDT 760 Cognition and Instructional Design (3 Credit Hours)

Students will be introduced to the theoretical frameworks that form the basis of instructional systems theory and design. Focus will be on learning theories, instructional psychology, and instructional system theory. Recent developments in cognition, learning and instruction for educators will also be considered. Topics include perspectives of behaviorism, social-historical constructivism, cognitive science, situated cognition, and cultural influences on cognition.

IDT 761 Applied Instructional Design Tools (3 Credit Hours)

Problem-based course in which students gain experience applying knowledge from IDT 749/IDT 849 to real-world instructional and instructional technology problems. Project work is individual, paired, and in teams. Students demonstrate mastery of the instructional design and development process through production of tools, technologies, media or materials that successfully resolve an instructional problem. Focus is on rapid prototyping model.

Prerequisites: IDT 749 or IDT 849

IDT 763 Instructional Design Theory (3 Credit Hours)

Students will investigate traditional and contemporary instructional design theories and models. Behavioral, cognitive, generative, problem-based learning, and constructivist theories as well as cognitive hierarchies will be examined, compared, contrasted and applied to various instructional situations.

IDT 764 Instructional Message Design (3 Credit Hours)

This course is a study of the application of perceptual and learning principles to the design of instructional media for use in educational and training applications. The focus is on the development and application of heuristics from the research literature. We will examine verbal and iconic signs as well as visual imagery, and their role in the instructional and learning processes.

IDT 773 Advanced Instructional Design Techniques (3 Credit Hours)

Exploration and application of techniques, tools and competencies characteristic of expert designers. Topics may include: instructional strategies, use of design software, program design, advanced analysis techniques, motivation design, rapid prototyping, reducing design cycle time, and designing instruction for diverse learner populations.

Prerequisites: IDT 749/IDT 849

IDT 775 Designing Online Instruction (3 Credit Hours)

An applied survey of online instruction, including relevant theory and design considerations. Topics include efficacy of online learning, design considerations when using course management systems and similar online learning technologies, research and future directions.

IDT 795 Topics in Instructional Design and Technology (1-3 Credit Hours)

Provides opportunities for master's and doctoral students to explore topics related to instructional design.

IDT 801 Instructional Design and Technology Seminar (3 Credit Hours)

Introduces new Ph.D. students to the field of instructional design and technology and provides orientation to doctoral level study. The course includes reading, critiquing and analyzing empirical research, theories, and real-world instructional problems. Potential student research agendas consistent with faculty or programmatic research foci will be explored. Academic and technological expectations will be communicated and practiced.

IDT 810 Trends and Issues in Instructional Design and Technology (3 Credit Hours)

Exploration and discussion of trends and issues of current and historical significance to instructional design. Readings will include contributions of key scholars, past and present, in instructional design and related fields. Includes analysis of trends and issues to track and predict their impact on the future of the field.

Prerequisites: 9 hours IDT coursework

IDT 825 Human Performance Assessment (3 Credit Hours)

This course focuses on the theory, design, and evaluation of measurement instruments used to assess individual knowledge, performance, and attitudes. Topics include fundamentals of measurement, reliability, validity, and instrument selection, construction, and use. Students will develop and evaluate instruments for instructional and research purposes.

Prerequisites: FOUN 722 or equivalent

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Prerequisites: IDT 749 or IDT 849

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Prerequisites: IDT 749/IDT 849

IDT 875 Designing Online Instruction (3 Credit Hours)

An applied survey of online instruction, including relevant theory and design considerations. Topics include efficacy of online learning, design considerations when using course management systems and similar online learning technologies, research and future directions.

IDT 879 Research Residency in Instructional Design and Technology (3 Credit Hours)

An introduction to conducting instructional technology research. Students will work in consultation with their advisor to develop a proposal for a study related to instructional technology as part of their research residency that will be submitted for presentation at a nationally refereed conference or to a refereed journal.

IDT 895 Topics in Instructional Design and Technology (3 Credit Hours)

Provides opportunities for master's and doctoral students to explore topics related to instructional design.

IDT 898 Research Residency II (1-3 Credit Hours)

A mentored research project by the student's advisor. Students work independently with their advisor to complete the research residency project. This course focuses on obtaining appropriate human subjects approval, collecting and analyzing data, and preparing a manuscript suitable for presentation or publication in nationally refereed journal or conference. Course may be repeated as needed, but only 3 hours may be counted toward degree requirements.

Prerequisites: IDT 879

INBU - International Business

INBU 630 Fundamentals of International Business (1 Credit Hour)

This course covers topics from management, marketing, economics, and finance that are important to the study of international business.

INBU 631 International Business Issues (2 Credit Hours)

This 2 hour capstone course covers topics facing international firms. This course uses a combination of case studies, lectures, and simulations to highlight the cultural, organizational, and financial challenges to doing business in various regions of the world.

INBU 685 International Business and Trade (3 Credit Hours)

This course is designed for high-level executive or general managers who must use a perspective that is qualitatively different from that of the lower-level functional managers. The unique focus of this course is that it brings together two dimensions that affect managerial decisions in internationalizing and structuring their businesses: first the international context in which firms operate and then how firms design and adapt approaches to take advantage of international opportunities and mitigate their risks. At the highest levels of organizations, leaders deal with complexity, ambiguity and uncertainty. The course discusses topics and frameworks that will help you navigate this world and enables you to pursue international (strategic) developments within your own firm.

Prerequisites: Admission to the MBA program OR approval by the MBA program office

IPEH - Interprofessional Education-Health

IPEH 590 Social Determinants of Health: An Interprofessional Approach (3 Credit Hours)

The social determinants of health status and health outcomes, including structural, financial and personal influences will be examined. The utility of an interprofessional collaborative approach to health care delivery will be highlighted.

Prerequisites: Junior standing or permission of the instructor

IS - International Studies

IS 600 Research Methods in International Studies (3 Credit Hours)

Interdisciplinary quantitative techniques applicable to the study of international phenomena.

IS 601 Seminar in International Relations Theory (3 Credit Hours)

Surveys major theoretical approaches to international relations and foreign policy. A systematic introduction designed to lay a foundation for advanced graduate study.

IS 655 International History (3 Credit Hours)

Course explores how different societies in the 20th century were shaped by similar practices, ideas, and pressures. Course themes may include colonialism, the global history of World War II, the cold war ethnic distortion and the consumer revolution among others.

IS 668 Internship in International Studies (3 Credit Hours)

Individually arranged internship at local, state, national or international level.

Prerequisites: approval of the director

IS 695 Topics in International Studies (3 Credit Hours)

The advanced study of selected (titled) topics not offered on a regular basis.

IS 696 Seminar Topics in International Studies (3 Credit Hours)

The advanced study of selected topics in an interdisciplinary manner which permits small groups of qualified students to work on subjects of mutual interest. Due to their specialized nature, seminar topics may not be offered regularly.

IS 697 Independent Research in International Studies (3 Credit Hours)

Independent research on a topic from an interdisciplinary perspective. Students must receive prior approval from the faculty supervisor and the director.

Prerequisites: Director approval required

IS 698 Directed Research (3 Credit Hours)

Methodological and theoretical preparation designed to assist students in writing a thesis.

Prerequisites: approval of director or instructor

IS 699 Thesis (1-9 Credit Hours)

Writing of the thesis.

IS 701 Global Change and American Foreign Policy (3 Credit Hours)

This research seminar examines the transformation of the U.S. role in the world in the global context of the 20th Century and since September 2001.

IS 702 Approaches to Collective Security (3 Credit Hours)

This seminar explores the origins of the idea of collective security, examines the attempts to organize international security collectively and assesses possibilities and opportunities for collective security arrangements after the Cold War.

IS 703 Ethics and International Relations (3 Credit Hours)

The focus of this research seminar will be on the role of normative ideas in international relations. Students will be introduced to the growing literature on normative approaches to international relations as well as the traditional literature on the practical and philosophical problems of ethical action in the relations of states. Although a number of policy applications will be considered, the primary focus will be on the theoretical incorporation of normative ideas into our understanding of state action in the anarchic international environment

IS 704 Latin American Politics (3 Credit Hours)

This course examines Latin American politics from comparative and historical perspectives. Particular focus is placed on various manifestations of political authority in the region and the major societal challenges to state power. The course reviews and critiques alternative theoretical approaches to the study of state-societal relations in Latin America.

IS 705 The Euro-Atlantic Community (3 Credit Hours)

An examination of the Euro-Atlantic area as a partial international system since World War II; alignments and patterns within and between the members of the European "community" and the role and attitudes of the United States and leading European states to preserve and strengthen their sovereign prerogatives and influence; and the prospects for a true Euro-Atlantic community that would link the U.S. and Europe.

IS 707 Interdependence, Power, and Transnationalism (3 Credit Hours)

This course covers the fundamental concepts, ideas, and approaches to the study of interdependence and transnationalism. It seeks to expose students to the nature, role, and impact of economic, technological, strategic, and cultural interdependence. Cases of interdependence and transnationalism are explored in the post-Cold War era. Some focus is placed on how interdependence and transnationalism are impacting the power of the state.

IS 708 Asian Politics (3 Credit Hours)

This course is a graduate seminar on the domestic politics and international relations of (East) Asia focusing on both Northeast and Southeast Asia. The first half of the course examines the domestic politics of Asian countries, with a focus on mainland China, Taiwan, Japan, and South Korea. The topics include political development, state-society relations, and political economy. The second half of the course turns to foreign relations in the region, exploring various topics and different levels of analysis to understanding the regional dynamics.

IS 709 Chinese Foreign Policy (3 Credit Hours)

This seminar includes an advanced survey of theoretical approaches to the study of Chinese foreign policy and in-depth analyses of the domestic/ international environment, ideological principles, political/economic goals, military/diplomatic instruments, decision-making processes, and global/ regional consequences of Chinese foreign policy.

IS 710 Global Environmental Policy (3 Credit Hours)

This seminar examines the institutions and political actors involved in global environmental policy making with emphasis on the role of the United States. In doing so, it addresses the scientific and political debate concerning the causes, consequences, and proposed solutions of selected worldwide ecological problems, including global climate change, stratospheric ozone depletion, acid rain, and loss of biodiversity among others.

IS 711 International Migration and Refugee Movement (3 Credit Hours)

A review of current literature and empirical issues concerning transnational migration and refugees.

IS 712 The New Germany in the New Europe (3 Credit Hours)

The unification of Germany and the end of the East-West conflict have changed the context within which policy is made in Europe. What kind of Europe will emerge? What kind of hierarchies will determine direction and pace of European politics? The purpose of this course is to explore the role played by Germany in the development of post-Cold War European politics.

IS 713 Global Political Economy (3 Credit Hours)

Analysis of the forces shaping national and transnational economic institutions and their policies on a range of contemporary issues, including North-South relations.

IS 714 Law in the International System (3 Credit Hours)

An introduction to the principles of international law and to the political and institutional role of law in the relations of states.

IS 715 France and New Europe (3 Credit Hours)

Emphasis will be placed on the transformation of French-American relations from the idyllic beginnings of the American nation to the complexities of the Cold War, to the new alignments of the new Europe and the European Union.

IS 716 Theories of Comparative Sociopolitical Studies (3 Credit Hours)

The fundamental goal of the course is to provide the theoretical basis for subsequent coursework and research in the comparative and regional studies track. To achieve this goal, this seminar examines major theories and debates in comparative social and political studies based on extensive and intensive literature review.

IS 717 World Population and Development (3 Credit Hours)

This seminar discusses population processes and their connections to socioeconomic development. A nontechnical course, the goal is to introduce students to the major concerns and issues in population and current debates over the role of population in sustainable development. It will provide students with a systematic but critical review of research findings and issues in various areas of population and development.

IS 720 Research Seminar in Global Security (3 Credit Hours)

The research seminar investigates the profound changes in international security brought about by the end of the Cold War with a specific focus on the role of nuclear weapons. The primary purpose of the seminar is to promote research into the global aspects of the nuclear issue and to enhance understanding of the relationship between nuclear control and the New World Order.

IS 721 New World Order: Chaos and Coherence (3 Credit Hours)

This course explores ideas of order and how they apply to international politics over space and time. Using theories of international relations, students look at how states and other international actors shape the principles and practices on which order is built and how these actors navigate among the many challenges and disruptions that arise. Specifically, students study the international liberal order, power shifts, and technological innovations, including cyber, and the rise and demise of norms in the international system.

IS 722 Democracy and International Relations (3 Credit Hours)

An examination of the relationship between democratic politics, democratic ideals, and international relations. Subjects covered will include trends and processes of democratization and their implications for international relations, the distinctiveness of democratic states in their international behavior, the impact of the international environment on the internal politics of democratic states, and the problems of democracy in global governance.

IS 723 Advanced Statistical Techniques in International Studies (3 Credit Hours)

Introduces the use of advanced statistical techniques for the analysis of social science data. The central objective is to give students a working understanding of multivariate analysis, with a particular focus on the techniques and problems associated with multiple regression, causal analysis, and limited dependent variable maximum likelihood models.

Prerequisites: IS 600 or equivalent

IS 724 International & Comparative Political Economy (3 Credit Hours)

This class focuses on core theories of international political economy, including international trade, international finance, foreign direct investment, the role of multinational corporations, and the subfield of comparative political economy. Students are introduced to the two main paradigms of contemporary economics, Keynesianism and Hayekian monetarism. Students study labor markets and industrial relations, welfare states, the domestic regulation of finance, the politics of debt, inequality, and the role of the state.

IS 725 Politics of the Middle East (3 Credit Hours)

Explores the international relations of the Middle East from World War I to the present. Examines the origins of the Arab-Israeli and Persian Gulf Wars and their modern dimensions. Examines the role of oil, outside powers and religion.

IS 726 American Foreign Policy and World Order (3 Credit Hours)

This course deals with the adaptation of US foreign policies to the changing structure of the international system after WWII and in the Cold War, and since Reagan. It is designed to review, analyze, and discuss the global rise of the US role in the world. It will also assess the transformation of US interests since 1945, through the Cold War and since the events of September 11, 2001.

IS 728 Ghosts of French Colonization (3 Credit Hours)

An analysis of France ex-colonies as they moved from colonization and decolonization to independence. An overview of political, historical, cinematic, and literary texts with a focus on France's relationship with its ex-colonies, and its ex-colonies' struggles in a post-decolonized world up until contemporary times.

IS 731 Media & Migration (3 Credit Hours)

This class explores the complex relationships between immigration, globalization, nationalism, and media at the turn of the 21st Century. Students distinguish between different forms of migration and experiences of travel. It explores how media has depicted immigration processes and shaped public attitudes toward different immigrant groups. It also investigates how first- and second-generation immigrant populations consume and produce media that both shape and are shaped by transnational identity formations.

IS 732 National Identity in a Global Age (3 Credit Hours)

This course will focus on narratives of national identity in the age of globalization. Seminal works of cultural criticism, philosophy, and political philosophy will shed light on the complex nature of national identity construction in the contemporary world.

IS 734 U.S. Grand Strategy (3 Credit Hours)

This course offers a thorough exploration into the subject of U.S. grand strategy. It confronts debates over the definition and usefulness of grand strategy, examines variations across the history of U.S. grand strategy and among current visions for U.S. grand strategy, and analyzes subjects of core concern to U.S. grand strategy.

IS 735 International Relations of the Middle East (3 Credit Hours)

The purpose of this course is to help the student understand, evaluate and analyze key features of the international relations of the Middle East. Major issues covered include the historical background of the Middle East, primarily from World War I; Islam and Islamism; Zionism and Israel; Arab nationalism and pan-Arabism; the Arab-Israeli conflict in its historical and contemporary context; the Persian Gulf wars; global oil dynamics; the foreign policy of key regional states; the role of outside powers in the region, especially the United States; and major issues including democratization, WMD, and the Arab Spring.

Prerequisites: Instructor or Director approval

IS 738 European Politics (3 Credit Hours)

The course explores on the politics of Europe, focusing on four core themes: the political economy and the travails of the single currency, the question of immigration, legitimacy and democracy, and the changing political landscape. Students will familiarize themselves with the European Union and its institutions, as well as such themes as populism, the decline of centrist political parties and economic stagnation.

IS 740 Political Economy of Development (3 Credit Hours)

This seminar examines alternate theoretical perspectives on development. These perspectives are then employed to understand contemporary political and economic changes in the developing world, including the consolidation of democratic governance and the liberalization of domestic economics.

IS 741 Globalization and Social Change in the World System (3 Credit Hours)

This course is intended to first identify the distinguishing characteristics of globalization. It then attempts to examine its implications on a number of critical issues, including the future of democracy, income distribution and ethnic, class, and gender relations.

IS 748 Gender and Globalization (3 Credit Hours)

Studies systems of global restructuring as they impact women throughout the globe. Migration, international development, and transnational activism will be focal themes, explored across a variety of national contexts.

IS 750 France's Decolonized Legacy: Africa, Asia, the Caribbean, Quebec (3 Credit Hours)

An analysis of France's ex-colonies as they moved from colonization and decolonization to independence. An overview of political, historical, cinematic, and literary texts with a focus on France's relationship with its ex-colonies, and its ex-colonies' struggles in a post-decolonized world.

Prerequisites: Approval of instructor or director

IS 751 Ethnic Conflict in the Emerging Global Order (3 Credit Hours)

Using different case studies, this course investigates the most important internal and external factors that cause ethnic conflicts. It also examines different mechanisms that help resolve or mitigate such conflicts.

IS 752 Research Seminar in International Studies: Refugees (3 Credit Hours)

This is a graduate-level seminar focusing on the refugee movement from a global perspective. The goals are to provide a critical and realistic understanding of the refugee phenomenon and to explain why the refugees tend to follow some identifiable paths, and why they sometimes return and sometimes do not. Discussion will be centered on the causes and consequences of refugee flow, and the roles the more developed countries can play in helping solve the problem.

IS 755 Conflict and Violence in Modern Africa (3 Credit Hours)

This course will confront the theme of conflict and violence in Africa since the mid-20th century. It will explore the reasons behind the level of violent conflicts in the continent today, seek to understand their larger significance, and explore ideas for conflict resolution and prevention. (cross listed with HIST 755)

IS 760 International Cultural Studies: History, Theory and Application (3 Credit Hours)

Course analyzes culture in the context of material conditions in which it is produced, disseminated, controlled and practiced. Theoretical application of cultural studies will include developing familiarity with key foundational theories, terminologies, and critical thinking.

IS 762 Game Theory (3 Credit Hours)

Game theory uses mathematical models, empirical investigation, and simulations in an effort to explain simple and complex strategic interactions among individuals, states, groups, and species. This course teaches the tools of game theory, with a focus on applications in international relations and political science.

IS 765 Agent-Based Modeling and Simulation for International Studies (3 Credit Hours)

An introduction to complex systems theory and to the application of agent-based modeling technologies to a variety of social systems.

IS 770 Transnational Media Practices (3 Credit Hours)

Course examines the key roles played by media technologies in implementing and promoting international development programs, as well as some of the concerns these initiatives have raised in terms of media literacy, cultural sovereignty, and information access.

IS 772 Modeling Global Events (3 Credit Hours)

This course introduces modeling and simulation as a tool for expanding one's understanding of events that have shaped the global environment of the 21st century. The course will first provide a broad look at international politics through a review of select international incidents, military interventions, and homeland security issues. Second, select topics from these categories will serve as case studies to facilitate representing those events with the application of modeling, simulation, and visualization. Understanding how modeling and simulation can provide another method of analysis allows students to delve deeper into their understanding of "what happened" and to explore their conception of "what if."

Prerequisites: Approval of instructor or director

IS 790 Advanced Seminar Conflict & Cooperation (3 Credit Hours)

This course explores debates in the field of Security Studies, their relevance to creating knowledge, discourse, consensus and critique, and the development of diverse research agendas.

IS 794 Seminar in Thesis and Dissertation Preparation (3 Credit Hours)

Prepares students to research, formulate and write thesis and dissertation prospectuses.

Prerequisites: permission of the director

IS 795 Topics in International Studies (1-3 Credit Hours)

The advanced study and discussion of selected (titled) topics not offered on a regular basis.

IS 796 Selected Topics in International Studies (1-3 Credit Hours)

The advanced study of selected topics in an interdisciplinary manner which will permit small groups of qualified students to work on subjects of mutual interest. Due to their specialized nature, the course may not be offered regularly.

IS 801 Global Change and American Foreign Policy (3 Credit Hours)

This research seminar examines the transformation of the U.S. role in the world in the global context of the 20th Century and since September 2001.

IS 802 Approaches to Collective Security (3 Credit Hours)

This seminar explores the origins of the idea of collective security, examines the attempts to organize international security collectively and assesses possibilities and opportunities for collective security arrangements after the Cold War.

IS 803 Ethics and International Relations (3 Credit Hours)

The focus of this research seminar will be on the role of normative ideas in international relations. Students will be introduced to the growing literature on normative approaches to international relations as well as the traditional literature on the practical and philosophical problems of ethical action in the relations of states. Although a number of policy applications will be considered, the primary focus will be on the theoretical incorporation of normative ideas into our understanding of state action in the anarchic international environment

IS 804 Latin American Politics (3 Credit Hours)

This course examines Latin American politics from comparative and historical perspectives. Particular focus is placed on various manifestations of political authority in the region and the major societal challenges to state power. The course reviews and critiques alternative theoretical approaches to the study of state-societal relations in Latin America.

IS 805 The Euro-Atlantic Community (3 Credit Hours)

An examination of the Euro-Atlantic area as a partial international system since World War II; alignments and patterns within and between the members of the European "community" and the role and attitudes of the United States and leading European states to preserve and strengthen their sovereign prerogatives and influence; and the prospects for a true Euro-Atlantic community that would link the U.S. and Europe.

IS 807 Interdependence, Power, and Transnationalism (3 Credit Hours)

This course covers the fundamental concepts, ideas, and approaches to the study of interdependence and transnationalism. It seeks to expose students to the nature, role, and impact of economic, technological, strategic, and cultural interdependence. Cases of interdependence and transnationalism are explored in the post-Cold War era. Some focus is placed on how interdependence and transnationalism are impacting the power of the state.

IS 808 Asian Politics (3 Credit Hours)

This course is a graduate seminar on the domestic politics and international relations of (East) Asia focusing on both Northeast and Southeast Asia. The first half of the course examines the domestic politics of Asian countries, with a focus on mainland China, Taiwan, Japan, and South Korea. The topics include political development, state-society relations, and political economy. The second half of the course turns to foreign relations in the region, exploring various topics and different levels of analysis to understanding the regional dynamics.

IS 809 Chinese Foreign Policy (3 Credit Hours)

This seminar includes an advanced survey of theoretical approaches to the study of Chinese foreign policy and in-depth analyses of the domestic/international environment, ideological principles, political/economic goals, military/diplomatic instruments, decision-making processes, and global/regional consequences of Chinese foreign policy.

IS 810 Global Environmental Policy (3 Credit Hours)

This seminar examines the institutions and political actors involved in global environmental policy making with emphasis on the role of the United States. In doing so, it addresses the scientific and political debate concerning the causes, consequences, and proposed solutions of selected worldwide ecological problems, including global climate change, stratospheric ozone depletion, acid rain, and loss of biodiversity among others.

IS 811 International Migration and Refugee Movement (3 Credit Hours)

A review of current literature and empirical issues concerning transnational migration and refugees.

IS 812 The New Germany in the New Europe (3 Credit Hours)

The unification of Germany and the end of the East-West conflict have changed the context within which policy is made in Europe. What kind of Europe will emerge? What kind of hierarchies will determine direction and pace of European politics? The purpose of this course is to explore the role played by Germany in the development of post-Cold War European politics.

IS 813 Global Political Economy (3 Credit Hours)

Analysis of the forces shaping national and transnational economic institutions and their policies on a range of contemporary issues, including North-South relations.

IS 814 Law in the International System (3 Credit Hours)

An introduction to the principles of international law and to the political and institutional role of law in the relations of states.

IS 815 France and New Europe (3 Credit Hours)

Emphasis will be placed on the transformation of French-American relations from the idyllic beginnings of the American nation to the complexities of the Cold War, to the new alignments of the new Europe and the European Union.

IS 816 Theories of Comparative Sociopolitical Studies (3 Credit Hours)

The fundamental goal of the course is to provide the theoretical basis for subsequent coursework and research in the comparative and regional studies track. To achieve this goal, this seminar examines major theories and debates in comparative social and political studies based on extensive and intensive literature review.

IS 817 World Population and Development (3 Credit Hours)

This seminar discusses population processes and their connections to socioeconomic development. A nontechnical course, the goal is to introduce students to the major concerns and issues in population and current debates over the role of population in sustainable development. It will provide students with a systematic but critical review of research findings and issues in various areas of population and development.

IS 820 Research Seminar in Global Security (3 Credit Hours)

The research seminar investigates the profound changes in international security brought about by the end of the Cold War with a specific focus on the role of nuclear weapons. The primary purpose of the seminar is to promote research into the global aspects of the nuclear issue and to enhance understanding of the relationship between nuclear control and the New World Order.

IS 821 New World Order: Chaos and Coherence (3 Credit Hours)

This course explores ideas of order and how they apply to international politics over space and time. Using theories of international relations, students look at how states and other international actors shape the principles and practices on which order is built and how these actors navigate among the many challenges and disruptions that arise. Specifically, students study the international liberal order, power shifts, and technological innovations, including cyber, and the rise and demise of norms in the international system.

IS 822 Democracy and International Relations (3 Credit Hours)

An examination of the relationship between democratic politics, democratic ideals, and international relations. Subjects covered will include trends and processes of democratization and their implications for international relations, the distinctiveness of democratic states in their international behavior, the impact of the international environment on the internal politics of democratic states, and the problems of democracy in global governance.

IS 823 Advanced Statistical Techniques in International Studies (3 Credit Hours)

Introduces the use of advanced statistical techniques for the analysis of social science data. The central objective is to give students a working understanding of multivariate analysis, with a particular focus on the techniques and problems associated with multiple regression, causal analysis, and limited dependent variable maximum likelihood models.

Prerequisites: IS 600 or equivalent

IS 824 International & Comparative Political Economy (3 Credit Hours)

This class focuses on core theories of international political economy, including international trade, international finance, foreign direct investment, the role of multinational corporations, and the subfield of comparative political economy. Students are introduced to the two main paradigms of contemporary economics, Keynesianism and Hayekian monetarism. Students study labor markets and industrial relations, welfare states, the domestic regulation of finance, the politics of debt, inequality, and the role of the state.

IS 825 Politics of the Middle East (3 Credit Hours)

Explores the international relations of the Middle East from World War I to the present. Examines the origins of the Arab-Israeli and Persian Gulf Wars and their modern dimensions. Examines the role of oil, outside powers and religion.

IS 826 American Foreign Policy and World Order (3 Credit Hours)

This course deals with the adaptation of US foreign policies to the changing structure of the international system after WWII and in the Cold War, and since Reagan. It is designed to review, analyze, and discuss the global rise of the US role in the world. It will also assess the transformation of US interests since 1945, through the Cold War and since the events of September 11, 2001.

IS 828 Ghosts of French Colonization (3 Credit Hours)

An analysis of France ex-colonies as they moved from colonization and decolonization to independence. An overview of political, historical, cinematic, and literary texts with a focus on France's relationship with its ex-colonies, and its ex-colonies' struggles in a post-decolonized world up until contemporary times.

IS 831 Media & Migration (3 Credit Hours)

This class explores the complex relationships between immigration, globalization, nationalism, and media at the turn of the 21st Century. Students distinguish between different forms of migration and experiences of travel. It explores how media has depicted immigration processes and shaped public attitudes toward different immigrant groups. It also investigates how first- and second-generation immigrant populations consume and produce media that both shape and are shaped by transnational identity formations.

IS 832 National Identity in a Global Age (3 Credit Hours)

This course will focus on narratives of national identity in the age of globalization. Seminal works of cultural criticism, philosophy, and political philosophy will shed light on the complex nature of national identity construction in the contemporary world.

IS 834 U.S. Grand Strategy (3 Credit Hours)

This course offers a thorough exploration into the subject of U.S. grand strategy. It confronts debates over the definition and usefulness of grand strategy, examines variations across the history of U.S. grand strategy and among current visions for U.S. grand strategy, and analyzes subjects of core concern to U.S. grand strategy.

IS 835 International Relations of the Middle East (3 Credit Hours)

The purpose of this course is to help the student understand, evaluate and analyze key features of the international relations of the Middle East. Major issues covered include the historical background of the Middle East, primarily from World War I; Islam and Islamism; Zionism and Israel; Arab nationalism and pan-Arabism; the Arab-Israeli conflict in its historical and contemporary context; the Persian Gulf wars; global oil dynamics; the foreign policy of key regional states; the role of outside powers in the region, especially the United States; and major issues including democratization, WMD, and the Arab Spring.

Prerequisites: Instructor or Director approval

IS 838 European Politics (3 Credit Hours)

The course explores on the politics of Europe, focusing on four core themes: the political economy and the travails of the single currency, the question of immigration, legitimacy and democracy, and the changing political landscape. Students will familiarize themselves with the European Union and its institutions, as well as such themes as populism, the decline of centrist political parties and economic stagnation.

IS 840 Political Economy of Development (3 Credit Hours)

This seminar examines alternate theoretical perspectives on development. These perspectives are then employed to understand contemporary political and economic changes in the developing world, including the consolidation of democratic governance and the liberalization of domestic economics.

IS 841 Globalization and Social Change in the World System (3 Credit Hours)

This course is intended to first identify the distinguishing characteristics of globalization. It then attempts to examine its implications on a number of critical issues, including the future of democracy, income distribution and ethnic, class, and gender relations.

IS 848 Gender and Globalization (3 Credit Hours)

Studies systems of global restructuring as they impact women throughout the globe. Migration, international development, and transnational activism will be focal themes, explored across a variety of national contexts.

IS 850 France's Decolonized Legacy: Africa, Asia, the Caribbean, Quebec (3 Credit Hours)

An analysis of France's ex-colonies as they moved from colonization and decolonization to independence. An overview of political, historical, cinematic, and literary texts with a focus on France's relationship with its ex-colonies, and its ex-colonies' struggles in a post-decolonized world.

Prerequisites: Approval of instructor or director

IS 851 Ethnic Conflict in the Emerging Global Order (3 Credit Hours)

Using different case studies, this course investigates the most important internal and external factors that cause ethnic conflicts. It also examines different mechanisms that help resolve or mitigate such conflicts.

IS 852 Research Seminar in International Studies: Refugees (3 Credit Hours)

This is a graduate-level seminar focusing on the refugee movement from a global perspective. The goals are to provide a critical and realistic understanding of the refugee phenomenon and to explain why the refugees tend to follow some identifiable paths, and why they sometimes return and sometimes do not. Discussion will be centered on the causes and consequences of refugee flow, and the roles the more developed countries can play in helping solve the problem.

IS 855 Conflict and Violence in Modern Africa (3 Credit Hours)

This course will confront the theme of conflict and violence in Africa since the mid-20th century. It will explore the reasons behind the level of violent conflicts in the continent today, seek to understand their larger significance, and explore ideas for conflict resolution and prevention. (cross listed with HIST 755)

IS 860 International Cultural Studies: History, Theory and Application (3 Credit Hours)

Course analyzes culture in the context of material conditions in which it is produced, disseminated, controlled and practiced. Theoretical application of cultural studies will include developing familiarity with key foundational theories, terminologies, and critical thinking.

IS 862 Game Theory (3 Credit Hours)

Game theory uses mathematical models, empirical investigation, and simulations in an effort to explain simple and complex strategic interactions among individuals, states, groups, and species. This course teaches the tools of game theory, with a focus on applications in international relations and political science.

IS 865 Agent-Based Modeling and Simulation for International Studies (3 Credit Hours)

An introduction to complex systems theory and to the application of agent-based modeling technologies to a variety of social systems.

IS 868 Internship in International Studies (3 Credit Hours)

Internship individually arranged at local, state, or international level.

Prerequisites: approval of director

IS 870 Transnational Media Practices (3 Credit Hours)

Course examines the key roles played by media technologies in implementing and promoting international development programs, as well as some of the concerns these initiatives have raised in terms of media literacy, cultural sovereignty, and information access.

IS 872 Modeling Global Events (3 Credit Hours)

This course introduces modeling and simulation as a tool for expanding one's understanding of events that have shaped the global environment of the 21st century. The course will first provide a broad look at international politics through a review of select international incidents, military interventions, and homeland security issues. Second, select topics from these categories will serve as case studies to facilitate representing those events with the application of modeling, simulation, and visualization. Understanding how modeling and simulation can provide another method of analysis allows students to delve deeper into their understanding of "what happened" and to explore their conception of "what if."

Prerequisites: Approval of instructor or director

IS 890 Advanced Seminar Conflict & Cooperation (3 Credit Hours)

This course explores debates in the field of Security Studies, their relevance to creating knowledge, discourse, consensus and critique, and the development of diverse research agendas.

IS 894 Seminar in Thesis and Dissertation Preparation (3 Credit Hours)

Prepares students to research, formulate and write thesis and dissertation prospectuses.

Prerequisites: permission of the director

IS 895 Topics in International Studies (1-3 Credit Hours)

The advanced study and discussion of selected (titled) topics not offered on a regular basis.

IS 896 Selected Topics in International Studies (1-3 Credit Hours)

The advanced study of selected topics in an interdisciplinary manner which will permit small groups of qualified students to work on subjects of mutual interest. Due to their specialized nature, the course may not be offered regularly.

IS 897 Independent Research in International Studies (3 Credit Hours)

Independent research directed by professors. May only be taken once.

Prerequisites: approval of the director

IS 898 Directed Research (3 Credit Hours)

Methodological and theoretical preparation designed to assist students in writing a dissertation. Students may only take this once.

Prerequisites: approval of director or instructor

IS 899 Dissertation (1-9 Credit Hours)

May be repeated up to 18 credits.

IS 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

IS 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

IT - Information Technology

IT 564 Essentials of Project Management (3 Credit Hours)

This course focuses on project management concepts and methodologies. Topics include project management framework, knowledge areas, and techniques.

Prerequisites: Enrolled in a graduate program or a graduate certificate program, or waiver approved by the instructor

IT 595 Topics (1-3 Credit Hours)

IT 630 Intelligent Systems & Business Analytics (3 Credit Hours)

This course explores the intersection of intelligent systems and business analytics. Students gain insights into leveraging artificial intelligence and data analysis techniques to drive informed decision-making and solve complex business problems. Topics include descriptive analytics, predictive analytics, prescriptive analytics, AI, machine learning, and real-world case studies in various industries.

Prerequisites: Admission to the MBA program OR approval by the MBA program office/instructor

IT 634 Cloud Computing and Security (3 Credit Hours)

An introduction to key concepts and techniques of cloud computing and security. Topics include: cloud computing systems, virtualization and container technologies, cloud architecture and service platform design, cloud programming models, big data analytics, cloud performance and security.

IT 650 Database Management Systems (3 Credit Hours)

Introduction to database management systems. The topics addressed include system architecture, data models, database analysis, design and implementation, query processing, business transaction processing, and database security.

Prerequisites: IT 620 or equivalent; or permission of the department

IT 651 Business Intelligence (3 Credit Hours)

Introduction to business intelligence and its three components: data warehouse, data mining, and OLAP. Examines traditional techniques as well as emerging technologies.

Prerequisites: IT 650, or admission to a graduate program at ODU, or permission of the instructor or department

IT 652 Information and Communications Technology for Big Data (3 Credit Hours)

Introduction to emerging ICT techniques for big data analytics and big data science. Topics cover WSN, cloud computing and IoT.

Prerequisites: IT 650, or admission to a graduate program at ODU, or permission of the instructor or department

IT 660 Digitalizing Enterprises (3 Credit Hours)

Information and Communication Technologies (ICT) is a critical enabler of the digital enterprise. This class introduces cutting-edge ICT, including enterprise systems, IoT, CPS as the foundation for digitalizing enterprises for the seamless integration of enterprises and supply chain. Topics includes intra- and inter-organizational integration, supply chain collaboration and integration, and digitalization technologies.

Prerequisites: IT 650 or permission of the instructor or department or admission to a graduate program at ODU

IT 664 Project Management (3 Credit Hours)

This course provides knowledge of project management including tools and techniques to manage scope, time, cost, quality, risk, team, communications, security and procurement. Special issues in the context of information- and technology-based projects are emphasized.

IT 667 Cooperative Education (1-3 Credit Hours)

Approval for enrollment and allowable credits are determined by the department in the semester prior to enrollment. Available for pass/fail grading only.

Prerequisites: IT 620 or equivalent

IT 668 Information Systems Internship (1-3 Credit Hours)

Approval for enrollment and allowable credits are determined by the department in the semester prior to enrollment. Available for pass/fail grading only.

Prerequisites: IT 620 or equivalent

IT 672 Enterprise Architectures (3 Credit Hours)

Introduction to enterprise architectures for business organizations as well as related information architectures. Examines traditional techniques as well as emerging techniques including industrial information integration engineering.

Prerequisites: IT 650, or admission to a graduate program at ODU, or permission of the instructor or department

IT 680 Computing Aspects of Medical Informatics (3 Credit Hours)

Overview of computing aspects of medical informatics. Computational methods in scientific computing of medical informatics are covered. The basic thrust is to demonstrate the usefulness and power of computational methods in solving real-life problems in perspectives of medical informatics.

IT 695 Selected Topics in Information (1-3 Credit Hours)

3 credits.

Prerequisites: permission of the department chair and the graduate program director

IT 697 Independent Study in Information Systems (1-3 Credit Hours)

Affords students the opportunity to undertake independent study under the direction of a faculty member.

Prerequisites: IT 650 or permission of the department

IT 698 Master's Project in Information (3 Credit Hours)

3 credits.

Prerequisites: IT 650 and permission of the department

IT 699 Master's Thesis in Information Systems (1-6 Credit Hours)

1-6 credits.

Prerequisites: IT 650 and permission of the department

IT 795 Selected Topics in Management Information Systems (1-3 Credit Hours)

3 credits.

Prerequisites: permission of the department chair and the graduate program director

IT 800 Theoretical Foundation in Information Technology Research (3 Credit Hours)

A survey of research methodology in supply chain and operations management, data science, and information technology including empirical, behavioral, computational, and interdisciplinary methods and techniques in different types of problem domains.

IT 850 Enterprise Architecture and Computing Algorithms (3 Credit Hours)

This course examines the latest advances in enterprise architecture and computing. Topics include enterprise architecture design and modeling, service-oriented architecture (SOA), and integration of enterprise information and applications.

Prerequisites: IT 800

IT 890 Seminar in Business Process and Enterprise Systems (3 Credit Hours)

This course discusses how firms achieve business excellence through business process management (BPM), business process improvement (BPI), and business process reengineering (BPR) supported by IT. Topics include business process and workflow modeling, analysis, integration, monitoring and management.

Prerequisites: IT 800

IT 891 Seminar in Business Intelligence (3 Credit Hours)

The objective of this course is to provide an overview of managerial and technical issues associated with business intelligence. Topics covered include the state-of-the art data warehousing, data mining and OLAP technologies.

Prerequisites: IT 800

IT 892 Seminar in Knowledge Management (3 Credit Hours)

The course examines the latest advances in knowledge management (KM) including identifying, capturing, sharing and evaluating an enterprise's knowledge assets. The course reviews and discusses existing technologies in KM and new emerging KM technologies and practices.

Prerequisites: IT 800

IT 893 Supply Chain in E-Business Environment (3 Credit Hours)

This course examines how supply chain management and information technology integrate to support global e-commerce opportunities. Topics include the theories and practices of material flow management, omnichannel distribution and retailing, maritime, logistics, procurement, and inventory management.

Prerequisites: IT 800

IT 895 Selected Topics in Management Information Systems (1-3 Credit Hours)

3 credits.

Prerequisites: permission of the department chair and the graduate program director

IT 899 Dissertation (1-12 Credit Hours)

Ph.D. level research and writing of dissertation.

Prerequisites: IT 893; departmental approval required

IT 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

JAPN - Japanese

JAPN 522 Analyzing Japanese Conversation (3 Credit Hours)

This course examines Japanese conversation from a comparative perspective using the framework of Conversation Analysis. It explores the basic mechanisms of social interaction in English and Japanese spoken discourse with a particular focus on everyday talk.

Prerequisites: JAPN 312W or permission of the instructor

JAPN 595 Topics in Japanese (1-6 Credit Hours)

This course provides a study of selected topics in Japanese. Topics vary with the semester and the instructor. Expectations for materials covered and produced for the class vary with the level (higher-level classes will have higher expectations). Contact the Japanese Program Coordinator for details about specific topics covered in a given semester.

Prerequisites: JAPN 312W or permission of the instructor

JAPN 596 Topics in Japanese (1-6 Credit Hours)

A study of selected topics in Japanese. These courses will appear in the course schedule and will be more fully described by academic advisors.

Prerequisites: JAPN 312W or permission of the instructor

JAPN 697 Tutorial Work in Japanese (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: Permission of the instructor

JST - Jewish Studies

JST 595 Topics in Jewish Studies (3 Credit Hours)

This course addresses various topics in Jewish Studies.

Prerequisites: graduate standing or permission of instructor

KIN - Kinesiology

KIN 810 Seminar in Applied Science in Kinesiology (3 Credit Hours)

An integrative seminar focusing on major issues within the field of kinesiology in which students will apply concepts related to aspects of professional practice and higher education.

Prerequisites: Admission to the Doctor of Applied Science in Kinesiology program

KIN 820 Applied Quantitative Research Methods in Kinesiology (3 Credit Hours)

Knowledge in kinesiology is built through careful analysis and interpretation of data. In this course, students will apply descriptive and inferential statistical methods to various kinds of data and interpret the results through an understanding of research methods used to collect data. This will develop students' ability to make sense of kinesiology related research literature and make informed, evidence-based decisions.

Prerequisites: Admission to the Doctor of Applied Science in Kinesiology program or permission of instructor

KIN 825 Mixed & Multi Methods in Kinesiology Research (3 Credit Hours)

This course will cover the writing and refining of research questions, collecting and analyzing qualitative and quantitative data, and choosing the appropriate mixed or multi-method design. The course will also review analyzing, interpreting, and presenting the results of a mixed or multi method design to address the research questions. Students will learn how qualitative and quantitative data can be combined to capture the perspectives of healthcare providers, patients, organizations, or other stakeholders to answer research questions.

Prerequisites: Admission to the Doctor of Applied Science in Kinesiology program or permission of instructor

KIN 890 Kinesiology Capstone (3-6 Credit Hours)

The capstone experience(s) provides students with an in-depth supervised experience with an approved mentor. The capstone experience(s) will require students to complete a project related to an actual kinesiological issue that aligns with the expertise of the mentor.

Prerequisites: Admission to the Doctor of Applied Science in Kinesiology program

KRS - Kinesiology and Rehabilitation Sciences

KRS 820 MATLAB Programming for Kinesiology and Rehabilitation (3 Credit Hours)

Developments in technology provide researchers with the ability to measure different aspects of human movement many times a second. To make sense of these large and complex datasets researchers are increasingly using engineering software, e.g., MATLAB, to manipulate, process, and analyze data. In this course, students will gain experience importing, plotting, filtering, selecting critical points, and exporting data through the creation of custom functions and scripts within the MATLAB user interface.

Prerequisites: admission to the kinesiology and rehabilitation doctoral program or permission of the instructor

KRS 825 Mixed and Multi Methods in Health Sciences Research (3 Credit Hours)

This course will cover the writing and refining of research questions, collecting and analyzing qualitative and quantitative data, and choosing the appropriate mixed or multi-method design. The course will also review analyzing, interpreting, and presenting the results of a mixed or multi method design to address the research questions. Students will learn how qualitative and quantitative data can be combined to capture the perspectives of healthcare providers, patients, organizations, or other stakeholders to answer research questions.

KRS 830 Theoretical Models in Kinesiology and Rehabilitation (3 Credit Hours)

This course will explore some of the theories that are common to kinesiology and rehabilitation research. It will include theories associated with disablement, rehabilitation, patient-centered care, motor control, and models for clinical research. These theories will be applied to clinical and research applications relevant to kinesiology and rehabilitation.

KRS 835 Critical Appraisal and Synthesis of Evidence in Kinesiology and Rehabilitation (3 Credit Hours)

This course will introduce the student to critical appraisal of all forms of research in kinesiology and rehabilitation. The purpose of this course is to further develop the student's competence in conducting and evaluating research. The student will develop the skills necessary to find, critically evaluate, and synthesize the available research in order to answer individual research questions or cultivate a line of research inquiry.

KRS 851 Motor Performance: Rhythmic/Cyclic Tasks (3 Credit Hours)

This course examines the coordination of cardiorespiratory, musculoskeletal, and neurological systems in performing rhythmic movement tasks such as walking, running, swallowing, speaking, and feeding. Students will gain experience measuring and interpreting cardiorespiratory variables, kinematics, kinetics, and energetics of rhythmic movement tasks integrated with measures of activity, participation, and clinical standardized tests.

KRS 852 Motor Performance: Discrete Tasks (3 Credit Hours)

This course will examine the coordination of musculoskeletal and neurological systems in performing discrete movement tasks such as reaching, grasping, throwing and speaking. Students will gain experience measuring and interpreting kinematics and kinetics of discrete tasks integrated with measures of activity and participation and clinical standardized tests.

KRS 855 Neurosciences of Motor Control (3 Credit Hours)

This course covers neuroscience with specific regard to the fundamental design, organization and workings of the central nervous system (CNS) in the areas of motor control. The topics cover areas related to the typical development of motor function and changes in motor control throughout the lifespan. This course also assesses motor-control problems that occur as a result of congenital conditions, acquired damage, dysfunction or disease. Pathological conditions such as (but not limited to) stroke, Parkinson's disease, cerebellar disease, and muscle and joint pathologies are examined.

KRS 856 Balance and Postural Control (3 Credit Hours)

An optimal level of balance and postural control is essential for the performance of many everyday activities. This course is specifically focused on the neural, muscular and biomechanical mechanisms underlying postural control in healthy populations of different ages. In addition, changes that can be observed in postural control following damage, dysfunction and/or disease are also covered. The implications of changes in balance control for falls will be a particular focus. Students in this course learn how to collect and interpret kinematic, kinetic and electrophysiological data associated with the neuromuscular function during posture and balance tasks.

KRS 857 Kinesiology in Rehabilitation (3 Credit Hours)

Rehabilitation aims to enhance the functional ability of individuals with impairment or disease, while areas within the field of kinesiology seek to understand changes in tissues, physiological systems, movements, and behaviors that occur through training and practice. In this course, students will study these related processes of adaptation, learning, and rehabilitation.

KRS 887 Structured Teaching Experience for Kinesiology and Rehabilitation Professions (1-3 Credit Hours)

This course is designed to provide supervised and mentored teaching experience within fields applicable to kinesiology and rehabilitation.

KRS 895 Special Topics in Kinesiology and Rehabilitation (3 Credit Hours)

The advanced study of special topics in kinesiology and rehabilitation.

KRS 898 Supervised Research (1-3 Credit Hours)

This course is designed to provide supervised and mentored research experience within specialized topics applicable to kinesiology and rehabilitation.

KRS 899 Dissertation (1-12 Credit Hours)

An approved research project written under the supervision of a faculty advisor, in which the student demonstrates the capacity to design and complete independent applied research. The completed project must be approved by the dissertation committee.

LAS - Latin American Studies

LAS 521 Human Rights in Latin America (3 Credit Hours)

This course evaluates human rights movements, mechanisms, and their impacts in Latin America. Students will examine different human rights crises to understand how these events have shaped the region and what the response to them has been. The class is less a study of the specific legal mechanisms used in human rights practice and more a study of how human rights have evolved as a discourse and political strategy in struggles for justice. It adopts a more anthropological and geographic approach to understanding human rights theory and practice. All readings and lectures in English.

LAS 530 Latin American Thinkers Changing Culture and Politics (3 Credit Hours)

In this course students will study the ideas of some important Latin American thinkers whose work has helped to shape Latin American history and society from Independence in the early 19th Century to the present. Even though special attention will be paid to some writers, works by a larger number of intellectuals will be analyzed as a way of understanding some of the central ideas in Latin American culture: "mestizaje," nationalism and popular culture, among others. All readings and lectures in English.

Prerequisites: A grade of C or better in ENGL 110C

LAS 531 Race and Culture in Brazil (3 Credit Hours)

This course will explore some of the unique contradictions shaping Brazilian reality as related to notions of race and culture by tracing the history of race relations in the ongoing transformation of Brazilian culture, examining such key examples and events as slavery and the plantation economy, popular music, Carnival, populism, racial democracy, affirmative action, and urban and rural violence. All readings and lectures in English.

LAS 595 Topics in Latin American Area Studies (3 Credit Hours)

Investigation of special topics on Latin America. All readings and lectures are in English.

Prerequisites: A grade of C or better in ENGL 110C

LIBS - Library Science

LIBS 601 STEM Education and Maker Spaces in Libraries (3 Credit Hours)

This course builds on current research and practice to strengthen candidates' conceptual understanding of design-based STEM pedagogy. Through participation in activities and discussions, students will review concepts embedded within design-based, problem-based, project-based, and inquiry instruction and learning. This course will explore a synthesized overview of trends affecting STEM education and investigate makerspaces and making activities to support inquiry-driven, community engagement in information settings. Students will gain hands-on experience with digital and physical making toolkits and design maker experiences within library spaces.

LIBS 602 Production of Instructional Materials (3 Credit Hours)

This course develops skills in preparing, evaluating, and presenting instructional materials and the use of those materials to promote higher-level thinking and enhance the learning environment. It includes elements of design, multimedia materials, and development of in-service activities. Students will participate in sandbox activities to incorporate hands-on practice of media production and dissemination.

LIBS 603 Online Resources for Teaching (3 Credit Hours)

Students will gain experience locating, evaluating, collecting, arranging, and disseminating content resources available as open educational resources to support learning and teaching. Issues surrounding open educational resources including copyright, licensing, access, and quality will be addressed. A primary focus will be on developing digital textbooks that may include websites, databases, current awareness experts, and digital field trips to support the delivery of instruction.

LIBS 608 Foundations of Libraries and Information (3 Credit Hours)

This course provides a social, cultural, and historical perspective on libraries and librarianship. Topics include the purpose, functions, and processes of library and information sciences, including the history and development of libraries, different types of libraries and information agencies, and key issues in the field to include intellectual freedom, ethics, and evolving library technologies. Students will explore different libraries and information agencies, as well as legal, ethical, and economic policies, advocacy trends and positions. They will engage in discussions, research projects, and practical assignments to develop professional skills and gain a deeper understanding of the principles that guide modern information professionals as well as of the challenges faced in library settings.

Prerequisites: Admission to the Master of Library and Information Studies Degree

LIBS 609 History of Books and Libraries (3 Credit Hours)

This course provides a historical perspective on books and libraries as social and cultural objects and spaces. Surveys the history of communication technologies from early history through current events and from stone tablets to electronic formats.

LIBS 610 Preservation Management in Libraries and Archives (3 Credit Hours)

An introduction to the principles and practice of preservation with an emphasis on the management of preservation activities. Includes physical and intellectual preservation of records and media and the history, kinds of materials and treatments, techniques and technologies, and digitization and digital records. Issues of storage, security, and disaster prevention and response will also be addressed.

LIBS 611 Community Archiving (3 Credit Hours)

All communities create historical records, and recent decades have brought a growing critical awareness of how existing social hierarchies influence the creation and maintenance of historical archives. Community archive projects locate the power to preserve and shape history, heritage, and memory in communities themselves. Through readings, discussion, and analysis, this course will introduce students to a range of issues relating to grassroots community archives, archives of community organizations, and what happens when larger institutions partner with communities and community organizations to create and maintain archives.

Prerequisites: LIBS 608

LIBS 612 Research Methods in Library and Information Studies (3 Credit Hours)

This course will introduce students to theoretical and applied research design, methodologies, and evaluation of research in library and information science (LIS). The course will include a review of existing research, allowing students to evaluate and assess the potential value of literature and research findings through critical analysis. Basic qualitative and quantitative research protocols will be learned through this class.

Pre- or corequisite: LIBS 608

LIBS 614 Information Ethics (3 Credit Hours)

Introduces the major theories and basic concepts of ethics. Historical and contemporary professional frameworks and positions will be analyzed in ethical contexts. Students will apply ethical principles to dilemmas and decision making in the information and library profession.

Prerequisites: LIBS 608

LIBS 615 Action Research for School Librarians (3 Credit Hours)

This course explores action research in a school library. Students will examine the value and characteristics of educational action research and apply these ideas toward the development of an action research project. Topics include the evaluation of published action research projects, community-based assessment, data collection and analysis, and the design and development of a project conducted in a school library setting.

LIBS 626 Web Archiving Theory, Practice, and Implications (3 Credit Hours)

An interdisciplinary introduction to web archiving fundamentals including web crawling, collection development and summarization including planning, analyzing, and sharing collections. Includes a review of ethical and legal issues, trustworthiness, preservation, security, and cultural impact of web archiving.

Prerequisites: This course is intended for computer science students with limited information studies skills, as well as information science studies students with limited computer science skills

LIBS 642 Children's Literature PREK-8 (3 Credit Hours)

Students examine, evaluate, discuss, and use literature and related materials for children and young adolescents and explore strategies for introducing and using literature with children.

Prerequisites: graduate standing

LIBS 644 Literature and Media for Young Adults (3 Credit Hours)

An exploration of the selection of literature and media for young adults (ages 12 - 18). Includes current trends and research in teens' social, physical and cultural development, teen interests and needs, and multiple literacies. Focus is on multiple formats, diverse learners, and strategies to promote reading for information, pleasure and lifelong learning.

Prerequisites: Graduate standing

LIBS 647 Reading and Literature for Adults (3 Credit Hours)

Survey of trends and selection tools in literature and reading for adult library patrons including popular fiction and non-fiction genres in multiple formats and across life stages in adulthood. Strategies will include reader's advisory, book clubs, and other programming to meet the diverse needs and interests of adult readers.

LIBS 648 Reading, Evaluating, and Selecting Graphic Novels (3 Credit Hours)

This course explores the use, selection and evaluation of literature and media that use sequential art to tell stories in a visual format: comics, webcomics, graphic novels, and more. The course will include the history of the sequential art format; an exploration of reading through a variety of graphics, text and media; and a survey of current and historical titles for all ages. Students will explore resources for selecting and evaluating materials in graphic format as well as specific applications for graphic materials in classrooms and libraries.

LIBS 649 Storytelling (3 Credit Hours)

This course introduces narrative structure and technique using a variety of different media. It explores storytelling for the purpose of informing, entertaining and/or educating in an information setting. Storytelling strategies help students gain communication skills and practice. Students will explore the and demonstrate the use of storytelling for a variety of age groups, from preschool through adults, and for special audiences.

Prerequisites: LIBS 608

LIBS 653 User Centered Design in Library and Information (3 Credit Hours)

This course introduces current and future information professionals to user-centered design in library and information studies. Students learn how to conduct research with users, gather users' requirements, and develop intuitive, user-friendly interfaces (e.g., software, mobile applications). Theories and techniques for engaging users and designing user-centered interfaces are learned and applied.

Prerequisites: LIBS 608

LIBS 654 Information Literacy Instruction (3 Credit Hours)

Students will develop expertise in the delivery of in-person and online information literacy and research instruction in library and information contexts through an exploration of various information literacy models, standards, and theories. Students will gain practical experience in planning, implementing, and assessing library instruction and digital learning objects through a variety of delivery methods.

LIBS 655 Methods and Strategies for the School Library (1-3 Credit Hours)

This course draws on research-based theory of pedagogical best practice to discuss, model, and apply practical teaching strategies and methods in the context of a school library. Topics include strategies to implement effective classroom management in the library learning environment, engage library learners and assess their performance, and build collaborative relationships with teaching peers. Students will complete 20 hours of observation in a school library and reflect on these experiences, create a personal teaching philosophy, respond to learner behaviors in a library setting, create assessments for student learning, develop and teach a lesson for k-12 learners, and deliver a PD session for teaching peers.

LIBS 656 User Services and Programming (3 Credit Hours)

An overview of the planning, evaluation, and administration of programs and services designed to meet the needs and interests of individuals and groups in libraries and other information spaces.

LIBS 657 LGBTQIA+ Issues in Public Libraries (3 Credit Hours)

The populations served by public libraries are varied and diverse, and they require resources that will address these diverse needs. Budgetary and political concerns, among other things, often restrict the ability of libraries to fulfill the needs of 'invisible populations,' or groups whose minority status is not readily or visually apparent, such as the lesbian, gay, bisexual, transgender, queer, intersex, asexual plus (LGBTQIA+) community. This course is designed to bring particular issues the LGBTQIA+ community may have in relation to public libraries to the forefront and provide students with the tools to address these issues in the field.

LIBS 658 Knowledge Resources: Planning, Selecting & Managing Collections (3 Credit Hours)

Examines the concepts and issues related to the lifecycle of recorded knowledge and information including emerging technologies and addresses the fundamentals of planning, selecting, analyzing, managing, and developing collections and technology resources for diverse communities. Topics include the philosophy, principals, and methodologies of collection development in a variety of library and information settings. Emphasis is placed on understanding the library environment and selection and acquisition of materials, inclusive of print and non-print items. Students will gain knowledge and experiences with needs assessment, planning, analyzing, and managing collections of print, digital, and technological tools. Students will also develop a targeted plan to address identified needs including a budget and presentation to stakeholders.

Pre- or corequisite: LIBS 608

LIBS 668 Internship in Libraries and Information Workplaces (1-9 Credit Hours)

This course provides a focused internship experience that supports developing the knowledge, skills, and understanding required to participate in the day-to-day operations of a library or information setting. Central to the purpose of the internship is the valuable learning experiences interns gain in an authentic setting. Topics include self-assessment and exploration of information careers in a library or information environment. Interns also gain proficiency in the identification, analysis, and resolution of issues using data-driven problem-solving techniques. They gain insights into the operation of information work places, their professional goals, and how these goals can be achieved. Interns progressively develop skills through an experiential approach documented through formative and summative evaluations, as well as in the final Impact Project. Students taking this course for school library endorsement may have additional requirements/prerequisites.

Prerequisites: LIBS 608, LIBS 658, LIBS 677, and LIBS 674

LIBS 669 Internship in School Libraries (3-6 Credit Hours)

This course provides a focused internship experience that supports the planning, development, and instruction of PK-12 learner projects in a school library setting. Central to the purpose of the internship is the valuable learning experiences interns gain in an authentic setting. Topics include self-assessment and exploration of information careers in a K-12 school environment. Interns also gain proficiency in the identification, analysis, and resolution of issues using data-driven problem-solving techniques. They gain insights into the operation of information work places, their professional goals, and how these goals can be achieved. Interns progressively develop skills through an experiential approach documented through formative and summative evaluations well as in the final Impact Project. This course is for students who are already licensed teachers or who are seeking initial licensure in school librarianship.

Prerequisites: LIBS 602, LIBS 608, LIBS 642, LIBS 644, LIBS 658, LIBS 674, LIBS 676, OR LIBS 677

LIBS 674 Library Management and Leadership (3 Credit Hours)

This course will explore the critical issues and established best practices of library management and leadership. Topics include communication, core values, strategic planning, organizational culture, human resources, assessment, fundraising, and advocacy. Students will develop the skills necessary to plan, establish, and operate a modern library at the building level.

Pre- or corequisite: LIBS 608

LIBS 676 Library Media Services and the Curriculum (3 Credit Hours)

This course focuses on library services and the curriculum of the school. Content includes techniques for curriculum design and development, information skills instruction, instructional partnerships, advocacy, assessment of learners and the library, and implementation of integrated library instruction. Students will explore the National School Library Standards and situate these within the context of learners and learning, develop collaborative instruction, and deliver a unit of instruction within a K-12 school library setting.

Prerequisites: Admittance to the MLIS with School Library Concentration
Pre- or corequisite: LIBS 608, LIBS 658, LIBS 674, LIBS 677, and LIBS 602

LIBS 677 Knowledge Organization and Access (3 Credit Hours)

This course focuses on the fundamental and uniform principles of information resource description and availability. Topics include cataloging, processing, organizing and accessing of materials. Students will develop the ability to apply and adapt the principles of classifying and cataloging and will understand how these fundamental skills fit into the broader area of technical processing and how they support the principles of services in libraries and other information environments. They will engage in discussions and practical assignments to develop applicable professional skills and prepare them for basic material organization or advanced cataloging courses.

Pre- or corequisite: LIBS 608

LIBS 679 Theory and Management of Reference and Information Retrieval (3 Credit Hours)

Students will explore database structures, search algorithms, indexing principles, and user interfaces for information search and retrieval. Current issues in the evaluation, acquisitions and management of databases and other information resources will be addressed. Includes advanced strategies for effective information search and educating and assisting users in search techniques and evaluation.

Prerequisites: LIBS 677

LIBS 680 Culturally Responsive Librarianship (3 Credit Hours)

This course provides thought-provoking background and practical suggestions for engaging with a diverse population. Participants explore their own assumptions about race, class, and culture and learn strategies for creating environments and an open dialog that are culturally inviting to all.

LIBS 681 Assessment and Evaluation in Library and Information Science (3 Credit Hours)

Students will explore assessment and evaluation related to library and information contexts with particular attention to historical and current theories and values, relevant standards, and current initiatives and measures. Students will design an evaluation of a current library service or resource that is connected to library goals and objectives with a presentation to effectively communicate data to various stakeholders.

Prerequisites: LIBS 608

LIBS 684 Advanced Library Management (3 Credit Hours)

Reviews the advanced knowledge and competencies required for the senior administration level of all types of libraries and library systems. Competencies include budgeting and analysis, project management, human resources, and the development of library reporting and advocacy materials.

Prerequisites: LIBS 674

LIBS 687 Cataloging and Classification (3 Credit Hours)

Cataloging and metadata principles introduced in LIBS 677 are further developed and applied in this course. Students will apply principles of bibliographic description, subject analysis, and classification to a variety of formats including multimedia, serials, and online resources. The course will address systems, technology and trends in cataloging and metadata environments.

Prerequisites: LIBS 677 or instructor approval

LIBS 690 Seminar in Academic Libraries (3 Credit Hours)

Academic libraries are dynamic organizations, working to meet the needs of their users and stakeholders while supporting parent higher education institutions. This course examines the functions of the academic library within the higher education environment. A wide variety of topics are covered in this survey of the field, including a focus on the historical background, current trends, and future directions in academic librarianship.

LIBS 691 Seminar in Public Libraries (3 Credit Hours)

Students will gain an understanding of public libraries in the United States and their role within their communities. Topics covered include a historical background of public libraries, overviews of current trends, and future directions in public libraries. This course also explores public services, the roles and expectations of public librarianship as a career.

LIBS 693 Seminar in Archives and Special Collections (3 Credit Hours)

An introduction to the nature of archives and special collections. The course explores the history of special collections, archives, records, and cultural memory. Aspects of the profession including ethics, values, financial and legal responsibilities are included. Students will be introduced to the basic knowledge, tools, methods and practices associated with archival work.

LIBS 694 Seminar in Social Justice in Library and Information Work (3 Credit Hours)

In this seminar course, students will explore current social justice issues through an activist framework. Historical and contemporary frameworks, positions and initiatives related to the library profession will be considered. The course will examine professional structures, documents, emerging frameworks and social actions as they relate to specific topics of social justice.

LIBS 695 Topics in Library and Information Studies (1-3 Credit Hours)

This course provides opportunities for graduate students to explore current topics, trends and issues related to libraries and information studies.

LIBS 697 Independent Study in Library Science (1-3 Credit Hours)

This course is an independent study of special topics in Library Science.

Prerequisites: Instructor approval required

LIBS 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

MAE - Mechanical and Aerospace Engineering

MAE 503 Flight Mechanics (3 Credit Hours)

Aircraft concepts including performance prediction and optimization, flight and maneuver envelopes, and steady flight performance. Additional topics: longitudinal static stability and trim; aircraft dynamics; development, separation and solution of aircraft equations of motion; natural modes; dynamic stability; sensors and actuators; and design of stability augmentation and autopilot systems.

Prerequisites: MAE 303 with a grade of C or better and MAE 340

Pre- or corequisite: MAE 436

MAE 504 Vibrations (3 Credit Hours)

Free and forced vibrations of undamped and damped, single-degree of freedom, multi-degree of freedom, and continuous systems. Exact and approximate methods to find natural frequencies.

Prerequisites: A grade of C or better in MAE 205, a grade of C or better in MAE 220; MAE 340 and MATH 312

MAE 506 Flight Vehicle Aerodynamics (3 Credit Hours)

Inviscid flow concepts including: Euler equations, stream function, velocity potential, singularities, vorticity and circulation laws. Viscous flow topics including boundary layers separation, and turbulent flow. In addition, external flows, lift and drag, thin airfoil theory, finite wing theory and airfoil design will be discussed.

Prerequisites: A grade of C or better in MAE 303; MAE 340

MAE 511 Mechanical Engineering Power Systems Theory and Design (3 Credit Hours)

Thermodynamic properties of gases and vapors relating to power generating devices, work-energy relations, combustion, and heat exchangers. Performance analyses and design concepts of gas turbines, internal combustion engines, steam power plants and heat exchanger equipment from theoretical and applied viewpoints.

Prerequisites: MAE 312 and MAE 315

MAE 512 Environmental Control (3 Credit Hours)

Engineering principles as applied to the analysis and design of systems for automatically controlling man or machine environments. Course encompasses fundamentals of heating, ventilating, air conditioning, refrigeration, cryogenics, and design of building energy systems.

Prerequisites: MAE 312 and MAE 315

MAE 513 Energy Conversion (3 Credit Hours)

Introduction of relevant kinetic theory, solid state, and thermodynamic principles; operation and analysis of thermoelectric, photovoltaic, thermionic, magnetohydrodynamic devices, fuel cell, isotopic, and solar power generators. Course seeks to define engineering limits of converter efficiency and other performance criteria.

Prerequisites: MAE 312

MAE 514 Introduction to Gas Dynamics (3 Credit Hours)

One-dimensional compressible flow considering isentropic flow, normal shocks, flow in constant area ducts with friction, flow in ducts with heating and cooling, oblique shocks, Prandtl-Meyer expansions, shock-expansion theory, flow around diamond shaped airfoils, and wind tunnel mechanics.

Prerequisites: A grade of C or better in MAE 303 and a grade of C or better in MAE 312

MAE 517 Propulsion Systems (3 Credit Hours)

Basic principles of design, operation and performance of propulsion systems - including turbojet, turboprop, turbofan, and ramjet engines. Introduction to chemical rockets, ion and plasma thrusters.

Prerequisites: Must earn a grade of C or better in MAE 303 and MAE 311

MAE 520 Aerospace Structures (3 Credit Hours)

Analysis of aircraft and space vehicle structural components. Effects of bending, torsion and shear on typical aerospace structural components, statically indeterminate beams, shear center and shear flow. Introduction to typical aerospace structures. Introduction to composite structures.

Prerequisites: MAE 332 with a grade of C or better

MAE 522 Modern Engineering Materials (3 Credit Hours)

Limitations of conventional materials; inter-relationship among materials, design and processing, material selection criteria and procedures; strengthening mechanisms in metals; superelasticity; shape memory effect, amorphous metals; structure-property relationship in polymers; polymers crystallinity; thermoplastic and thermosets; high-temperature restraint polymers; ceramics; toughening mechanisms in ceramics.

Prerequisites: MAE 201, MAE 203, and a grade of C or better in MAE 220; MAE 332

MAE 531 Mechanisms Analysis and Design (3 Credit Hours)

Basic relations necessary for analysis of plane motion mechanisms, numerical and analytical solutions for some of the basic mechanisms, methods of calculating rolling and sliding velocities and accelerations of contacting bodies, cams, and gears.

Prerequisites: A grade of C or better in MAE 205, a grade of C or better in MAE 332, and MATH 312 or MATH 285

MAE 538 Applied Analog and Digital Control (3 Credit Hours)

Computer-aided analysis and design of practical control systems.

Introduction to state-space, digital signal processing and digital control.

Laboratory sessions on aliasing, analog, system identification, and real-time control.

Prerequisites: a grade of C or better in MAE 436

MAE 540 Introduction to Finite Element Analysis (3 Credit Hours)

Basic concepts of finite-element method, method of weighted residuals, interpolation functions, numerical implementation of finite-element method, applications to engineering problems such as beam deflection, heat conduction, and plane elastic problems.

Prerequisites: MAE 340

MAE 550 Principles of Naval Architecture (3 Credit Hours)

Basic principles of naval architecture related to ship geometry, stability, strength, resistance, propulsion, vibration and motions in waves and controllability.

Prerequisites: MATH 212 with a grade of C or better

MAE 560 Introduction to Space Systems Engineering (3 Credit Hours)

Introduction to spacecraft systems starting from mission design and space environment considerations and proceeding through propulsion, altitude control, spacecraft structural design, thermal control, power and communications for spacecraft.

Prerequisites: MATH 307 and PHYS 232N

MAE 595 Topics in Mechanical and Aerospace Engineering (1-3 Credit Hours)

Special topics of interest with emphasis placed on recent developments in mechanical and aerospace engineering or engineering mechanics. (offered fall, spring, summer)

Prerequisites: Senior standing; Permission of the chair is required

MAE 597 Independent Study in Mechanical and Aerospace Engineering (1-3 Credit Hours)

Individual analytical, computational, and/or experimental study in an area selected by student. Supervised and approved by the advisor.

Prerequisites: Senior standing; permission of the chair is required

MAE 601 Engineering Mathematics (3 Credit Hours)

Applications of linear algebra, ordinary and partial differential equations, and complex variables to engineering problems.

MAE 602 Fluid Dynamics and Aerodynamics (3 Credit Hours)

Conservation laws for viscous and inviscid flows. Boundary conditions; analytical and numerical solution of viscous flow problems; boundary-layer theory; 2 and 3-dimensional potential flows; applications to airfoils, wings, and internal flows; introduction to turbulence.

Prerequisites: MAE 601 or MATH 691

MAE 603 Advanced Mechanics of Solids (3 Credit Hours)

Stress, strain, equilibrium for deformable solids; material behavior of elasticity, hyperelasticity, plasticity and viscoelasticity; failure criteria, fracture; thermal effect; energy methods and their applications to bars and beams for static, stability and dynamic problems.

MAE 604 Analytical Dynamics (3 Credit Hours)

Advanced kinematics with moving reference frames. Euler equations of motion. Gyroscopic theory. Principle of virtual work, D'Alembert's principle, Hamilton's principle, Lagrange's equations of motion and rigid body dynamics.

MAE 605 Advanced Classical Thermodynamics (3 Credit Hours)

Rigorous development of the macroscopic theory of thermodynamics; structural basis for equations of state and general properties of matter; phase and chemical equilibria.

Prerequisites: MAE 601 or MATH 691

MAE 607 Continuum Mechanics (3 Credit Hours)

Indicial notations and tensor calculus; strain and stress tensors, rate of deformation tensor, Eulerian and Lagrangian descriptions, conservation principles, constitutive formulations for elastic solids and viscous fluids, formulation of fluid mechanics and solid mechanics problems. Simple applications.

Pre- or corequisite: MATH 691 or MAE 601

MAE 608 Applied Mathematics for Engineers (3 Credit Hours)

Linear algebra. Vectors and matrices. Partial differential equations. Curve fittings. Applied probabilities. Statistics of distributions. Testing of hypotheses and decisions. Quality control.

MAE 620 Heat Transfer I (3 Credit Hours)

Aspects of conduction, convection and radiation heat transfer, including governing equations, boundary layer flows, analytical and numerical solutions to one-, two-, and three-dimensional problems.

Prerequisites: MAE 602

MAE 640 Modern Control Theory (3 Credit Hours)

Formulation of state space equations governing dynamics and stability of linear systems. Controllability; observability. State feedback control design. Optimal control methods. State observers and estimators.

MAE 667 Cooperative Education in Mechanical and Aerospace Engineering (1-3 Credit Hours)

Student participation for credit based on academic relevance of the work experience, criteria, and evaluative procedures as formally determined by the department and the Cooperative Education program prior to the semester in which the work experience is to take place.

Prerequisites: Approval by department is required; Additional support may be provided by the Monarch Internship and Co-Op Office in the semester prior to enrollment

MAE 668 Internship in Mechanical and Aerospace Engineering (1-3 Credit Hours)

Academic requirements will be established by the department and will vary with the amount of credit desired. Allows students an opportunity to gain short duration career-related experience.

Prerequisites: Approval by department is required; Additional support may be provided by the Monarch Internship and Co-Op Office in the semester prior to enrollment

MAE 669 Practicum in Mechanical and Aerospace Engineering (1-3 Credit Hours)

Academic requirements will be established by the department and will vary with the amount of credit desired. Allows students an opportunity to gain short duration career-related experience. Student is usually already employed--this is an additional project within the organization.

Prerequisites: Approval by department is required; Additional support may be provided by the Monarch Internship and Co-Op Office in the semester prior to enrollment

MAE 672 Design of Experiments (3 Credit Hours)

This course will focus on formal experiment design. Topics to be discussed will include review of statistics, ANOVA, multiple comparisons, residuals, modal adequacy checking, randomized complete block designs, factorial designs, 2^k factorial and fractional factorial designs, random and mixed effects in factorials, and optimization. The course will also provide an introduction to response surface methods. Laboratory exercises will use designed experiments as applied to aerospace testing, including wind tunnel testing and instrument calibration.

MAE 682 Concurrent Engineering (3 Credit Hours)

Study of principles of concurrent engineering with emphasis on the design/manufacture interface for single products; Rapid prototyping projects; Design of injection-molded and stamped parts for cost.

MAE 685 Projects Design and Manufacturing (3 Credit Hours)

Project(s) course to allow graduate students to complete a practical engineering assignment in design and manufacturing areas.

Prerequisites: Permission of the instructor

MAE 690 Mechanical and Aerospace Engineering Seminar (1 Credit Hour)

Regular tutorials on recent topics of interest in mechanical and aerospace engineering and engineering mechanics.

MAE 695 Topics in Mechanical and Aerospace Engineering (3 Credit Hours)

Special topics of interest with emphasis placed on recent developments in mechanical and aerospace engineering or engineering mechanics.

MAE 696 Experimental Research Project (3 Credit Hours)

An independent laboratory experience in the area of either aerodynamics, structural dynamics or applied automatic control. Results will be reported in a format and quality similar to a technical conference paper.

MAE 697 Independent Study in Mechanical and Aerospace Engineering (3 Credit Hours)

Individual analytical, computational and/or experimental study in an area selected by the student. Supervised and approved by the advisor.

MAE 698 Master's Project in Mechanical and Aerospace Engineering (1-3 Credit Hours)

Individual project, investigation under the direction of the student's major professor.

MAE 699 Thesis Research in Mechanical and Aerospace Engineering (1-6 Credit Hours)

Thesis research in mechanical and aerospace engineering or engineering mechanics leading to the Master of Science degree.

Prerequisites: instructor approval required

MAE 710 Supersonic Flow (3 Credit Hours)

This course will examine governing equations for supersonic flow, including full potential equations, small disturbance theory, hodographs, and method of characteristics. It will also serve as an introduction to three-dimensional flows, compressible boundary layer flows, internal flows in nozzles and diffusers, airfoil flows, slender bodies of revolution flows, conical flows, and wing flows.

Prerequisites: MAE 514 and MAE 602

MAE 711 Hypersonic Aerodynamics (3 Credit Hours)

General consideration of hypersonic flow and similarity principles, hypersonic flow past slender bodies with sharp and blunt leading edges. Hypersonic blunt-body flow. Real gas, viscous and low density effects, and consideration of nonequilibrium phenomena in hypersonic flows.

Prerequisites: MAE 710

MAE 712 Experimental Aerodynamics (3 Credit Hours)

This course will examine techniques for static and dynamic measurement of pressure, temperature, and velocity. Experiment control and statistical treatment of data will be discussed, as will probe methods, including multi-hole pressure probes and hot-wire anemometers, and non-intrusive methods, including laser Doppler velocimetry and other optical methods. Surface and stream flow visualization and surface measurements will also be covered.

Prerequisites: MAE 602 and MAE 710

MAE 713 Turbulent Flow (3 Credit Hours)

Isotropic and homogeneous turbulence. Mixing length theories, Equilibrium turbulence models, Two-equation models (k-epsilon). Large eddy simulation. Reynold's stress transport models. Numerical simulations. Compressible and non-equilibrium turbulence effects.

Prerequisites: MAE 602 and MAE 715 or MAE 815

MAE 715 Boundary Layer Theory (3 Credit Hours)

Boundary layer equations; method of matched asymptotic expansions; body oriented coordinates, finite-difference solutions; separations, wake and jet flows; thermal and compressible boundary layers, transformations and finite-difference solutions, unsteady boundary layers. Introduction to hydrodynamic stability and turbulence.

Prerequisites: MAE 602

MAE 716 Computational Fluid Dynamics I (3 Credit Hours)

This course will cover the following topics: classification of single partial differential equations; finite difference methods; stability analysis, including convergence, consistency, and efficiency; basics of finite volume methods; model equations of hyperbolic, parabolic and elliptic type; and explicit and implicit schemes, central and upwind schemes, and weak solutions of quasi-linear hyperbolic equations.

Prerequisites: MAE 601 or MATH 691

MAE 718 Aerospace Test Facilities (3 Credit Hours)

A comprehensive examination of aerodynamic test facilities for use in subsonic, transonic, supersonic and hypersonic flow regimes. Aspects of wind tunnel design and operation will be discussed, as will flow quality and wall and support interferences. Advanced concepts including cryogenic wind tunnels, adaptive wall test sections and magnetic suspension will be examined, in addition to dynamic testing. There will be a review of flight test methods, including extraction of aerodynamic parameters from flight test data, a review of engine test facilities, and a review of ground test facilities for space structures and other space systems.

Prerequisites: Permission of the instructor

MAE 720 Heat Transfer II (3 Credit Hours)

Aspects of conduction, convection and radiation heat transfer, including governing equations, boundary layer flows, analytical and numerical solutions to one-, two- and three-dimensional problems.

Prerequisites: MAE 620

MAE 723 Nuclear Engineering (3 Credit Hours)

This course will consider nuclear power plant systems, and will introduce power reactor control kinetic behavior including safety coefficients, accumulative poisons, and temperature control parameters. It will also examine primary and secondary plant as a transient system.

MAE 730 Finite Element Analysis (3 Credit Hours)

This course provides an understanding of the finite element method (FEM) as derived from an integral formulation perspective. It demonstrates the solutions of (1-D and 2-D) continuum mechanics problems such as solid mechanics, fluid mechanics and heat transfer. It also provides insight into the theoretical formulation and numerical implementation of finite element methods.

MAE 731 Mechanics of Composite Structures (3 Credit Hours)

Stress-strain relations for a lamina; failure theories. Micro-mechanical behavior of a lamina. Constitutive relations of a laminate. Bending, buckling and vibration of laminated plates. Approximate and finite element methods of solution.

MAE 734 Theory of Vibrations (3 Credit Hours)

This course will introduce applied modal analysis, modes of vibration of discrete systems, modal coordinates, transfer functions in frequency domain, modes of vibration of continuous systems, and approximate systems response. It will also examine Finite Elements methods and nonlinear vibrations. Applications will be extended to rods, beams, plates and shells.

Prerequisites: MAE 504 and MAE 601 or MATH 691

MAE 740 Autonomous and Robotic Systems Analysis and Control (3 Credit Hours)

Kinematics, dynamics and control of complex non-linear electro-mechanical systems, particularly robotic manipulators.

MAE 741 Optimal Control Theory (3 Credit Hours)

Parameter optimization, optimization problem for dynamic systems with terminal and path constraints; optimal feedback control with and without the presence of uncertainty; nonlinear optimal control system.

Prerequisites: MAE 640

MAE 742 Multibody Dynamics: Theories and Applications (3 Credit Hours)

Basic theories are presented for formulation of equations of kinematics and dynamics of systems made of interconnected bodies. Topics include constrained motion, principle of virtual work and constrained dynamics. Examples cover robotic motion and biomechanics applications such as human locomotion.

Prerequisites: Permission of instructor

MAE 743 Kinematic Synthesis of Mechanisms (3 Credit Hours)

Classification of mechanisms; type and number synthesis, application of graph theory, expert systems for synthesis; introduction to dimensional synthesis via path and function generation; finite displacement theory including concept of poles, circlepoint, and centerpoint curves; structural error minimization using Chebychev's approximation; optimization approaches, current applications to robot manipulators, robot hands, space structures, and combustion engines.

Prerequisites: Permission of instructor

MAE 744 Atmospheric Flight Dynamics and Control (3 Credit Hours)

Principles governing the dynamics and control of vehicles in atmospheric flight. Equations of motion development and solution including inertial/gravitational/aerodynamic/propulsive loads, linear longitudinal and lateral-directional motions, and nonlinear trim and simulation. Flight control system design and analysis incorporating flying quality requirements, linear conventional/contemporary and frequency/time domain techniques for control and guidance functions, validation with nonlinear simulation, gain scheduling.

Prerequisites: MAE 403 or MAE 503 and MAE 604

MAE 745 Space Flight Dynamics and Control (3 Credit Hours)

Principles governing the dynamics and control of vehicles in space flight. Equations of motion development and solution including inertial/gravitational/aerodynamic/propulsive loads, decoupled translational and attitude motions. Orbital mechanics including elements, initial-value propagation, adjustments/transfers, Lambert boundary-value problem, perturbations, and nonlinear simulation. Attitude dynamics including torque free, gravity moment, axisymmetric/unsymmetric vehicles, and dual spinners. Flight control system design and analysis including impulsive velocities, finite burns, Lambert targeting, linear design using momentum wheels, and nonlinear phase-plane design using thrusters.

Prerequisites: MAE 604 and MAE 640

MAE 746 Advanced Control Methodologies (3 Credit Hours)

Review of multivariable dynamic math models including state space, transfer function, and matrix fractions. Multivariable design criteria including stability, performance, and robustness. Theory and application of multivariable control design techniques including LQR/LQG/LTR, H-infinity, Eigenspace Assignment and other advanced methods.

Prerequisites: MAE 640

MAE 747 Aerospace Vehicle Performance (3 Credit Hours)

This course will study the flight performance of aerospace vehicles, including a review of aerodynamic and propulsion characteristics. Range, flight and maneuver envelopes for vehicles in atmospheric flight will also be examined. It will introduce various methods of design for trajectory optimization, including launch vehicles. An open-ended, design-oriented project will be required.

Prerequisites: MAE 602 and MAE 514 or MAE 710

MAE 748 Flight Control Actuators and Sensors (3 Credit Hours)

This course will provide an overview of the governing principles and operations of actuator and sensor hardware used in aircraft and spacecraft flight control systems. Hydraulic, electro-hydraulic and electric actuators will be examined, as well as control jets and momentum wheels, accelerometers, and rate gyros. Other topics include air-data systems, inertial navigation systems and satellite navigation systems. The course will also examine dynamic model development, analysis and simulation, nonlinear hardware characteristics, and the influence on closed-loop vehicle behavior.

Prerequisites: MAE 503, MAE 538, and MAE 604

MAE 750 Nanoscale Mechanical and Structural Properties of Materials (3 Credit Hours)

Elastic and plastic properties of nanoscale materials, strain gradient dislocation plasticity, nanoindentation and nanoindentation creep, thin film mechanical and structural properties, kinetic-based investigations of hardening mechanisms in nanolayer composites.

MAE 751 Fatigue and Fracture (3 Credit Hours)

Divided into areas of fatigue and fracture; stress-controlled and strain-controlled fatigue; effect of mean stresses, notches, etc.; multiaxial stresses; variable amplitude loading; ductile and brittle fracture; linear elastic fracture mechanics; crack-tip plasticity; fracture testing; applications to fatigue life estimation. Requires permission of the instructor.

MAE 752 Mechanical Behavior of Materials (3 Credit Hours)

This course will examine the macroscopic behavior of materials with respect to elasticity, plasticity, and viscoelasticity. Other topics include yield criteria, fracture, the influence of high and low temperatures, and corrosion and radiation.

Prerequisites: Permission of instructor

MAE 753 Composite Materials (3 Credit Hours)

This course will examine reinforcements, matrices, particulate-composites, short-fiber and continuous-fiber reinforced composites. Directionally solidified composites will also be studied, including the prediction of elastic failure properties. Other topics to be covered include design considerations and experimental work.

Prerequisites: Permission of the instructor

MAE 772 Response Surface Methodology (3 Credit Hours)

An applied course in response surface methodology with aerospace applications. Empirical model building, method of least squares, second order models, model adequacy checking, canonical analysis. Method of steepest ascent, multiple response optimization. Rotatable, cuboidal and small run designs. Design optimality and efficiency metrics, robust design, restrictions on randomization. Laboratory exercises include RSM applied to wind tunnel testing and optimization.

Prerequisites: MAE 672

MAE 780 Engineering Optimization (3 Credit Hours)

Formulation and solution algorithms for Linear Programming (LP) problems. Unconstrained and constrained nonlinear programming (NLP) problems. Optimum solution for practical engineering systems.

MAE 781 Advanced Design (3 Credit Hours)

Concepts, principles and procedures related to analysis of stresses and strains in machine components. Consideration of function of parts along with factors such as forces, life required, maximum cost, weight and space restrictions, number of parts to be produced, material selection, kinematics, environmental restrictions. Finite element analysis to illustrate different aspects of stress analysis. Requires permission of the instructor.

MAE 783 Robots and Manufacturing Automation (3 Credit Hours)

This course will introduce the engineering of industrial robots used for manufacturing automation. Topics to be covered include spatial descriptions and transformations of manipulators, manipulator kinematics and inverse kinematics; manipulator velocities; static forces; and dynamics and trajectory generation. Other topics to be covered include design and on-line computer control of the manipulator.

MAE 785 Advanced Manufacturing Technology (3 Credit Hours)

Treatment of the next generation of manufacturing technology. Topics include additive manufacturing; rapid prototyping; electronic manufacturing; micro and nanofabrication; process simulation; product life cycle management; and sustainable design and manufacturing.

Prerequisites: MAE 682 or consent of instructor

MAE 788 Computational Intelligence for Engineering Design Optimization Problems (3 Credit Hours)

The concepts and algorithms of computational intelligence and their application to engineering design are discussed, including artificial neural networks, evolutionary optimization, and swarm intelligence. Both single and multi-objective optimization problems with continuous and/or discrete variables are also discussed.

MAE 789 Engineering Design with Uncertainties (3 Credit Hours)

An introduction to managing uncertainties and risk in strength design of mechanical components, including the study of the theoretical background, computational implementation, and applications of reliability-based methods for engineering analysis and design.

Prerequisites: MAE 608

MAE 794 Cellular Biomechanics (3 Credit Hours)

A broad introduction to the field of cellular biomechanics. Topics include overview of cell architecture, cytoskeleton, adhesion and molecular motors, biomolecular/biopolymer dynamics and mechanics, techniques to measure cell mechanical properties, techniques to mechanically stimulate cells, models of cell mechanical behavior, mechanobiology and mechanotransduction. Will include discussion of classic and current research articles. Course content will aim to cater to students with diverse backgrounds – students with biological science background will be exposed to physical science concepts and analysis; students with engineering/physical science background will be exposed to biological phenomena and concepts.

Prerequisites: MATH 212

MAE 795 Topics in Mechanical and Aerospace Engineering (3 Credit Hours)

Selected topics in mechanical and aerospace engineering or engineering mechanics.

MAE 797 Independent Study in Mechanical and Aerospace Engineering (3 Credit Hours)

Individual analytical, computational and/or experimental study in an area selected by the student. Supervised and approved by the advisor.

MAE 810 Supersonic Flow (3 Credit Hours)

This course will examine governing equations for supersonic flow, including full potential equations, small disturbance theory, hodographs, and method of characteristics. It will also serve as an introduction to three-dimensional flows, compressible boundary layer flows, internal flows in nozzles and diffusers, airfoil flows, slender bodies of revolution flows, conical flows, and wing flows.

Prerequisites: MAE 514 and MAE 602

MAE 811 Hypersonic Aerodynamics (3 Credit Hours)

General consideration of hypersonic flow and similarity principles, hypersonic flow past slender bodies with sharp and blunt leading edges. Hypersonic blunt-body flow. Real gas, viscous and low density effects, and consideration of nonequilibrium phenomena in hypersonic flows.

Prerequisites: MAE 710

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This course will examine techniques for static and dynamic measurement of pressure, temperature, and velocity. Experiment control and statistical treatment of data will be discussed, as will probe methods, including multi-hole pressure probes and hot-wire anemometers, and non-intrusive methods, including laser Doppler velocimetry and other optical methods. Surface and stream flow visualization and surface measurements will also be covered.

Prerequisites: MAE 602 and MAE 710

MAE 813 Turbulent Flow (3 Credit Hours)

Isotropic and homogeneous turbulence. Mixing length theories, Equilibrium turbulence models, Two-equation models (k-epsilon). Large eddy simulation. Reynold's stress transport models. Numerical simulations. Compressible and non-equilibrium turbulence effects.

Prerequisites: MAE 602 and MAE 715 or MAE 815

MAE 815 Boundary Layer Theory (3 Credit Hours)

Boundary layer equations; method of matched asymptotic expansions; body oriented coordinates, finite-difference solutions; separations, wake and jet flows; thermal and compressible boundary layers, transformations and finite-difference solutions, unsteady boundary layers. Introduction to hydrodynamic stability and turbulence.

Prerequisites: MAE 602

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This course will cover the following topics: classification of single partial differential equations; finite difference methods; stability analysis, including convergence, consistency, and efficiency; basics of finite volume methods; model equations of hyperbolic, parabolic and elliptic type; and explicit and implicit schemes, central and upwind schemes, and weak solutions of quasi-linear hyperbolic equations.

Prerequisites: MAE 601 or MATH 691

MAE 818 Aerospace Test Facilities (3 Credit Hours)

A comprehensive examination of aerodynamic test facilities for use in subsonic, transonic, supersonic and hypersonic flow regimes. Aspects of wind tunnel design and operation will be discussed, as will flow quality and wall and support interferences. Advanced concepts, including cryogenic wind tunnels, adaptive wall test sections and magnetic suspension will be examined, in addition to dynamic testing. There will be a review of flight test methods, including extraction of aerodynamic parameters from flight test data, a review of engine test facilities, and a review of ground test facilities for space structures and other space systems.

Prerequisites: Permission of the instructor

MAE 820 Heat Transfer II (3 Credit Hours)

Aspects of conduction, convection and radiation heat transfer, including governing equations, boundary layer flows, analytical and numerical solutions to one-, two- and three-dimensional problems.

Prerequisites: MAE 620

MAE 823 Nuclear Engineering (3 Credit Hours)

This course will consider nuclear power plant systems, and will introduce power reactor control kinetic behavior including safety coefficients, accumulative poisons, and temperature control parameters. It will also examine primary and secondary plant as a transient system.

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This course provides an understanding of the finite element method (FEM) as derived from an integral formulation perspective. It demonstrates the solutions of (1-D and 2-D) continuum mechanics problems such as solid mechanics, fluid mechanics and heat transfer. It also provides insight into the theoretical formulation and numerical implementation of finite element methods.

MAE 831 Mechanics of Composite Structures (3 Credit Hours)

Stress-strain relations for a lamina; failure theories. Micro-mechanical behavior of a lamina. Constitutive relations of a laminate. Bending, buckling and vibration of laminated plates. Approximate and finite element methods of solution.

MAE 834 Theory of Vibrations (3 Credit Hours)

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Prerequisites: MAE 504 and MAE 601 or MATH 691

MAE 840 Autonomous and Robotic Systems Analysis and Control (3 Credit Hours)

Kinematics, dynamics and control of complex non-linear electro-mechanical systems, particularly robotic manipulators.

MAE 841 Optimal Control Theory (3 Credit Hours)

Parameter optimization, optimization problem for dynamic systems with terminal and path constraints; optimal feedback control with and without the presence of uncertainty; nonlinear optimal control system.

Prerequisites: MAE 640

MAE 842 Multibody Dynamics: Theories and Applications (3 Credit Hours)

Basic theories are presented for formulation of equations of kinematics and dynamics of systems made of interconnected bodies. Topics include constrained motion, principle of virtual work and constrained dynamics. Examples cover robotic motion and biomechanics applications such as human locomotion.

Prerequisites: Permission of instructor

MAE 843 Kinematic Synthesis of Mechanisms (3 Credit Hours)

Classification of mechanisms; type and number synthesis, application of graph theory, expert systems for synthesis; introduction to dimensional synthesis via path and function generation; finite displacement theory including concept of poles, circlepoint, and centerpoint curves; structural error minimization using Chebychev's approximation; optimization approaches, current applications to robot manipulators, robot hands, space structures, and combustion engines.

Prerequisites: Permission of instructor

MAE 844 Atmospheric Flight Dynamics and Control (3 Credit Hours)

Principles governing the dynamics and control of vehicles in atmospheric flight. Equations of motion development and solution including inertial/gravitational/aerodynamic/propulsive loads, linear longitudinal and lateral-directional motions, and nonlinear trim and simulation. Flight control system design and analysis incorporating flying quality requirements, linear conventional/contemporary and frequency/time domain techniques for control and guidance functions, validation with nonlinear simulation, gain scheduling.

Prerequisites: MAE 403 or MAE 503 and MAE 604

MAE 845 Space Flight Dynamics and Control (3 Credit Hours)

Principles governing the dynamics and control of vehicles in space flight. Equations of motion development and solution including inertial/gravitational/aerodynamic/propulsive loads, decoupled translational and attitude motions. Orbital mechanics including elements, initial-value propagation, adjustments/transfers, Lambert boundary-value problem, perturbations, and nonlinear simulation. Attitude dynamics including torque free, gravity moment, axisymmetric/unsymmetric vehicles, and dual spinners. Flight control system design and analysis including impulsive velocities, finite burns, Lambert targeting, linear design using momentum wheels, and nonlinear phase-plane design using thrusters.

Prerequisites: MAE 604 and MAE 640

MAE 846 Advanced Control Methodologies (3 Credit Hours)

Review of multivariable dynamic math models including state space, transfer function, and matrix fractions. Multivariable design criteria including stability, performance, and robustness. Theory and application of multivariable control design techniques including LQR/LQG/LTR, H-infinity, Eigenspace Assignment and other advanced methods.

Prerequisites: MAE 640

MAE 847 Aerospace Vehicle Performance (3 Credit Hours)

This course will study the flight performance of aerospace vehicles, including a review of aerodynamic and propulsion characteristics. Range, flight and maneuver envelopes for vehicles in atmospheric flight will be examined. It will introduce various methods of design for trajectory optimization, including launch vehicles. An open-ended, design-oriented project will also be required.

Prerequisites: MAE 602 and MAE 514 or MAE 610

MAE 848 Flight Control Actuators and Sensors (3 Credit Hours)

This course will provide an overview of the governing principles and operations of actuator and sensor hardware used in aircraft and spacecraft flight control systems. Hydraulic, electro-hydraulic and electric actuators will be examined, as well as control jets and momentum wheels, accelerometers, and rate gyros. Other topics include air-data systems, inertial navigation systems and satellite navigation systems. The course will also examine dynamic model development, analysis and simulation, nonlinear hardware characteristics, and the influence on closed-loop vehicle behavior.

Prerequisites: MAE 503, MAE 538, and MAE 604

MAE 850 Nanoscale Mechanical and Structural Properties of Materials (3 Credit Hours)

Elastic and plastic properties of nanoscale materials, strain gradient dislocation plasticity, nanoindentation and nanoindentation creep, thin film mechanical and structural properties, kinetic-based investigations of hardening mechanisms in nanolayer composites.

MAE 851 Fatigue and Fracture (3 Credit Hours)

Divided into areas of fatigue and fracture; stress-controlled and strain-controlled fatigue; effect of mean stresses, notches, etc.; multiaxial stresses; variable amplitude loading; ductile and brittle fracture; linear elastic fracture mechanics; crack-tip plasticity; fracture testing; applications to fatigue life estimation. Requires permission of the instructor.

MAE 852 Mechanical Behavior of Materials (3 Credit Hours)

An examination of the macroscopic behavior of materials with respect to elasticity, plasticity, and viscoelasticity; yield criteria; fracture; influence of high and low temperatures; and corrosion and radiation.

Prerequisites: Permission of instructor

MAE 853 Composite Materials (3 Credit Hours)

This course will examine reinforcements, matrices, particulate-composites, short-fiber and continuous-fiber reinforced composites. Directionally solidified composites will also be studied, including the prediction of elastic failure properties. Other topics to be covered include design considerations and experimental work.

Prerequisites: Permission of the instructor

MAE 872 Response Surface Methodology (3 Credit Hours)

An applied course in response surface methodology with aerospace applications. Empirical model building, method of least squares, second order models, model adequacy checking, canonical analysis. Method of steepest ascent, multiple response optimization. Rotatable, cuboidal and small run designs. Design optimality and efficiency metrics, robust design, restrictions on randomization. Laboratory exercises include RSM applied to wind tunnel testing and optimization.

Prerequisites: MAE 672

MAE 880 Engineering Optimization (3 Credit Hours)

Formulation and solution algorithms for Linear Programming (LP) problems. Unconstrained and constrained nonlinear programming (NLP) problems. Optimum solution for practical engineering systems.

MAE 881 Advanced Design (3 Credit Hours)

Concepts, principles and procedures related to analysis of stresses and strains in machine components. Consideration of function of parts along with factors such as forces, life required, maximum cost, weight and space restrictions, number of parts to be produced, material selection, kinematics, environmental restrictions. Finite element analysis to illustrate different aspects of stress analysis. Requires permission of the instructor.

MAE 883 Robots and Manufacturing Automation (3 Credit Hours)

This course will introduce the engineering of industrial robots used for manufacturing automation. Topics to be covered include spatial descriptions and transformations of manipulators, manipulator kinematics and inverse kinematics; manipulator velocities; static forces; and dynamics and trajectory generation. Other topics to be covered include design and on-line computer control of the manipulator.

MAE 885 Advanced Manufacturing Technology (3 Credit Hours)

Treatment of the next generation of manufacturing technology. Topics include additive manufacturing; rapid prototyping; electronic manufacturing; micro and nanofabrication; process simulation; product life cycle management; and sustainable design and manufacturing.

Prerequisites: MAE 682 or consent of instructor

MAE 888 Computational Intelligence for Engineering Design Optimization Problems (3 Credit Hours)

The concepts and algorithms of computational intelligence and their application to engineering design are discussed, including artificial neural networks, evolutionary optimization, and swarm intelligence. Both single and multi-objective optimization problems with continuous and/or discrete variables are also discussed.

MAE 889 Engineering Design with Uncertainties (3 Credit Hours)

An introduction to managing uncertainties and risk in strength design of mechanical components, including the study of theoretical background, computational implementation, and applications of reliability-based methods for engineering analysis and design.

Prerequisites: MAE 608

MAE 894 Cellular Biomechanics (3 Credit Hours)

A broad introduction to the field of cellular biomechanics. Topics include overview of cell architecture, cytoskeleton, adhesion and molecular motors, biomolecular/biopolymer dynamics and mechanics, techniques to measure cell mechanical properties, techniques to mechanically stimulate cells, models of cell mechanical behavior, mechanobiology and mechanotransduction. Will include discussion of classic and current research articles. Course content will aim to cater to students with diverse backgrounds – students with biological science background will be exposed to physical science concepts and analysis; students with engineering/physical science background will be exposed to biological phenomena and concepts.

Prerequisites: MATH 212

MAE 895 Topics in Mechanical and Aerospace Engineering (3 Credit Hours)

Selected topics in mechanical and aerospace engineering or engineering mechanics.

MAE 897 Independent Study in Mechanical and Aerospace Engineering (3 Credit Hours)

Individual analytical, computational and/or experimental study in an area selected by the student. Supervised and approved by the advisor.

MAE 899 PhD Dissertation Research in Mechanical and Aerospace Engineering (1-9 Credit Hours)

Based on the Ph.D candidate's dissertation research in mechanical and aerospace engineering topics under the direction of the candidate's advisor.

Prerequisites: Instructor approval required

MAE 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

MAE 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

MAPD - Math Pedagogy

MAPD 601 Number and Operations for PK-8 Mathematics Specialists (3 Credit Hours)

This course will meet the requirements of students in the Master of Science in Education: PK-8 Mathematics Specialist Endorsement Program, and cannot be used for credit toward any degree offered by the Department of Mathematics and Statistics. The course introduces students to a number of topics in PK-8 mathematics and related pedagogical methods. Acknowledging that learning with understanding occurs through a process of establishing a solid knowledge base upon which to build, students will explore the many and varied ways in which PK-8 students may develop number sense. The focus will be upon the development of best practices for teaching mathematics. This requires that the student have knowledge of the content, use a variety of pedagogical approaches, and be able to select and utilize appropriate manipulatives and technological resources that will foster PK-8 student understanding.

MAPD 602 Geometry and Measurement for PK-8 Mathematics Specialists (3 Credit Hours)

This course will meet the requirements of students in the Master of Science in Education: PK-8 Mathematics Specialist Endorsement Program, and cannot be used for credit toward any degree offered by the Department of Mathematics and Statistics. The course introduces students to a number of topics in PK-8 mathematics and related pedagogical methods. Following a "concrete-to-abstract" developmental learning approach, students will explore the mathematical concepts of measurement and geometry in grades PK-8. Emphasis will be placed upon measurement and geometry content knowledge as well as the pedagogical knowledge specific to mathematics teaching and learning. Students will also learn to use appropriate technology.

MAPD 603 Rational Numbers and Proportional Reasoning for PK-8 Mathematics Specialists (3 Credit Hours)

This course will meet the requirements of students in the Master of Science in Education: PK-8 Mathematics Specialist Endorsement Program, and cannot be used for credit toward any degree offered by the Department of Mathematics and Statistics. The course introduces students to a number of topics in PK-8 mathematics and related pedagogical methods. It is designed to engage participants in constructing relational understanding between theoretical development of mathematics and students' learning of mathematics in the content strands of rational numbers and proportional reasoning. Students will learn how to select and use manipulatives to connect the concrete phase of mathematical learning to the abstract, symbolic phase. Various technologies will be integrated throughout the course as tools to enhance teaching and student understanding.

MAPD 604 Probability and Statistics for PK-8 Mathematics Specialists (3 Credit Hours)

This course will meet the requirements of students in the Master of Science in Education: PK-8 Mathematics Specialist Endorsement Program, and cannot be used for credit toward any degree offered by the Department of Mathematics and Statistics. The course introduces students to a number of topics in PK-8 mathematics and related pedagogical methods. It will focus on the content and processes that support the PK-8 students' learning of probability and statistics. Instruction will cover data collection, display, and analysis as well as the development of a fundamental understanding of probabilistic structures. These structures will be related to real world problem solving and hands-on activities. Technology will be integrated throughout the course to illustrate mathematical concepts, facilitate students exploration, and to make and test hypotheses.

MAPD 605 Algebra and Functions for PK-8 Mathematics Specialists (3 Credit Hours)

This course will meet the requirements of students in the Master of Science in Education: PK-8 Mathematics Specialist Endorsement Program and cannot be used for credit toward any degree offered by the Department of Mathematics and Statistics. The course introduces students to algebraic topics in PK-12 mathematics and related pedagogical methods. Topics will focus on making connections between arithmetic and algebra and transitioning concrete arithmetic thinking to abstract algebraic thinking. Technology will be included to enhance students' algebraic understanding and sense making.

MATH - Mathematical Sciences

MATH 500 History of Mathematics (3 Credit Hours)

Seminal ideas in geometry, arithmetic, algebra, analysis and applied mathematics (along with their mathematical representations) from antiquity, the age of exploration, the Promethean age to the present day.

Prerequisites: MATH 311W or MATH 316 or MATH 317

MATH 501 Partial Differential Equations (3 Credit Hours)

Not available to students with credit in MATH 691. Separation of variable techniques, Sturm-Liouville systems, generalized Fourier series, orthogonal functions of the trigonometric, Legendre and Bessel type boundary value problems associated with the wave equation and the heat conduction equation in various coordinate systems, applications to physics and engineering.

Prerequisites: A grade of C or better in MATH 307 and MATH 312

MATH 504 Fundamental Concepts of Geometry (3 Credit Hours)

Fundamentals of Euclidean and non-Euclidean geometry. Alternatives to Euclidean geometry are examined using a variety of mathematical techniques. Special topics such as 'Taxicab' geometry, the hyperbolic plane, the art of M.C. Escher, and the mathematics of maps may be included.

Prerequisites: MATH 311W

MATH 506 Number Theory and Discrete Mathematics (3 Credit Hours)

A survey course. Topics include the prime number theorem, congruences, Diophantine equations, continued fractions, quadratic reciprocity, combinatorics, logic, graphs, trees, algorithms, coding and linear programming.

Prerequisites: A grade of C or better in MATH 311W and MATH 316

MATH 508 Applied Numerical Methods I (3 Credit Hours)

An introduction to the numerical methods commonly used by scientists and engineers. Topics include solutions of equations of one variable, direct methods for solving linear systems, matrix factorization, stability analysis, iterative techniques, polynomial interpolation, numerical differentiation and integration, approximation theory, and initial and boundary value problems for ordinary differential equations.

Prerequisites: A grade of C or better in MATH 316; CS 150 or equivalent programming ability are also required

MATH 509 Applied Numerical Methods II (3 Credit Hours)

Topics include least squares problems, the QR factorization, the conjugate gradient method, Householder transformation and the QR method for approximating eigenvalues and singular values of a matrix. For applications, the finite difference method and the finite element method for solving partial differential equations, trigonometric interpolation and FFT as well as introductory study of optimization are discussed.

Prerequisites: A grade of C or better in MATH 508

MATH 517 Intermediate Real Analysis I (3 Credit Hours)

A rigorous course in classical real analysis. Topics include the topology of Euclidean n -space, properties of vector valued functions of several variables such as limits, continuity, differentiability and integrability, pointwise and uniform convergence of sequences and series of functions; Fourier series.

Prerequisites: A grade of C or better in MATH 317

MATH 518 Intermediate Real Analysis II (3 Credit Hours)

A rigorous course in classical real analysis. Topics include the topology of Euclidean n -space, properties of vector valued functions of several variables such as limits, continuity, differentiability and integrability, pointwise and uniform convergence of sequences and series of functions; Fourier series.

Prerequisites: A grade of C or better in MATH 517

MATH 520 Applied Mathematics I: Biomathematics (3 Credit Hours)

Exploring mathematical models in various biological contexts using both difference and differential equations: single and multiple species population growth, predator-prey and competing species (using phase plane analysis), epidemiological models of epidemics and pandemics, tumor growth, pattern formation in animals and insects.

Prerequisites: A grade of C or better in MATH 307

MATH 521 Applied Mathematics II: Mathematical Modeling (3 Credit Hours)

The philosophy and methodology of mathematical modeling, its successes and limitations. Models of climate change, atmospheric and ocean dynamics, models in other physical and biological contexts, and introduction to deterministic chaos.

Prerequisites: A grade of C or better in MATH 307, MATH 312, MATH 316 and MATH 317

MATH 522 Applied Complex Variables (3 Credit Hours)

Not available to students with credit in MATH 692. Topics include complex numbers, analytical functions and their properties, derivatives, integrals, series representations, residues and conformal mappings. Applications of the calculus of residues and mapping techniques to the solution of boundary value problems in physics and engineering.

Prerequisites: A grade of C or better in MATH 312

MATH 527 Applied Mathematics III: Elasticity (3 Credit Hours)

An introduction to the mathematical theory of linear and non-linear elastic continua. Topics include vectors, tensors, deformation, stress, nonlinear constitutive theory, exact solutions, infinitesimal theory, antiplane strain, plane strain, plane stress, extension, torsion, bending and elastic wave propagation.

Prerequisites: A grade of C or better in MATH 307 and MATH 312

MATH 528 Applied Mathematics IV: Fluid Mechanics (3 Credit Hours)

A mathematical investigation of the differential equations governing fluid flow with an emphasis on steady state incompressible flows. The Navier-Stokes equations are derived and some exact solutions are presented including the potential flow solutions. Topics therefore include classical ideal fluid flow and its complex variable representation, various approximations to the Navier-Stokes equations, boundary layer theory, and also surface and internal gravity wave motion, aspects of hydrodynamic stability theory and convection. Other topics may be introduced by the instructor.

Corequisites: MATH 501

MATH 557 Mathematics in Nature (3 Credit Hours)

A calculus and differential equations based description of many patterns observable in the natural world including wave motion in the air, oceans, rivers, and puddles; rainbows, halos and other meteorological phenomena; arrangement of leaves, petals and branches; height of trees; river meanders; animal and insect markings; mudcracks; spider webs; and others. Partial differential equations will be discussed as needed but a knowledge of ordinary differential equations will be assumed.

Prerequisites: A grade of C or better in MATH 307

MATH 596 Topics in Mathematics (1-3 Credit Hours)

Study of selected topics.

Prerequisites: permission of the instructor

MATH 598 Tutorial Work in Special Topics in Mathematics (1-3 Credit Hours)

Independent study under the direction of an instructor including library research and reports.

Prerequisites: permission of the instructor

MATH 605 Complex Variables I (3 Credit Hours)

An advanced course in complex analysis.

Prerequisites: MATH 501, MATH 518 and MATH 522

MATH 616 Computational Linear Algebra (3 Credit Hours)

Topics include singular value decomposition, sparse systems, Krylov subspace methods, large sparse eigenvalue problems and iterative methods. This course also covers applications of computational linear algebra in the areas of image compression, data processing and principal component analysis.

Prerequisites: MATH 312, MATH 316 and MATH 508

MATH 617 Measure and Integration (3 Credit Hours)

An introduction to measure theory and integration theory with special emphasis on Lebesgue measure and the Lebesgue integral including Fatou's Lemma, the Monotone Convergence Theorem and the Dominated Convergence Theorem.

Prerequisites: MATH 518

MATH 618 Applied Functional Analysis (3 Credit Hours)

Topics include orthogonal projections to subspaces, duality, the Hahn-Banach theorem and the Banach-Steinhaus theorem, L^2 spaces and convolution operators, fixed point theory, construction of Hilbert spaces, approximation procedures in Hilbert spaces, and spectral theory.

Prerequisites: MATH 617

MATH 620 Optimization Techniques (3 Credit Hours)

Theory and computational algorithms for the optimization of constrained linear and nonlinear systems or for locating the maximum of a constrained nonlinear function. Applications to problems in economics, operations research and systems theory.

Prerequisites: MATH 312 and MATH 316

MATH 622 Numerical Solutions to Differential Equations (3 Credit Hours)

An in-depth study of the numerical solution to ordinary and partial differential equations. Topics include linear multi-step methods, Runge-Kutta methods, stiff differential equations, collocation methods, and strong and weak stability analysis for ODEs. For PDEs, finite difference methods are examined.

Prerequisites: MATH 509

MATH 632 Master's Project (3 Credit Hours)

Under the guidance of a faculty member in the Department of Mathematics and Statistics, the student will undertake a significant data analysis problem in a scientific setting outside the department. A written report and/or public presentation of results will be required.

Prerequisites: permission of graduate program director

MATH 637 Tensor Calculus and Differential Geometry (3 Credit Hours)

Topics include metric spaces, bilinear and quadratic forms, tensors, point manifolds, theory of curves, geodesic differentiation, theory of surfaces, curvature of general manifolds, integrability.

Prerequisites: MATH 517

MATH 638 Mathematical Theories of Continua (3 Credit Hours)

Topics include deformation, motion, stress, conservation laws, and constitutive theories.

Prerequisites: MATH 501 and MATH 637

MATH 691 Engineering Analysis I (3 Credit Hours)

Not available to students with credit in MATH 501. Separation of variable techniques, Sturm-Liouville systems, generalized Fourier series, orthogonal functions of the trigonometric, Legendre and Bessel type, boundary value problems associated with the wave equation and the heat conduction equation in various coordinate systems, applications to physics and engineering.

MATH 692 Engineering Analysis II (3 Credit Hours)

Not available to students with credit in MATH 522. Topics include complex numbers, analytical functions and their properties, derivatives, integrals, series representations, residues and conformal mappings. Applications of the calculus of residues and mapping techniques to the solution of boundary value problems in physics and engineering.

Prerequisites: MATH 312

MATH 693 Engineering Analysis III (3 Credit Hours)

Advanced topics in the theory and application of ordinary differential equations, distributions, Green's functions, classification of partial differential equations, initial-value problems, eigenfunction expansions for boundary-value problems, selected special functions, singular perturbation theory for differential equations.

Prerequisites: MATH 501 or MATH 691

MATH 695 Seminar in Mathematics (1-3 Credit Hours)

Seminar in advanced topics.

Prerequisites: permission of the instructor

MATH 696 Topics in Mathematics (1-3 Credit Hours)

Advanced study of selected topics.

Prerequisites: permission of the instructor

MATH 697 Topics in Mathematics (1-3 Credit Hours)

Advanced study of selected topics.

MATH 698 Research (3 Credit Hours)**MATH 699 Thesis (3 Credit Hours)****MATH 702 Integral Equations (3 Credit Hours)**

Advanced material in theory and application of integral equations. Formulation of the integral equation problems, cause and effect, connection with differential equations, scattering theory, boundary values of partial differential equations, Fredholm and Volterra theory, expansions in orthogonal functions, theory of Hilbert-Schmidt singular integral equations, method of Wiener-Hopf, monotone operator theory, and direct methods.

Prerequisites: MATH 618 and MATH 693

MATH 721 Advanced Applied Numerical Methods I (3 Credit Hours)

Numerical solutions of partial differential equations and integral equations. For PDEs, the finite difference method, the finite element method and the boundary element method are studied. A priori and a posteriori error estimates are examined. For integral equations, topics include Galerkin methods, collocation methods, and the Petrov-Galerkin method.

Prerequisites: MATH 618, MATH 622 and MATH 691

MATH 722 Advanced Applied Numerical Methods II (3 Credit Hours)

Numerical solutions of partial differential equations and integral equations. For PDEs, the finite difference method, the finite element method and the boundary element method are studied. A priori and a posteriori error estimates are examined. For integral equations, topics include Galerkin methods, collocation methods, and the Petrov-Galerkin method.

Prerequisites: MATH 501, MATH 508 and MATH 509

MATH 725 Computational Fluid Dynamics (3 Credit Hours)

An introduction to the theory of finite volume methods for scalar and vector conservation laws and the Euler and Navier-Stokes equations. Topics include weak solutions, characteristics, Rankine-Hugoniot conditions, energy and entropy inequalities, Riemann solvers, and numerical methods for compressible and incompressible flows including MUSCL and total variation diminishing (TVD) schemes, essentially non-oscillatory (ENO), weighted ENO, and entropy stable scheme.

Prerequisites: MATH 501 and MATH 508

MATH 726 Discontinuous Galerkin Methods (3 Credit Hours)

An introduction to the theory of nodal discontinuous Galerkin (DG) methods for solving linear and nonlinear conservation law equations. Topics include fundamental properties of conservation laws including their ability to generate non-smooth solutions, thus leading to the notion of weak solutions and entropy inequalities, consistency and stability properties of nodal DG methods as well as their efficient implementation techniques, and application of nodal DG methods for solving both linear and nonlinear equations, such as the advection-diffusion, Burgers, and Navier-Stokes equations.

Prerequisites: MATH 725

MATH 745 Transform Methods (3 Credit Hours)

Use of integral transforms for students of applied mathematics, physics and engineering. Integral transforms studied are Laplace, Fourier, Hankel, finite Z-transforms and other special transforms.

Prerequisites: MATH 691 and MATH 692

MATH 750 Calculus of Variations (3 Credit Hours)

Maximum and minimum techniques in calculus and dynamic programming. Derivation of Euler-Lagrange equations for a variety of conditions, formulation of extremum problems with side conditions for ordinary and partial differential equations. Application to dynamics, elasticity, heat and mass transfer, energy principles and finite element techniques.

Prerequisites: MATH 691 and MATH 692

MATH 755 Introduction to Kinetic Theory and Mesoscopic Methods for Computational Mechanics I (3 Credit Hours)

The goal of this course is to provide an introduction to kinetic theory and nonequilibrium statistical mechanics, which bridges the microscopic theories and the macroscopic continuum theories of flows. Topics include the molecular dynamics of N particles, Hamiltonian equation, Liouville equation, Boltzmann equation, binary collision, linearized collision operator and its eigen theory, the H-theorem and irreversibility, calculation of the transport coefficients.

Prerequisites: MATH 501 or MATH 691 or permission of the instructor

MATH 756 Introduction to Kinetic Theory and Mesoscopic Methods for Computational Mechanics II (3 Credit Hours)

This is the second part of the study of the interaction between kinetic theory and nonequilibrium statistical mechanics. Models of Boltzmann equation and numerical techniques for hydrodynamic equations (Euler and Navier-Stokes equations) and the Boltzmann equation are studied. Topics include Non-normal and moment method, Maxwell's moment method, BGK model equation, gas mixtures and transport phenomena in mixtures, the Wang-Chang-Uhlenbeck equation, Enskog equation for dense gases, the lattice Boltzmann equation for incompressible flows, the gas-kinetic scheme for compressible flows and the Direct Simulation Monte Carlo (DSMC) method.

Prerequisites: MATH 755/MATH 855

MATH 771 Scientific Computing in Applied Mathematics (3 Credit Hours)

Numerical methods for algebraic systems, partial differential equations, integral equations, optimization, Monte Carlo method, and statistics, with emphasis on computational performance using modern programming languages such as Fortran 90 or C/C++ and modern computer architecture. Basic techniques of parallel computing using MPI (Message Passing Interface), openMP, or other distributed/multicore computing platforms. Common tools in scientific computing, such as Unix shell commands, debuggers, version control systems, scientific libraries, graphics and visualization, will also be introduced.

Prerequisites: MATH 501, MATH 508 and MATH 509

MATH 795 Seminar in Mathematics (1-3 Credit Hours)

Seminar in advanced topics.

Prerequisites: permission of the instructor

MATH 796 Topics in Mathematics (1-3 Credit Hours)

Advanced study of selected topics.

Prerequisites: permission of the instructor

MATH 797 Topics in Mathematics (1-3 Credit Hours)

Advanced study of selected topics.

Prerequisites: permission of instructor

MATH 801 Asymptotic and Perturbation Methods (3 Credit Hours)

Asymptotic and perturbation methods are developed and used to solve linear and nonlinear differential equations. Included are analyses of Duffing's Equation, Van der Pol's Equation, and Mathieu's Equation. Singular perturbation theory and the Method of Matched Asymptotic Expansions are used to solve equations with boundary layer type solutions. Asymptotic expansions of integrals using Laplace's Method, Method of Steepest Descent and Method of Stationary Phase are developed. Applications from all areas of applied mathematics are given.

Prerequisites: MATH 693

MATH 802 Integral Equations (3 Credit Hours)

Advanced material in theory and application of integral equations.

Formulation of the integral equation problems cause and effect, connection with differential equations, scattering theory, boundary values of partial differential equations, Fredholm and Volterra theory, expansions in orthogonal functions, theory of Hilbert-Schmidt singular integral equations, method of Wiener-Hopf, monotone operator theory, and direct methods.

Prerequisites: MATH 618 and MATH 693

MATH 803 Advanced Applied Mathematics I (3 Credit Hours)

Advanced techniques of mathematics applied to specific topics of physical interest. Examples could include high activation energy asymptotics applied to combustion, singular integral equations applied to fracture mechanics, or bifurcation theory applied to non-linear phenomena such as transition to turbulence, phase transitions and hydrodynamic stability.

Prerequisites: MATH 702

MATH 804 Advanced Applied Mathematics II (3 Credit Hours)

Advanced techniques of mathematics applied to specific topics of physical interest. Examples could include high activation energy asymptotics applied to combustion, singular integral equations applied to fracture mechanics, or bifurcation theory applied to non-linear phenomena such as transition to turbulence, phase transitions and hydrodynamic stability.

Prerequisites: MATH 702

MATH 821 Advanced Applied Numerical Methods I (3 Credit Hours)

Numerical solutions of partial differential equations and integral equations. For PDEs, the finite difference method, the finite element method and the boundary element method are studied. A priori and a posteriori error estimates are examined. For integral equations, topics include Galerkin methods, collocation methods, and the Petrov-Galerkin method.

Prerequisites: MATH 618, MATH 622 and MATH 691

MATH 822 Advanced Applied Numerical Methods II (3 Credit Hours)

Numerical solutions of partial differential equations and integral equations. For PDEs, the finite difference method, the finite element method and the boundary element method are studied. A priori and a posteriori error estimates are examined. For integral equations, topics include Galerkin methods, collocation methods, and the Petrov-Galerkin method.

Prerequisites: MATH 821

MATH 823 Approximation and Optimization I (3 Credit Hours)

Introductory and advanced topics representing current research in approximation and optimization techniques for various application problems. Topics include recent developments in algorithms, their analysis, and applications such as data fitting and pattern separation.

Prerequisites: permission of the graduate program director

MATH 825 Computational Fluid Dynamics (3 Credit Hours)

An introduction to the theory of finite volume methods for scalar and vector conservation laws and the Euler and Navier-Stokes equations. Topics include weak solutions, characteristics, Rankine-Hugoniot conditions, energy and entropy inequalities, Riemann solvers, and numerical methods for compressible and incompressible flows including MUSCL and total variation diminishing (TVD) schemes, essentially non-oscillatory (ENO), weighted ENO, and entropy stable scheme.

Prerequisites: MATH 501 and MATH 508

MATH 826 Discontinuous Galerkin Methods (3 Credit Hours)

An introduction to the theory of nodal discontinuous Galerkin (DG) methods for solving linear and nonlinear conservation law equations. Topics include fundamental properties of conservation laws including their ability to generate non-smooth solutions, thus leading to the notion of weak solutions and entropy inequalities, consistency and stability properties of nodal DG methods as well as their efficient implementation techniques, and application of nodal DG methods for solving both linear and nonlinear equations, such as the advection-diffusion, Burgers, and Navier-Stokes equations.

Prerequisites: MATH 725 or MATH 825

MATH 845 Transform Methods (3 Credit Hours)

Use of integral transforms for students of applied mathematics, physics and engineering. Integral transforms studied are Laplace, Fourier, Hankel, finite Z-transforms and other special transforms.

Prerequisites: MATH 691 and MATH 692

MATH 850 Calculus of Variations (3 Credit Hours)

Maximum and minimum techniques in calculus and dynamic programming. Derivation of Euler-Lagrange equations for a variety of conditions, formulation of extremum problems with side conditions for ordinary and partial differential equations. Application to dynamics, elasticity, heat and mass transfer, energy principles and finite element techniques.

Prerequisites: MATH 691 and MATH 692

MATH 855 Introduction to Kinetic Theory and Mesoscopic Methods for Computational Mechanics I (3 Credit Hours)

The goal of this course is to provide an introduction to kinetic theory and nonequilibrium statistical mechanics, which bridges the microscopic theories and the macroscopic continuum theories of flows. Topics include the molecular dynamics of N particles, Hamiltonian equation, Liouville equation, Boltzmann equation, binary collision, linearized collision operator and its eigen theory, the H-theorem and irreversibility, calculation of the transport coefficients.

Prerequisites: MATH 501 or MATH 691 or permission of the instructor

MATH 856 Introduction to Kinetic Theory and Mesoscopic Methods for Computational Mechanics II (3 Credit Hours)

This is the second part of the study of the interaction between kinetic theory and nonequilibrium statistical mechanics. Models of Boltzmann equation and numerical techniques for hydrodynamic equations (Euler and Navier-Stokes equations) and the Boltzmann equation are studied. Topics include Non-normal and moment method, Maxwell's moment method, BGK model equation, gas mixtures and transport phenomena in mixtures, the Wang-Chang-Uhlenbeck equation, Enskog equation for dense gases, the lattice Boltzmann equation for incompressible flows, the gas-kinetic scheme for compressible flows and the Direct Simulation Monte Carlo (DSMC) method.

Prerequisites: MATH 755/MATH 855

MATH 871 Scientific Computing in Applied Mathematics (3 Credit Hours)

Numerical methods for algebraic systems, partial differential equations, integral equations, optimization, Monte Carlo method, and statistics, with emphasis on computational performance using modern programming languages such as Fortran 90 or C/C++ and modern computer architecture. Basic techniques of parallel computing using MPI (Message Passing Interface), openMP, or other distributed/multicore computing platforms. Common tools in scientific computing, such as Unix shell commands, debuggers, version control systems, scientific libraries, graphics and visualization, will also be introduced.

Prerequisites: MATH 501, MATH 508 and MATH 509

MATH 895 Seminar in Mathematics (1-3 Credit Hours)

Seminar in advanced topics.

Prerequisites: permission of the instructor

MATH 896 Topics in Mathematics (1-3 Credit Hours)

Advanced study of selected topics.

Prerequisites: permission of the instructor

MATH 897 Topics in Mathematics (1-3 Credit Hours)

Advanced study of selected topics.

MATH 898 Research (1-9 Credit Hours)**MATH 899 Dissertation (1-9 Credit Hours)****MATH 999 Doctoral Graduate Credit (1 Credit Hour)**

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

MBA - Master of Business Administration

MBA 520 Spreadsheet Modeling (1 Credit Hour)

This course introduces students to the use of spreadsheet modeling to analyze and make business decisions. Course topics include spreadsheet design, data analysis for modeling, and Monte Carlo simulation. The course is web-based providing tremendous flexibility for the students. Students will need some proficiency with Excel.

Prerequisites: Admission to the MBA program OR approval by the MBA program office/instructor

MBA 610 The Problem-Solving Manager (3 Credit Hours)

The course aims to develop students' problem-solving mindset, professional brand, and communication skills. Students will be introduced to and apply various approaches to problem-solving and critical thinking; polish one's resume and professional profile in the course of career planning and preparation; and refine one's managerial communication skills across written and oral media.

Prerequisites: Admission to the MBA program OR approval by the MBA program office/instructor

MBA 695 Selected Topics for MBA Modules (1-3 Credit Hours)

The study of selected topics not offered on a regular basis.

Prerequisites: admission to the MBA program

MBA 697 Independent Study (1-3 Credit Hours)

Affords student the opportunity to undertake independent study under the direction of a faculty member.

Prerequisites: Admission to the MBA program, MBA 600, MBA 601, MBA 602, MBA 603, and MBA 604, and permission of the instructor

MBA 698 Corporate Field Project (1-3 Credit Hours)

Students will work with regional firms and non-profits to propose solutions for a real problem facing the firm.

Prerequisites: admission to the MBA program

MBA 998 Graduate Credit (1 Credit Hour)

This is a pass/fail course MBA students may take to maintain active status. All graduate students are required to be registered for at least one graduate credit hour in their semester of graduation.

MDPM - Molecular Diagnostics and Precision Medicine

MDPM 500 Principles of Molecular Diagnostics (3 Credit Hours)

Course will cover basic concepts of molecular biology including nucleic acids, chromosomes, DNA replication, transcription, and translation and the role of inherited and acquired mutations in disease. The role of clinical molecular diagnostics in detection, prognosis, theranostics, and monitoring and management of patients with inherited and infectious diseases will be explored.

MDPM 501 Molecular Diagnostics Lab (3 Credit Hours)

Course will cover basic molecular biology laboratory techniques including nucleic acid isolation, restriction enzyme digestion, polymerase chain reaction (PCR), quantitative reverse-transcription PCR, DNA sequencing, western blot, ELISA, and PCR-RFLP. This includes both hands on experience and lecture-based explanation of the science behind the techniques.

MDPM 600 Advanced Clinical Molecular Diagnostics (3 Credit Hours)

This course will cover the molecular pathology of various diseases including epigenetic disorders, metabolic disorders coagulopathies, cardiac disease, and infectious disease. It will also focus on cutting edge areas of molecular medicine and diagnostics such as pharmacogenomics, regenerative medicine and the microbiome.

MDPM 601 Advanced Molecular Diagnostics Lab (3 Credit Hours)

Course will cover advanced techniques and technologies in molecular diagnostics. Students will gain hands on experience in diagnostic methods using relative quantification of qRT-PCR, sequencing, and fragment analysis using capillary electrophoresis. Alternative techniques and emerging technologies such as next-generation sequencing will also be discussed.

MDPM 620 Human Subjects Regulations and Ethics (3 Credit Hours)

Students will be engaged and guided through a series of lectures and class discussions that emphasize regulatory and ethical considerations in the clinical molecular diagnostic laboratory, scientific research laboratory, and human subjects research environments. This class will cover issues specific for the Clinical Laboratory (CLIA regulatory environment) as well as Responsible Conduct of Research generally including: conflict of interest; policies regarding human subjects, live vertebrate animal subjects in research, and safe laboratory practices; mentor/mentee responsibilities and relationships; safe research environments (e.g., those that promote inclusion and are free of discriminatory harassment); collaborative research; peer review; data acquisition and analysis; laboratory tools (e.g., tools for analyzing data and creating or working with digital images); recordkeeping practices, including methods such as electronic laboratory notebooks; secure and ethical data use; data confidentiality, management, sharing, and ownership; research misconduct and policies for handling misconduct; responsible authorship and publication; and the scientist as a responsible member of society, contemporary ethical issues in biomedical research, and the environmental and societal impacts of scientific research.

MDPM 640 Molecular Cytology & Histology (3 Credit Hours)

This course will provide didactic training and hands on experience in methodologies associated with clinical and experimental molecular cytology and histology. This includes, immunohistochemistry, immunofluorescence, fluorescent in situ hybridization, and fluorescent chromosome analysis. Students will learn to design and implement experiments using these technologies to answer questions in molecular diagnostics.

MDPM 669 Molecular Diagnostics Pract (3 Credit Hours)

Students will perform directed laboratory research in an academic, industry, or clinical laboratory. Research project will be supervised by student's mentor. Projects must encompass the use of molecular diagnostics techniques and must be approved by an advisory committee selected by the student and approved by the program director. Upon completion of the 15 credit hours, students will present their findings in an open seminar.

MDPM 698 Molecular Diagnostics Lab (3 Credit Hours)

Students will obtain molecular diagnostic research experience in laboratories of prospective mentors. Student will be trained in research methods and procedures and will obtain a perspective on potential projects. Rotations can be completed in academic research, industry, or clinical laboratories. Work must include the use of molecular diagnostic techniques and rotations must be approved by the program director.

MDPM 720 Genomics and Bioinformatics (3 Credit Hours)

Genomics and Bioinformatics combines a didactic survey of topics important for understanding the origin, curation, advantages, and limitations of a variety of key genomic resources with hands-on training in the proper use of widely accessed web-based genome resources and common web-based bioinformatic tools.

MDTS - Medical Diagnostic and Translational Sciences

MDTS 500 Principles of Molecular Diagnostics (3 Credit Hours)

Course will cover basic concepts of molecular biology including nucleic acids, chromosomes, DNA replication, transcription, and translation and the role of inherited and acquired mutations in disease. The role of clinical molecular diagnostics in detection, prognosis, theranostics, and monitoring and management of patients with inherited and infectious diseases will be explored.

MDTS 501 Molecular Diagnostics Laboratory (3 Credit Hours)

Course will cover basic molecular biology laboratory techniques including nucleic acid isolation, restriction enzyme digestion, polymerase chain reaction (PCR), quantitative reverse-transcription PCR, DNA sequencing, western blot, ELISA, and PCR-RFLP. This includes both hands on experience and lecture-based explanation of the science behind the techniques.

Pre- or corequisite: MDTS 500 or permission of instructor

MDTS 600 Advanced Clinical Applications of Molecular Diagnostics (3 Credit Hours)

This course will cover the molecular pathology of various diseases including epigenetic disorders, metabolic disorders coagopathies, cardiac disease, and infectious disease. It will also focus on cutting edge areas of molecular medicine and diagnostics such as pharmacogenomics, regenerative medicine and the microbiome.

Prerequisites: MLRS 500, MLRS 501 or permission of instructor

MDTS 601 Advanced Molecular Diagnostics Laboratory (3 Credit Hours)

Course will cover advanced techniques and technologies in molecular diagnostics. Students will gain hands on experience in diagnostic methods using relative quantification of qRT-PCR, sequencing, and fragment analysis using capillary electrophoresis. Alternative techniques and emerging technologies such as next-generation sequencing will also be discussed.

Prerequisites: MDTS 500, MDTS 501 or permission of instructor

Pre- or corequisite: MDTS 600

MDTS 668 Clinical Laboratory Internship (3 Credit Hours)

An optional three-week supervised rotation in a hospital-based molecular diagnostic laboratory or a molecular research laboratory.

Prerequisites: MDTS 500, MDTS 501, MDTS 600, and MDTS 601 or permission of instructor

MDTS 714 Molecular Diagnostics Laboratory (2-3 Credit Hours)

Laboratory rotation with a pre-designated faculty member in which the student obtains hands-on experience. Designed for graduate students to sample different types of research models, techniques, and subject matter without the commitment of dissertation level involvement.

Prerequisites: Graduate Program Director approval required

MDTS 720 Genomic Databases: Content, Curation, and Application to Biomedical Research (3 Credit Hours)

This course combines a didactic survey of topics important for understanding the origin, curation, advantages, and limitations of a variety of key genomic resources with hands-on training in the proper use of widely accessed public genome resources and common bioinformatic tools.

Prerequisites: Graduate standing

MDTS 730 Chromosome Biology and Human Disease (3 Credit Hours)

Course goals are a comprehensive understanding of the mechanisms involved in chromosome function and how aberrations in these processes contribute to human disease. Topics include DNA repair and recombination; centromere and telomere dynamics, maintenance, and function; chromosome replication and segregation; control of cell division; dynamics of chromatin structure and function; epigenetics and gene expression; and long-range chromatin interactions and genome function.

Prerequisites: MDTS 610, MDTS 611, or approval of instructor

MDTS 740 Stem Cells: Biology and Therapy (3 Credit Hours)

Topics to be covered include history of stem cell biology, molecular definitions for stem cell identification, methods for stem cell isolations including: adult and embryonic, current technologies for induced pluripotent stem cell reprogramming, stem cells in tissue engineering and regenerative medicine, and current and future stem cell applications.

Prerequisites: MDTS 600 and MDTS 601 or equivalent

MDTS 742 Tissue Engineering (3 Credit Hours)

Topics to be covered include history of tissue engineering, development and morphogenesis, tissue structure, cells, scaffolds, regulators, and creating and evaluating a tissue engineering construct. Focus is on biomedical tissue engineering concepts as applied to creating human tissues in the laboratory for surgical repair of injured and diseased tissues and organs.

Prerequisites: Graduate standing

MDTS 750 Molecular Genetics, Gene Function and Genomics (3 Credit Hours)

The goals of this course are a comprehensive understanding of the mechanisms involved in molecular genetics and gene function and in-depth exploration of modern experimental analyses of these processes. Topics include DNA replication, repair, and recombination; transcription; epigenetic regulation of transcription; chromatin structure, histone modifications, transcription factors, and regulatory RNAs; long-range chromatin interactions and gene regulation; post-transcriptional gene regulation and translation; molecular biology based experimental analysis of gene function; and experimental genomic approaches to gene regulation and gene function.

Prerequisites: MDTS 600 and MDTS 601 or instructor approval

MDTS 805 Fundamentals of Cancer Biology (3 Credit Hours)

Course will cover molecular aspects of cancer including DNA damage, tumor viruses, cell cycle regulation, oncogenes and tumor suppressor genes and their respective roles in cancer prevention/development, genes involved in promoting or inhibiting metastasis, angiogenesis, telomeres and telomerase, regulation of both apoptosis and autophagy in normal and cancer cells, cancer stem cells, and diagnostic screening assays for therapeutic responses or resistance in cancer patients.

Prerequisites: MDTS 600 and MDTS 601 or equivalents; instructor approval also required

MDTS 810 Molecular Basis of Health and Disease (3 Credit Hours)

Emphasis is on human genetic syndromes and disorders associated with dysregulation of key signal transduction pathways that control gene expression, cell growth and protein synthesis including the Ras/MAPK pathway, tuberous sclerosis complex-mammalian target of rapamycin, PI3-kinase and others. Diagnosis, screening and treatment will be covered.

Prerequisites: MDTS 600 and MDTS 601

MDTS 814 Molecular Laboratory Rotation (2-3 Credit Hours)

Laboratory rotation with a pre-designated faculty member in which the student obtains hands-on experience. Designed for graduate students to sample different types of research models, techniques, and subject matter without the commitment of dissertation level involvement.

Prerequisites: Graduate Program Director approval required

MDTS 820 Genomic Databases: Content, Curation, and Application to Biomedical Research (3 Credit Hours)

This course combines a didactic survey of topics important for understanding the origin, curation, advantages, and limitations of a variety of key genomic resources with hands-on training in the proper use of widely accessed public genome resources and common bioinformatic tools.

Prerequisites: Graduate standing

MDTS 830 Chromosome Biology and Human Disease (3 Credit Hours)

Course goals are a comprehensive understanding of the mechanisms involved in chromosome function and how aberrations in these processes contribute to human disease. Topics include DNA repair and recombination; centromere and telomere dynamics, maintenance, and function; chromosome replication and segregation; control of cell division; dynamics of chromatin structure and function; epigenetics and gene expression; and long-range chromatin interactions and genome function.

Prerequisites: MDTS 610, MDTS 611, or approval of instructor

MDTS 840 Stem Cells: Biology and Therapy (3 Credit Hours)

Topics to be covered include history of stem cell biology, molecular definitions for stem cell identification, methods for stem cell isolations including: adult and embryonic, current technologies for induced pluripotent stem cell reprogramming, stem cells in tissue engineering and regenerative medicine, and current and future stem cell applications.

Prerequisites: MDTS 600 and MDTS 601 or equivalent

MDTS 842 Tissue Engineering (3 Credit Hours)

Topics to be covered include history of tissue engineering, development and morphogenesis, tissue structure, cells, scaffolds, regulators, and creating and evaluating a tissue engineering construct. Focus is on biomedical tissue engineering concepts as applied to creating human tissues in the laboratory for surgical repair of injured and diseased tissues and organs.

Prerequisites: Graduate standing

MDTS 850 Molecular Genetics, Gene Function and Genomics (3 Credit Hours)

The goals of this course are a comprehensive understanding of the mechanisms involved in molecular genetics and gene function and in-depth exploration of modern experimental analyses of these processes. Topics include DNA replication, repair, and recombination; transcription; epigenetic regulation of transcription; chromatin structure, histone modifications, transcription factors, and regulatory RNAs; long-range chromatin interactions and gene regulation; post-transcriptional gene regulation and translation; molecular biology based experimental analysis of gene function; and experimental genomic approaches to gene regulation and gene function.

MDTS 891 Doctoral Seminar (1-2 Credit Hours)

Students attend seminars, attend a class on giving seminars, and present a seminar on their own research.

MDTS 895 Topics in Molecular Medicine (1 Credit Hour)

Student led presentations of current topics related to molecular medicine.

Prerequisites: Instructor approval required

MDTS 898 Molecular Biology Research (1-9 Credit Hours)

Supervised doctoral research in molecular diagnostics or biomedical studies.

Prerequisites: instructor approval required

MGMT - Management

MGMT 500 Managing Organizations (3 Credit Hours)

This course introduces students to understanding employee attitudes and behaviors as well as human resource management. Topics include job performance, performance management, organizational commitment, employee retention, motivation, compensation, and employee well-being.

Prerequisites: Admission to the MBA Program or approval by the MBA Program Office/instructor

MGMT 517 Employment Law (3 Credit Hours)

An analysis of how the federal and state governments may regulate the employer-employee relationship. Topics include labor relations law, equal employment opportunity law, other current statutory employment law and common law employment issues.

MGMT 552 Negotiations and Change Management (3 Credit Hours)

This course focuses on negotiations and change. Students will develop analytical, interpersonal, and communication skills, with an emphasis placed on experiential learning through case studies, role playing, and simulations.

MGMT 563 Management Seminar Abroad (3 Credit Hours)

A study tour abroad under the direction of a faculty member including on-site visits and management lectures designed to provide insight into differences in management practices in foreign countries. Offered summers only and when available.

Prerequisites: permission of the chief departmental advisor

MGMT 565 SHRM Learning System (3 Credit Hours)

This is a course based on the SHRM (Society for Human Resource Management) Learning System® for SHRM-CP/SHRM-SCP. Comprised of comprehensive learning modules teaching the SHRM Body of Applied Skills and Knowledge™ (SHRM BASK™), and advanced online multimedia resources, these study materials streamline study time, accelerate learning and build confidence for passing the SHRM-CP/SHRM-SCP exam. The course tuition includes all books, including one year access to the SHRM online learning resources, but does not include registration for the SHRM-CP/SHRM-SCP examinations.

MGMT 595 Topics (3 Credit Hours)**MGMT 599 Selected Topics in Human Resources (3 Credit Hours)****MGMT 602 Organizational Management (3 Credit Hours)**

Examine issues and principles in the management of individuals, groups, and organizations. Topics include motivation and reward systems, groups dynamics and team building organization design and change.

MGMT 605 Leadership Dynamics (2 Credit Hours)

This course focuses on providing students with the foundations of leadership by reviewing past leadership research and integrating this into their own understanding of what makes one an effective leader. Contemporary concepts of leadership, including the role of culture and gender, will also be presented. The course will utilize self-assessments, case analysis, and leadership-related readings that will require students to think critically about what leaders do and how their own strengths and limitations influence their personal leadership development.

Prerequisites: Admission to the MBA Program

MGMT 618 Issues in Human Resource Management (3 Credit Hours)

An analysis and evaluation of current human resource practices and problems. Examines topics such as human resource planning, selection, development, and compensation.

MGMT 630 Motivation and Leadership (3 Credit Hours)

This course addresses how managers and organizations can enhance employee productivity and job satisfaction in a competitive global environment. Both the theories and practices of motivation and leadership will be examined.

MGMT 650 Managing People and Culture (3 Credit Hours)

This course focuses on providing students with the foundations of leadership by reviewing past leadership research and integrating this into their own understanding of what makes one an effective leader. Contemporary concepts of leadership, including how leaders influence through culture and emotions, will also be presented. The course will utilize self-assessments, case analysis, simulations, and leadership-related readings that will require students to think critically about what leaders do and how their own strengths and limitations influence their personal leadership development.

Prerequisites: Admission to the MBA program OR approval by the MBA program office/instructor

MGMT 668 Management Internship (1-3 Credit Hours)

This course is a practicum in management, applying theories, concepts, and management techniques in a business setting.

Prerequisites: Graduate standing and permission of the department chair

MGMT 690 Strategic Management (3 Credit Hours)

This course is the capstone course of the MBA program. It takes a distinct upper-level management perspective and aims to align all internal business functions – production, finance, accounting, marketing, etc. – with the external environment the company operates in order to ensure that organizational goals are accomplished efficiently. It also discusses how long-term value creation is affected by a firm's expansion within and beyond its current markets and industries.

Prerequisites: ACCT 645 OR ACCT 609 and ACCT 611 OR instructor or departmental approval

Pre- or corequisite: FIN 660 or FIN 613 AND OPMT 670 or OPMT 615 OR instructor or departmental approval

MGMT 695 Selected Topics in Management (1-3 Credit Hours)

Study designed for students who have one or more of the required courses waived, or for students desiring additional work in an area of particular interest in management.

Prerequisites: permission of the department chair and the graduate program director

MGMT 721 International Strategic Management (3 Credit Hours)

This course deals with various strategic options available to businesses operating in an international environment. It explores the literature and case materials on multinational companies and the theories and concepts relevant to the analysis of international strategic decisions.

Prerequisites: Permission of the instructor

MGMT 750 Business Policy and Strategy (3 Credit Hours)

A capstone integrative course on strategy formulation and implementation.

Prerequisites: permission of the graduate program director

MGMT 821 International Strategic Management (3 Credit Hours)

This course deals with various strategic options available to businesses operating in an international environment. It explores the literature and case materials on multinational companies and the theories and concepts relevant to the analysis of international strategic decisions.

Prerequisites: Permission of the instructor

MGMT 830 Strategic Human Resource Management (3 Credit Hours)

The course examines strategic issues in human resource management. The course will examine how strategies and policies in areas such as recruitment, selection, training, career development, performance management and international human resource management influence firm performance. Other topics of current research may also be included.

MGMT 835 Organization Theory (3 Credit Hours)

This course examines theories and empirical research on organizations and their environment. Topics would include organization design, structure, decision making, change and adaptation. Other topics of current research may also be included.

MGMT 836 Corporate Strategy Seminar (3 Credit Hours)

This course introduces strategic management students to the different theories, concepts, and phenomena in the field of corporate strategy.

MGMT 837 Business Strategy Seminar (3 Credit Hours)

This course introduces a variety of explanations for organizational competitive advantage as the ultimate outcome of business strategy. This course includes reading assignments, discussions and student presentations directed to developing novel research ideas.

MGMT 838 Strategic Entrepreneurship Seminar (3 Credit Hours)

This doctoral seminar will expose students to the theory and research behind new business creation and corporate entrepreneurship and it will prepare students to do rigorous and relevant research in this particular topic.

Prerequisites: MGMT 835

MGMT 890 Advanced Topics in Strategy (3 Credit Hours)

This course critically evaluates the classical debates and viewpoints within strategic management research. In addition the course would cover the emerging theoretical and methodological areas in strategic management research. Finally, the course would review in depth the research on contemporary issues in strategy. The objective of the course is to enable students to become independent scholars in the area of strategic management.

MGMT 891 Strategic Entrepreneurship Seminar (3 Credit Hours)

This doctoral seminar will expose students to the theory and research behind strategic entrepreneurship and prepare them to do rigorous and relevant research in this field of study.

Prerequisites: MGMT 835

MGMT 896 Selected Topics in Management (1-3 Credit Hours)

Advanced study in selected topics in management planning, strategy and policy under the direction of one or more faculty in the Management Department.

MGMT 899 Dissertation (1-9 Credit Hours)

Ph.D.-level research and writing of dissertation.

MGMT 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

MHPE - Medical and Health Professions Education

MHPE 606 Mixed Methods Research Design (3 Credit Hours)

Learners will explore general qualitative/quantitative research methods used in medical and health professions education research. The course will include investigation of quantitative and qualitative research approaches, sampling techniques, validity, and ethical considerations. The goal of the course is acquisition of skills needed to understand, plan, manage, analyze, and interpret studies where data is mixed (qualitative and quantitative).

MHPE 608 Contexts of Teaching and Learning (3 Credit Hours)

The goal of the course is to provide students with a strong background for designing educational experiences, planning educational programs, and conducting research on a variety of teaching and learning-related questions. Application of principles to medical and health professions education is expected. The course is designed to help participants consider the meaning of learning and the various contextual factors that influence the learning process in higher education. This course explores the application of science in the design of learning environments. Students evaluate the contexts of educational environments and use insights to improve practices, as well as the technologies higher education institutions use to document and assess learning.

MHPE 609 Designing Educational Experiences (3 Credit Hours)

This course prepares students with theoretic foundations and best practices to plan, apply, design, and evaluate appropriate instructional methods to enhance learner achievement. Application of principles to Medical & Health Professions Education is expected. Learners will analyze a wide range of instructional methods and then design an array of formative and summative assessments utilizing evidence-based assessment instruments and techniques.

MHPE 613 Community Partnerships in Health Professions Education (3 Credit Hours)

This course is designed to prepare health professions educators and administrators to embrace and model a commitment to service through effective community engagement practices. During this course, students will explore, analyze, and discuss partnership frameworks with diverse stakeholders including state and federal agencies, nonprofit organizations, businesses, and other educational institutions, and will apply philosophies and techniques for effective cross-sector collaboration.

MHPE 614 Organization and Management (3 Credit Hours)

Learners will research and understand higher education organizational structures and issues of oversight and will develop an understanding of how colleges and universities are governed. Who are the key decision makers at these institutions? What roles do various constituents such as the board members, presidents, deans, faculty and staff, and students play? Learners will explore how organizational structures, culture, context, and characteristics influence institutional governance and decision making. Learners will become knowledgeable about the history of and current trends in the management and operations of higher education institutions with a focus on academic health centers. This course will make use of current research literature, debate, and discussion of current events as a means to better understand higher education organization and management.

MHPE 615 Current Issues in Higher Education (3 Credit Hours)

Learners will explore issues of contemporary concern among higher education practitioners, faculty, and administrators. The course utilizes a historical perspective to establish the background for the discussion of the issues influencing higher education today. Topics related to academic and student affairs in academic health centers will be identified and examined. Coursework and readings provide a nuanced understanding of differing perspectives on complex issues. Learners will utilize higher education research to examine issues, identify pros and cons, and challenge assumptions. Doctoral-level writing is emphasized.

MHPE 669 Practicum (3 Credit Hours)

The practicum provides students with an in-depth supervised opportunity to apply knowledge and skills gained in the MHPE core teaching courses. This virtual practicum requires students to work individually to develop all aspects of an online course. Students will engage through media creation, planning for diverse course audiences, and peer review.

MHPE 690 Capstone (1 Credit Hour)

The capstone experience provides the learner the opportunity to present a program portfolio demonstrating achievement of all program goals and student learning outcomes.

MHPE 702 Program Evaluation (3 Credit Hours)

Program evaluation is a relatively young discipline in the formal sense of systematically collecting data for the purpose of informing decision-making. Program evaluation builds on many other disciplines to include social sciences, education, and statistics. In this course, we will explore the philosophical and theoretical roots of evaluation and the bridge between those roots and evaluation practice. In particular, we will discuss the meaning of program evaluation and its historical roots; philosophical and theoretical orientations that provide guidance for thinking about evaluation; examine program evaluation approaches specific to health professions education; and finally, we will cover the specifics of planning, implementing, and managing the evaluation process.

MHPE 704 Simulation in Healthcare (3 Credit Hours)

This course will examine the use of medical modeling and simulation as instructional and assessment tools of the modern health professions educator. Participants will explore the key features of simulation-based healthcare education that lead to effective learning, evaluate the range of simulation methodologies, and critically review current research and trends in simulation-based education and assessment. Participants will apply learning with a systematic instructional design process to develop a practical simulation-based teaching and/or assessment project by the end of the course.

MHPE 705 Applied Statistics (3 Credit Hours)

Learners will gain an understanding of the statistical tests used in medical and health professions education research. The focus is on understanding why a particular test is used, and how to interpret and apply results obtained from each test. Utilizing SPSS statistical analysis software, learners will perform all statistical procedures related to descriptive statistics and inferential statistics such as t-tests, analysis of variance, correlation, regression, and chi-square. Visual representation of data will also be covered.

MHPE 715 Educational Scholarship Method (3 Credit Hours)

Within the context of Boyer's four models of scholarship, this course provides the knowledge necessary to understand the purposes and processes of research using an expanded definition of scholarship that goes beyond the scholarship of discovery (research) to include the scholarship of integration, the scholarship of application, and the scholarship of teaching. The course will also introduce students to quantitative and qualitative design approaches, examine foundational issues of research from both quantitative and qualitative perspectives, and build skills for interpreting and evaluating research including criteria for evaluating empirical studies, particularly in the social sciences and in education.

MHPE 720 Exploring Paradigms in Higher Education (3 Credit Hours)

Learners will reflect upon and articulate an understanding of representation of individuals (primarily students and faculty) from all backgrounds in institutions of higher education. The discourse that has shaped education (knowledge making) in the United States and its impact on higher education paradigms will be explored. Learners will research and determine ways to address issues impacting quality of education and will develop effective teaching strategies illustrating best practices in establishing ideal learning environments. Historical and dynamic, 'real-time' literature and media will be explored and further enriched through our active participation.

MHPE 725 Business of Simulation (3 Credit Hours)

Today's simulation centers are analogous to small businesses, in that they involve small teams leveraging limited resources to support the mission critical needs of clients (students, faculty, residents, practicing clinicians, etc.). Like small businesses, it is critical for simulation leaders to understand and manage both immediate and long term resource requirements and planning considerations be they funding, staff, equipment, or space related. This course explores the core business principles required to help leaders both better manage their center and develop or hone their business model for both internal and external opportunities.

MHPE 803 Teaching Anatomy (3 Credit Hours)

Teaching anatomy.

MHPE 804 Educational Scholarship Seminar (1 Credit Hour)

The goals of the educational scholarship seminar are to explore opportunities for educational scholarship within medical and health professions education and to provide you with the tools to connect foundational research skills with your research interest in order to successfully complete a contemporary scholarly project. Proposal writing, literature review, and manuscript publication are core topics. The course will be repeated for a total of three credits.

MHPE 806 Mixed Method Research Design (3 Credit Hours)

Learners will explore general qualitative/quantitative research methods used in medical and health professions education research. The course will include investigation of quantitative and qualitative research approaches, sampling techniques, validity, and ethical considerations. The goal of the course is acquisition of skills needed to understand, plan, manage, analyze, and interpret studies where data is mixed (qualitative and quantitative).

MHPE 807 Advanced Research Methods (3 Credit Hours)

This course equips students with skills necessary to conduct doctoral research concentrating on major methodological and analytic traditions, building on the context of educational research established in introductory courses. Both quantitative and qualitative methodologies are included, including topics on ANOVA, Regression, and Coding with a special focus on analysis, interpretation, and presentation of findings.

MHPE 808 Contexts of Teaching and Learning (3 Credit Hours)

The goal of the course is to provide students with a strong background for designing educational experiences, planning educational programs, and conducting research on a variety of teaching and learning-related questions. Application of principles to medical and health professions education is expected. The course is designed to help participants consider the meaning of learning and the various contextual factors that influence the learning process in higher education. This course explores the application of science in the design of learning environments. Students evaluate the contexts of educational environments and use insights to improve practices, as well as the technologies higher education institutions use to document and assess learning.

MHPE 809 Designing Educational Experiences (3 Credit Hours)

This course prepares students with theoretic foundations and best practices to plan, apply, design, and evaluate appropriate instructional methods to enhance learner achievement. Application of principles to Medical & Health Professions Education is expected. Learners will analyze a wide range of instructional methods and then design an array of formative and summative assessments utilizing evidence-based assessment instruments and techniques.

MHPE 810 Practicum (3 Credit Hours)

The practicum provides students with an in-depth supervised opportunity to apply knowledge and skills gained in the MHPE core teaching courses. This virtual practicum requires students to work individually to develop all aspects of an online course. Students will engage through media creation, planning for diverse course audiences, and peer review.

MHPE 813 Community Partnerships in Health Professions Education (3 Credit Hours)

This course is designed to prepare health professions educators and administrators to embrace and model a commitment to service through effective community engagement practices. During this course, students will explore, analyze, and discuss partnership frameworks with diverse stakeholders including state and federal agencies, nonprofit organizations, businesses, and other educational institutions, and will apply philosophies and techniques for effective cross-sector collaboration.

MHPE 814 Organization and Management (3 Credit Hours)

Learners will research and understand higher education organizational structures and issues of oversight and will develop an understanding of how colleges and universities are governed. Who are the key decision makers at these institutions? What roles do various constituents such as the board members, presidents, deans, faculty and staff, and students play? Learners will explore how organizational structures, culture, context, and characteristics influence institutional governance and decision making. Learners will become knowledgeable about the history of and current trends in the management and operations of higher education institutions with a focus on academic health centers. This course will make use of current research literature, debate, and discussion of current events as a means to better understand higher education organization and management.

MHPE 815 Current Issues in Higher Education (3 Credit Hours)

Learners will explore issues of contemporary concern among higher education practitioners, faculty, and administrators. The course utilizes a historical perspective to establish the background for the discussion of the issues influencing higher education today. Topics related to academic and student affairs in academic health centers will be identified and examined. Coursework and readings provide a nuanced understanding of differing perspectives on complex issues. Learners will utilize higher education research to examine issues, identify pros and cons, and challenge assumptions. Doctoral-level writing is emphasized.

MHPE 820 Diversity in Higher Education (3 Credit Hours)

Learners will reflect upon and articulate an understanding of representation of individuals (primarily students and faculty) from diverse backgrounds in institutions of higher education. The social, legal, and political discourse that has shaped education (knowledge making) in the United States and its impact on diversity in higher education will be explored. Learners will research and determine ways to address issues such as equity, bias, and access to high quality education and develop effective teaching strategies illustrating best practices in establishing ideal learning environments. Historical (seminal texts dating back early as 1900) and dynamic, 'real-time' literature and media will be explored and further enriched through our active participation. Therefore, you are advised to follow the course through Blackboard (particularly Course Materials and Discussion Board) as assignments, requirements, and information may be updated.

MHPE 825 Data-based Decision Making (3 Credit Hours)

Learners will gain a perspective on institutional research and data-driven decision making by exploring real-world institutional problems. The goal of the course is to help the learner acquire skills in asking data-driven questions, collecting and preparing data, mining data for patterns, developing institutional knowledge, and creating real predictive models.

MHPE 830 Candidacy Seminar (3 Credit Hours)

This course is designed to thoroughly evaluate the learner's knowledge of medical and health professions education and their concentration using combined written and oral evaluation strategies. Students must complete the Comprehensive exam and write and present a preliminary dissertation research proposal. Learners must successfully complete this course before moving on to complete their Dissertation research. Completion of all MHPE doctoral coursework is required prior to enrollment.

MHPE 835 Independent Study (3 Credit Hours)

Independent study.

MHPE 869 Practicum (3 Credit Hours)

The practicum provides students with an in-depth supervised opportunity to apply knowledge and skills gained in the MHPE core teaching courses. This virtual practicum requires students to work individually to develop all aspects of an online course. Students will engage through media creation, planning for diverse course audiences, and peer review.

MHPE 900 Research (2-6 Credit Hours)

Work on dissertation under the direction of the dissertation chair. Students will work with Dissertation Chairs to allocate MHPE 900 credit and may graduate in any semester they are ready for dissertation defense. Completion of all MHPE830 Candidacy Seminar is required prior to enrollment in MHPE 900 and 905. Students who do not fulfill all dissertation requirements prior to the date designated in the Student Handbook will continuously enroll in MHPE 905 Research Continuance (1 credit) each term until which time the dissertation is successfully defended.

MHPE 905 Research Continuance (1-2 Credit Hours)

Work on dissertation under the direction of the dissertation chair. Students will work with Dissertation Chairs to allocate MHPE 900 credit and may graduate in any semester they are ready for dissertation defense. Completion of all MHPE830 Candidacy Seminar is required prior to enrollment in MHPE 900 and 905. Students who do not fulfill all dissertation requirements prior to the date designated in the Student Handbook will continuously enroll in MHPE 905 Research Continuance (1 credit) each term until which time the dissertation is successfully defended.

MKTG - Marketing

MKTG 603 Marketing Management (3 Credit Hours)

Fundamentals of marketing (including market research, product design, distribution, pricing and promotion of goods, services, people, places and ideas) with case analyses to clarify applications.

MKTG 621 Managerial Problems in Marketing Strategy (3 Credit Hours)

Lecture, case analysis and discussion of marketing from the business executive's viewpoint. Recent developments in marketing and related disciplines and their application in management. Readings, case analysis, discussion.

Prerequisites: MKTG 603 or MKTG 608 or instructor permission

MKTG 625 Marketing Research Methods and Analysis (3 Credit Hours)

This course examines the various methods of marketing research design, while covering experimental methods, sampling procedures, measurement techniques, and other methodological problems. The student is introduced to data analysis and statistical modeling programs.

Prerequisites: MKTG 603 or MKTG 608 and BNAL 606 or instructor permission

MKTG 628 Marketing of Services (3 Credit Hours)

This course examines the application of marketing principles and techniques to service organizations. Topics covered include the nature of services, distribution, and promotion considerations. Class discussion revolves around a textbook, cases, and outside readings. Students take part in a major group project which will involve the development of a marketing plan for a service organization.

Prerequisites: MKTG 603 or MKTG 608 or instructor permission

MKTG 630 Ethics and Marketing Decision-Making (3 Credit Hours)

Marketers, probably more than other professionals, often are faced with decisions involving an ethical issue. This course has the following objectives: 1) to examine the ethical decision-making process of marketing professionals, 2) to examine the major ethical issues confronting marketers, 3) to provide frameworks to help resolve the ethical dimensions of marketing decisions, and 4) to provide experience in making marketing decisions that involve ethical dilemmas through the use of case studies.

Prerequisites: MKTG 603 or MKTG 608 or instructor permission

MKTG 640 Global Marketing Management (3 Credit Hours)

Examines the global environment of business and its potential effects on marketing principles and practices. The course will include the effect of culture on marketing mix strategies.

Prerequisites: MKTG 603 or MKTG 608 or instructor permission

MKTG 650 Marketing on the Internet (3 Credit Hours)

Course examines the application of marketing theories to the internet.

Topics include internet marketing strategy, electronic commerce, web page development, and the impact of the internet in the international marketplace.

Prerequisites: MKTG 603 or MKTG 608 or instructor permission

MKTG 660 Advertising and Integrated Marketing Communications (3 Credit Hours)

Introduces students to the concepts of integrated marketing communications (IMC). Students will learn how to formulate a firm's marketing communication strategy from an integrated perspective, become familiar with the various tools used in IMC programs, and develop necessary skills to develop an IMC plan for a business. Topics covered in the course include the role of the IMC in the marketing process, the IMC plan development process, the components of IMC media planning and budgeting for IMC, creative strategies, and assessment of the effectiveness of an IMC campaign.

Prerequisites: MKTG 603 or MKTG 608 or instructor permission

MKTG 668 Marketing Internship (1-3 Credit Hours)

Internship in the field of marketing, applying theories, concepts, and marketing tools in a business environment.

Prerequisites: MKTG 603 or MKTG 608, graduate standing, and instructor permission

MKTG 680 Marketing and Customer Value Management (3 Credit Hours)

This course introduces students to the fundamental concepts and management issues associated with marketing and customer value management. The focus will be translating marketing analyses and marketing research into marketing strategy and market strategy implementation elements. Cases will be used to highlight applications and develop analytical, critical-thinking, and communications skills to prepare students for marketing decision-making.

Prerequisites: Admission to the MBA program OR approval by the MBA program office/instructor

MKTG 696 Selected Topics in Marketing (1-3 Credit Hours)

Study designed for students who have had one or more of the required courses waived, or for students desiring additional work in a marketing area of particular interest.

Prerequisites: permission of the graduate program director

MKTG 801 Seminar in Marketing Theory: History and Current Topics (3 Credit Hours)

This course focuses on theory development in marketing from the 1940s to the latest publications in marketing journals. The topics covered include philosophy of science, truth in research, the development of marketing theory and practice, and the current direction in marketing theory and research opportunities.

Prerequisites: MKTG 603

MKTG 802 Seminar in Marketing Concepts and Issues (3 Credit Hours)

This course examines the current academic research trends in the different functional areas of the marketing discipline. Topics covered include promotional theory, pricing theory, distribution theory, product theory, marketing strategy theory, marketing ethics, and multinational marketing.

MKTG 803 Seminar in Consumer Behavior (3 Credit Hours)

The purpose of this course is to provide a comprehensive and up-to-date understanding of the major research work carried out in consumer behavior. It examines major psychological constructs and phenomena related to consumer behavior and introduces students to various research approaches to consumer behavior issues.

Prerequisites: MKTG 603

MKTG 813 Fundamentals of Survey Research (3 Credit Hours)

This course focuses on the fundamental issues associated with survey research as found in the marketing/management disciplines. The topics covered are experimental and quasi-experimental designs, analysis of data from experimental designs, questionnaire design and refinement, and scale development.

Prerequisites: BNAL 711/BNAL 811

MKTG 814 Seminar in Advanced Marketing Methodology (3 Credit Hours)

This course examines the design, analysis, and implementation of marketing research methods along with advanced statistical techniques. This is an integrative capstone course for the marketing research doctoral sequence of courses. The focus is on ensuring that the marketing academic understands all aspects of data analysis and design issues.

Prerequisites: BNAL 711, BNAL 712 and MKTG 813

MKTG 826 Seminar in International Marketing Problems (3 Credit Hours)

An analysis of planning, organization, and control functions of multinational marketing operations and how marketing procedures need to be developed/adapted for effective pursuit of business opportunities in other countries.

Prerequisites: MKTG 603

MKTG 827 Seminar in Marketing Planning and Strategy (3 Credit Hours)

Focus on contemporary marketing practice and provides opportunity to acquire a comprehensive understanding of the marketing planning process and the need for development of sound marketing strategy. Marketing goals, strategies, and tactics are examined in detail.

Prerequisites: MKTG 603

MKTG 895 Selected Topics in Marketing (3 Credit Hours)

Designed to provide the advanced student with an opportunity to study independently or in small groups and investigate specific topics of current interest in the field of marketing.

Prerequisites: Ph.D. standing and permission of the chair and coordinator

MKTG 899 Dissertation Research (1-12 Credit Hours)

1-12 credits per semester with limitation of 24 credits.

Prerequisites: advanced standing in Ph.D. program

MKTG 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

MLAS - Laboratory Animal Science

MLAS 602 Laboratory Animal Husbandry, Care, & Ethics (3 Credit Hours)

This course will discuss husbandry practices, proper nutrition and enrichment requirements for different species; environmental parameters, such as proper housing, temperatures, humidity and lighting. Humane handling, restraint and overall well-being of laboratory animals will also be covered.

MLAS 603 Journal Club (1 Credit Hour)

This course will review the selected publications in related fields such as animal models in research, new technologies, etc.

MLAS 604 Diseases of Lab Animals I (3 Credit Hours)

This course will cover the biology, husbandry, diseases, pathology, treatments and main research uses of main laboratory animal species.

MLAS 606 Anesthesia & Surgery (2 Credit Hours)

This course will review techniques and procedures used in surgery and anesthesia, including instruments and equipment preparation and identification, handling of instruments and supplies during surgery, anesthesia induction and monitoring, post-surgical care, clean up and surgical record keeping.

MLAS 608 Internship (2 Credit Hours)

During this course, students will have hands-on experience on various aspects and techniques and on multiple laboratory animal species. This course is for one week (40 hours) on the EVMS campus in Norfolk, Virginia.

MLAS 613 Comparative Anatomy & Physiology (4 Credit Hours)

This course will cover anatomy and physiology of laboratory animals including study of body systems such as skeletal, muscular, circulatory, digestive, nervous, respiratory, reproductive and special sense organs and principles of diseases.

MLAS 614 Applied Biostatistics and Research Design (3 Credit Hours)

This course will cover the fundamentals of research design, including the use of literature search, the formulation of testable hypotheses, selection of the appropriate methodology and statistics to evaluate these hypotheses and the generation and interpretation of experimental outcomes. Students will learn to critique published studies, as well as to create and evaluate their own studies and protocols.

MLAS 705 Diseases of Lab Animals II (3 Credit Hours)

This course will cover the biology, husbandry, diseases, pathology, treatments and main research uses of main laboratory animal species.

MLAS 709 Biotech & Diagnostic Tech (3 Credit Hours)

This course will cover various topics such as molecular analysis and detection systems including ELISA, PCR and real time PCR, basics of cell culture, laboratory blood, urine processing and basics of imaging techniques such as ultrasound, etc.

MLAS 711 Facility Management (3 Credit Hours)

This course provides both technical and Non-technical skills necessary for the successful laboratory animal facility managers such as; understanding of facility equipment, personnel management and scheduling, supply procurement, space allocation, animal production management, communication with researchers and senior management, conflict resolution, hiring and firing, critical thinking, problem solving, negotiation, finance/budgeting, and vendor management skills.

MLAS 712 Graduate Seminar (2 Credit Hours)

During this course students will be assigned to one topic of interest which will be presented to the whole group. Students will review the recent publications in their assigned topic and with recommendation and suggestions of their selected expert mentors, will prepare and present their presentation.

MLAS 715 Laboratory Animal Behavior and Behavioral Management (1 Credit Hour)

This course will provide students with behavioral biology of species commonly used in laboratories. The course will also cover behavioral management, including enrichment and positive reinforcement training and will introduce students to some behavioral tests utilized to model human behavior.

MLAS 716 Cryopreservation (1 Credit Hour)

Cell freezing is now a well-established laboratory activity in both clinical and research facilities. This course is designed to teach technically complex process of cryopreservation by explaining the procedure of cryopreservation (freezing) of cells.

MLS - Medical Laboratory Science

MLS 503 Management in the Clinical Setting (3 Credit Hours)

A course concerned with organization and management in the clinical setting including personnel supervision, planning, equipment justification, quality assurance, data processing, budgeting, fiscal techniques, marketing, regulatory agencies, educational methodologies, current issues, as well as legal and ethical considerations.

MLS 520 Blood Collection Techniques (2 Credit Hours)

Laboratory methods in the procurement of blood by capillary, venipuncture and arterial draws, analytical variables, special phlebotomy tests, isolation techniques, safety, forensic, molecular, legal and ethical implications, pediatric, geriatric, and compromised patient concerns. All students must submit to venipuncture by fellow students.

Prerequisites: Limited to students in the Medical Laboratory Science major or minor (must be fully declared into degree program); C or better in BIOL 250 and BIOL 251 or equivalent (BIOL 240 and 241) or permission of the instructor

MLS 540 Statistical Applications and Data Analysis in the Clinical Laboratory (3 Credit Hours)

Topics include review of basic statistics used in the laboratory; use of statistics for quality control, reference range determination, method comparisons, test utility assessment, techniques for searching the literature and assessing quality and applicability of published studies; and data organization and retrieval via queries. Students will perform projects, preferably using actual laboratory data, that relate to lecture topics.

Prerequisites: STAT 130M or equivalent; Limited to graduate students with permission from the instructor and/or MLS Program Director

MLS 568 Phlebotomy Internship (2 Credit Hours)

A 120-hour clinical internship for those desiring to qualify for the ASCP certification exam in phlebotomy.

Prerequisites: C or better in MLS 520

MLS 595 Special Topics in Medical Laboratory Science (1-3 Credit Hours)

The advanced study of selected topics within the medical field.

Prerequisites: Limited to Medical Laboratory Science or Medical Laboratory Science Degree Completion majors (intended or declared) or permission of the instructor/program director

MLS 597 Directed Study in Medical Laboratory Science (1-3 Credit Hours)

Supervised experience in medical laboratory science specialties, allowing students to pursue areas of interest under faculty direction.

Prerequisites: Limited to Medical Laboratory Science or Medical Laboratory Science Degree Completion majors (intended or declared) or permission of the instructor/program director

MPAS - Physician Assistant

MPAS 601 Introduction to the PA Profession (3 Credit Hours)

The purpose of this course is to provide the student with a future provider's perspective of the Physician Assistant (PA) profession and the U.S. health care system. The history, education and professional characteristics of the Physician Assistant profession are explored. The course is designed to engaged students in the formation of a professional identity and prepare them for a lifetime of professional wellness.

MPAS 602 Business of Medicine (1 Credit Hour)

The purpose of this course is to provide the student with a future provider's perspective of the U.S. health care system. The history, education and professional characteristics of the health care system and members of the healthcare system are explored. This course also provides students with a basic understanding of the tenets and history of public health and how clinicians interact with the Public Health Systems.

MPAS 603 Introduction to Medical Diagnostics (0.5 Credit Hours)

This course will introduce the fundamentals and foundational skills of clinical ultrasonography.

MPAS 604 Legal & Ethical Issues in Medicine (2 Credit Hours)

The history, role, practice scope, and professional policies of the physician assistant in health care are explored. This course also presents an interactive and strategic examination of the evolving American health care system, the issues and controversies relative to health care reforms, and the growing impact of managed care.

MPAS 615 Anatomy for Health Professions (5 Credit Hours)

A study and exploration of the human cadaver through lecture, lab dissection and pro-section.

MPAS 619 Physiology and Pathophysiology (4 Credit Hours)

The purpose of this course is to provide advanced coverage of human pathophysiology through the analysis of diseased and other abnormal physiological conditions.

MPAS 620 Foundations of IPE (0.5 Credit Hours)

Introduce interprofessional roles in health care in order to enable effective collaboration for a safe, effective, and value-driven healthcare delivery system by emphasizing teams of professionals working together in order to benefit patients and improving health outcomes.

MPAS 623 Medical Diagnostics I (3 Credit Hours)

This course introduces and assesses clinical competency of specified skills, diagnostic modalities, and interventions related to professional responsibilities and practices in patient care.

MPAS 624 Patient Counseling & Education (2 Credit Hours)

This course builds on knowledge gained in clinical science courses by providing the student with the skills necessary to educate patients about their disease processes, help patients become a partner in their own health care, and guide the patient toward health promoting behavior.

MPAS 625 Clinical Assessment & Reasoning I (3 Credit Hours)

Introduces the beginning practitioner to the skills of listening, communicating, data collecting and documenting patient encounters.

MPAS 628 Clinical Pharmacology I (3 Credit Hours)

Preparation for appropriate administration/prescription of medicines is accomplished through a study of drug classifications, pharmacodynamic actions, and rationale for therapeutic use of prescription and non-prescription medications.

MPAS 639 Introduction to Clinical Medicine I (5 Credit Hours)

This course is designed to lay the foundation for patient care through a comprehensive understanding of illness. This 3-course series in the medical sciences and related technologies addresses care of the adult, adolescent and pediatric patient beginning with common acute self-limited illnesses and progressing to more complex, well-defined chronic disorders.

MPAS 640 Practicum for IPE (0.5 Credit Hours)

Work in Interprofessional Teams to help address the needs of the individual patient and the community in patients who may have significant health disparities.

MPAS 643 Medical Diagnostics II (3 Credit Hours)

This course introduces and assesses clinical competency of specified skills, diagnostic modalities, and interventions related to professional responsibilities and practices in patient care.

MPAS 644 Introduction to Epidemiology and Evidence-Based Medicine (2 Credit Hours)

Introduces population epidemiology and decision-making theory, followed by an introduction to and application of the principles of evidence-based medicine to patient care.

MPAS 645 Clinical Assessment & Reasoning II (4 Credit Hours)

This course introduces the use of examination techniques and equipment used during a patient-centered physical examination and emphasizes the relationship of the exam to the history to aid in developing competency and clinical judgment in clinical assessment. It also promotes a working knowledge base for integrating information into decision-making, diagnosis hypothesis, clinical reasoning, and data resolution skills through cooperative learning strategies and selected clinical topics.

MPAS 648 Clinical Pharmacology II (3 Credit Hours)

Preparation for appropriate administration/prescription of medicines is accomplished through a study of drug classifications, pharmacodynamic actions, and rationale for therapeutic use of prescription and non-prescription medications.

MPAS 649 Introduction to Clinical Medicine II (5 Credit Hours)

Designed to lay the foundation for patient care through a comprehensive understanding of illness, this 3-course series in the medical sciences and related technologies addresses care of the adult, adolescent and pediatric patient beginning with common acute self-limited illnesses and progressing to more complex, well-defined chronic disorders.

MPAS 663 Medical Diagnostics III (2 Credit Hours)

This course introduces and assesses clinical competency of specified skills, diagnostic modalities, and interventions related to professional responsibilities and practices in patient care.

MPAS 664 Psychosocial Elements of Wellness (2 Credit Hours)

The societal determinants of health, illness and disease are explored as a continuum of community care, a promotion of cultural sensitivity, and enrichment of the clinician-patient relationship.

MPAS 665 Clinical Assessment & Reasoning III (5 Credit Hours)

This course integrates the patient-centered history-taking and physical examination skills presented in Clinical Assessment and Reasoning I and II and emphasizes differential formulation in the context of problem-focused encounters. A systematic approach is used in studying the comprehensive and problem-oriented clinical assessment of various patient populations within simulated cases.

MPAS 688 Clinical Pharmacology III (2 Credit Hours)

Preparation for appropriate administration/prescription of medicines is accomplished through a study of drug classifications, pharmacodynamic actions, and rationale for therapeutic use of prescription and non-prescription medications.

MPAS 689 Introduction to Clinical Medicine III (5 Credit Hours)

Designed to lay the foundation for patient care through a comprehensive understanding of illness, this 3-course series in the medical sciences and related technologies addresses care of the adult, adolescent and pediatric patient beginning with common acute self-limited illnesses and progressing to more complex, well-defined chronic disorders.

MPAS 694 Directed Medical Studies (1 Credit Hour)

Directed medical studies.

MPAS 701 Introduction to Clinical Practice (0 Credit Hours)

This seminar course provides an introduction to the clinical phase of the program. In lecture and lab sessions, students will examine documentation, billing and coding, use of technology in clinical practice, and have an opportunity to revisit suturing and clinical skills.

MPAS 702 Interprofessional Practice (1 Credit Hour)

Observation and application of interprofessional concepts within interprofessional health care teams in clinical practice to enable effective collaboration for a safe, effective, and value-driven healthcare delivery system by emphasizing teams of professionals working together in order to benefit patients and improving health outcomes. The course extends through the Clinical Year.

MPAS 710 SCPE in Family Medicine (3 Credit Hours)

The supervised clinical practice experience (SCPE) in Family Medicine is designed to prepare a student to function in an ambulatory setting in a role appropriate to a primary care physician assistant (PA).

MPAS 720 SCPE in Pediatric Medicine (3 Credit Hours)

The supervised clinical practice experience (SCPE) in Pediatric Medicine is designed to prepare a student to function in an ambulatory setting in a role appropriate to a primary care physician assistant (PA).

MPAS 730 SCPE in General Internal Medicine (3 Credit Hours)

The supervised clinical practice experience (SCPE) in Internal Medicine is designed to prepare a student to function in an Internal Medicine setting in a role appropriate to a primary care physician assistant (PA).

MPAS 740 SCPE in Emergency Medicine (3 Credit Hours)

The supervised clinical practice experience (SCPE) experience in Emergency Medicine is designed to prepare a student to function in an ambulatory setting in a role appropriate to a physician assistant (PA) practicing in Emergency Medicine.

MPAS 750 SCPE in General Surgery (3 Credit Hours)

The supervised clinical practice experience (SCPE) experience in Surgery is designed to prepare a student to function in an ambulatory or inpatient setting in a role appropriate to a physician assistant (PA) practicing in surgery.

MPAS 760 SCPE in Womens Health (3 Credit Hours)

The supervised clinical practice experience (SCPE) in Women's Health is designed to prepare a student to function in an outpatient and/or inpatient setting in a role appropriate to a physician assistant (PA) practicing in women's health.

MPAS 770 SCPE in Psychiatry & Behavioral Health (3 Credit Hours)

The supervised clinical practice experience (SCPE) in Psychiatry and Behavioral Health is designed to prepare a student to function in various clinical settings and gain exposure to behavioral health.

MPAS 780 SCPE in Elective I (3 Credit Hours)

This may consist of one 5-week elective in a chosen area of medicine.

MPAS 785 SCPE in Elective II (3 Credit Hours)

This may consist of one 5-week elective in a chosen area of medicine.

MPAS 794 Senior Seminar (5 Credit Hours)

The purpose of this course is to prepare the student for transition to a practicing PA through lectures, small group activities and oral presentations. Students will be required to participate in comprehensive board review sessions designed for certification. At the conclusion of the course, students will be required to pass a summative evaluation designed to assess overall performance and preparation for clinical practice.

MPH - Master of Public Health

MPH 600 Introduction to Public Health (1 Credit Hour)

This course provides an introduction to the multidisciplinary field of public health. Students will learn the history, core functions and roles of the U.S. public health system through grounding in the 12 foundational public health knowledge areas.

MPH 610 Introduction to Public Health (1 Credit Hour)

This introductory readings course provides students with an overview of the public health sector from a local, national, and global perspective. The history of public health and recent events leading to a complete transformation of service delivery are two of the topics presented.

MPH 611 Social and Behavioral Sciences for Public Health (3 Credit Hours)

This is a social and behavioral sciences core course for the MPH program. Psychological, social, and cultural concepts and models relevant to health and disease in society are reviewed and critiqued. Students will learn about different theoretical perspectives and how to apply appropriate social and behavioral models to public health programs. Students will learn how to select and apply appropriate social and behavioral models to the design of public health interventions and policies. The course will also cover existing social inequalities in health status related to race/ethnicity, social class, and gender, and the critical intersection between social risk factors, behavioral risk factors, and the development and implementation of public health interventions. Social ecological models that influence population health at multiple levels are emphasized.

MPH 612 Statistical Reasoning for Public Health (3 Credit Hours)

This course is designed for student majoring in public health and health-related disciplines. The course introduces basic concepts in biostatistics and fundamental methods in statistical analysis. Although formulae and computational elements will be incorporated into the lecture, the course is designed to teach students how to make informed decisions from a given set of data collected from a health research study. This process includes exploring data, reviewing all the underlying statistical assumptions, summarizing and analyzing the data using common descriptive and inferential statistical methods, and finally reporting and interpreting the statistical results. Students will utilize statistical software to perform data analysis and answer research questions. The overall goal of this course is to assist students to develop a process for critical statistical thinking that is important in many areas of scientific research.

MPH 613 Environment, Society, and Health (3 Credit Hours)

This course provides an introduction to 21st century environmental health science. In addition to covering some of the traditional environmental factors affecting the health of individuals and communities in the region, the nation, and around the world, the class familiarizes students with a broad range of contemporary and emerging environmental health challenges and issues. In addition, through a series of guest presentations by experienced practitioners in the field, the course introduces students to the “real world” of environmental health practice.

MPH 615 Systems Thinking and Health Management (3 Credit Hours)

Students will learn the practice of systems thinking, which includes the ability to integrate multiple perspectives and synthesize them into a framework or model that encompasses the various ways in which a system might react to policy choices.

MPH 616 Research Methods in Public Health (3 Credit Hours)

This is a foundational course in research methods that will provide an overview of the basic principles of research design, methods, measurements, data collection and data management in the field of public health. Students will learn the differences between quantitative, qualitative and mixed methods approaches to public health research, as well as how to formulate and evaluate research questions. The overall goal of this course is to provide practical, step-by-step guidance to the research process under the scientific method framework.

Prerequisites: MPH 612 and HLSC 746

MPH 622 Environmental Health Law, Justice and Governance (3 Credit Hours)

This course surveys the basic legal concepts affecting environmental health services and program enforcement and administration. It is designed to provide a fundamental background of environmental and public health law for public health officers and other environmental health workers to fulfill their respective roles more successfully. Workplace occupational health and safety will not be addressed in depth in this course.

Pre- or corequisite: MPH 613

MPH 630 Health Communication and Social Marketing for Public Health (3 Credit Hours)

This course aims to provide students with a critical understanding of how social marketing offers a useful approach to address a variety of public health problems. It will emphasize social marketing within a broader strategic health communication framework. Students will learn how social marketing and strategic health communication can be applied effectively to address public health issues and how to design effective health communication programs.

Pre- or corequisite: MPH 611

MPH 632 Environmental and Occupational Health Risk Assessment (3 Credit Hours)

This course is an introduction to risk assessment, as applied to environmental and workplace hazards. It examines the fundamental concepts of risk. Students will learn the United States Environmental Protection Agency (USEPA) standard and advanced methodology for quantitative risk assessment including hazard identification, exposure assessment, dose-response modeling, risk characterization, and risk communication. Utilization of qualitative assessment methods and ecological risk assessment are also explored.

Pre- or corequisite: MPH 613

MPH 640 Health Disparities and Social Justice (3 Credit Hours)

This course provides an introduction to the topic of global health disparities through an in-depth examination and discussion of the relationship between social injustice and inequitable health outcomes. Students will be introduced to the social and environmental determinants of health disparities and the pathways and mechanisms leading to inequitable health outcomes in vulnerable groups, as well as strategies for addressing these determinants to improve health.

Pre- or corequisite: MPH 611

MPH 643 Principles of Toxicology (3 Credit Hours)

An introduction to the fundamentals of toxicology with emphasis on the interaction of environmental and industrial chemicals with humans are studied. Exposure, dose response, kinetics and distribution of toxicants, metabolism of toxic agents, factors that affect toxicity and introductory chemical carcinogenesis are discussed.

MPH 651 Health Promotion Theory and Practice (3 Credit Hours)

This course provides students with a comprehensive overview of the practical and theoretical principles and skills needed to plan, implement, and evaluate health promotion programs in a variety of settings. The course will help students apply constructs from theories to understand the determinants of health behaviors and emphasizes the importance of addressing health behavior change at the individual, interpersonal, organizational, community and societal levels of the social ecological model.

Pre- or corequisite: MPH 611

MPH 661 Program Planning and Evaluation (3 Credit Hours)

This course provides public health graduate students with a comprehensive overview of the practical and theoretical principles and skills needed to plan, implement, and evaluate health programs in a variety of settings.

Pre- or corequisite: MPH 611

MPH 669 Applied Practice Experience (1-3 Credit Hours)

This course provides students with an opportunity to engage in public health practice in the community or in a working environment. Applied practice experience (APE) is based on applied learning, problem-based and competency-linked activities. Students gain competence in public health practice relevant to the concentration area selected. The applied learning will require students to complete a project related to an actual public health issue that is a focus within a specific organization.

Pre- or corequisite: Approval of Practicum Director and/or Program Director

MPH 670 Applied Mixed-Methods Research in Health Promotion (3 Credit Hours)

Examines multicultural consideration across health promotion and public health domains, and developing a culturally sensitive and effective plan for health behavior change using mixed-methods research.

MPH 688 Grant Writing for Public Health Practice (3 Credit Hours)

This course covers issues and problems concerned with the development of grants and contracts as they relate to the health professions. The course focuses on the multiple roles of funding agencies and the importance of matching the interests of the grant seeker with the corresponding funding agency

MPH 689 Integrative Learning Experience (1-3 Credit Hours)

This is the culminating course for the MPH program. Students demonstrate an ability to integrate and synthesize foundational and concentration-specific competencies from their MPH program coursework. Students complete assignments that address timely public health issues culminating in high quality written products and an e-portfolio that demonstrate the analysis, synthesis and intersection of course work and concurrent practicum experiences. Students from all tracks are required to complete this course prior to graduation.

MPH 712 Applied Biostatistics (3 Credit Hours)

This course presents modern methods for analyzing data from epidemiologic and public health studies using the latest statistical methods. Emphasis will also be placed on technical and statistical report writing.

Pre- or corequisite: Satisfactory academic performance with B or above in MPH 746, MPH 612 and MPH 616 or approval from instructor or program director

MPH 713 Applied Statistical Programming (3 Credit Hours)

This course covers programming and computing techniques using contemporary statistical packages. Emphasis is placed on practical issues relating to organizing, modifying, and preparing data for analysis.

Pre- or corequisite: Satisfactory academic performance with B or above in MPH 746, MPH 612 and MPH 616 or approval from instructor or program director

MPH 716 Application of Epidemiological Methods (3 Credit Hours)

The course aims to prepare students with hands-on experience in producing common epidemiological measures while critically evaluating the quality of data and the design of epidemiological investigations.

Pre- or corequisite: Satisfactory academic performance with B or above in MPH 746, MPH 612 and MPH 616 or approval from instructor or program director

MPH 717 Epidemiology of Infectious Diseases: (3 Credit Hours)

This course focuses on the epidemiology of infectious diseases from a public health perspective. It applies traditional and contemporary epidemiological methods used to deal with infectious diseases.

Pre- or corequisite: Satisfactory academic performance with B or above in MPH 746, MPH 612 and MPH 616 or approval from instructor or program director

MPH 746 Epidemiology (3 Credit Hours)

This course examines epidemiology as a method for viewing inborn community health problems and as a body of knowledge derived from this method. Skills in using epidemiology as a method and as knowledge to solve community health problems will be included.

MPH 761 Advanced Quantitative Methods (3 Credit Hours)

This course adopts an applied approach to teaching health professions students the necessary competencies and skills in advanced quantitative methods. Topics include handling missing data, survey design and exploratory factor analysis, mediation and moderation analysis, and an introduction to confirmatory factor analysis and structural equation modeling (SEM).

Pre- or corequisite: MPH 612 and MPH 746

MPH 776 Global Health (3 Credit Hours)

This course will introduce the student to the political, social, cultural and ethical issues involved in disease prevention and health promotion globally. Specific emphasis will be on incidence/prevalence, morbidity/mortality, and identified health problems in specific regions and countries. This course will also identify international health prerogatives aimed at improving health status through education and intervention.

MPH 778 Global Environmental Health (3 Credit Hours)

The goal of this course is to guide students with a public health perspective to develop skills to identify and analyze environmental health problems globally. It is designed to provide knowledge on recognizing and evaluating major environmental health issues and risk factors in developed and developing countries by using group discussions and real-life case studies.

Pre- or corequisite: MPH 613

MPH 784 Creating Sustainable Environmental Futures (3 Credit Hours)

This course examines the interrelationships between individual and societal decisions and the global environment, and analyzes the consequences these interrelationships have for public health and sustainability. The course is organized into four in-depth modules: (1) toxic substances and environmental disasters, (2) food, sustainability, environmental quality and health, (3) climate, sea-level rise and public health, and (4) communities, sustainability and health. Students engage in an extensive examination of each area, analyze the public health implications, and consider various strategies for improving individual and population health, and enhancing sustainability, in the local area, the region, the nation and around the world.

MPHO - Master of Public Health

MPHO 600 Introduction to Public Health Practice (1 Credit Hour)

This course provides an introduction to the multidisciplinary field of public health. Students will learn the history, core functions, and roles of the US public health system through grounding in the 12 foundational public health knowledge areas.

MPHO 605 Introduction to Biostatistics for Public Health (3 Credit Hours)

This course introduces fundamental concepts in biostatistics. Students will learn how to analyze and interpret numeric data using statistical tools to investigate and evaluate public health issues.

MPHO 608 Environment and Public Health (3 Credit Hours)

This course provides an introduction to 21st century environmental health science and practice. In addition to covering foundational environmental issues affecting people's health, the class familiarizes students with contemporary environmental health challenges such as climate change, sea level rise, antibiotic resistance, food and sustainability, plastics and environmental health, disaster preparedness, lead poisoning, radiation safety and health, environmental justice, cultural competence, and environmental risk communication.

MPHO 610 Introduction to Public Health Practice (1 Credit Hour)

This introductory readings course provides students with an overview of the public health sector from a local, national, and global perspective. The history of public health and recent events leading to a complete transformation of service delivery are two of the topics presented.

MPHO 611 Social and Behavioral Sciences for Public Health (3 Credit Hours)

This course reviews and critiques psychological, social, and cultural concepts and models relevant to health and disease in society. Students will learn how to select and apply appropriate social and behavioral models to the design of public health interventions and policies. Existing social inequalities in health status related to race, social class, and gender will be explored, as will the intersection between risk factors and the development/implementation of public health interventions.

MPHO 612 Statistical Reasoning for Public Health (3 Credit Hours)

This course is an introduction to the use of statistics in the health field with emphasis on descriptive statistics, estimation, linear regression and contingency tables.

MPHO 613 Principles of Environmental Health Science (3 Credit Hours)

This course is an introduction to the chemical, physical and biological factors affecting human health and disease with emphasis on the skills to detect environmental factors in health problems and to determine methods of control to prevent disease and maximize environmental quality.

MPHO 614 Principles of Epidemiology (3 Credit Hours)

This course will introduce the principles and basic methods of epidemiology for applications in public health. These include measures of disease frequency and association, study design, sources of errors in epidemiological studies, validity and reliability of diagnostic and screening tests, causation, and outbreak investigations.

MPHO 616 Research Methods in Public Health (3 Credit Hours)

Public health professionals require skills to identify problems that face population groups, and to delineate ways to solve them. Often this necessitates conducting small- or large-scale investigations on their own, or as a member of a project team. The goal of this course is to provide practical, step-by-step guidance to the research process in public health.

MPHO 620 Health Management and Systems Thinking (3 Credit Hours)

In this course, students will review the structure and functions of American and international healthcare systems, public health practice, and managerial responsibilities. Additionally, this course will introduce students to the practice of systems thinking in public health and the influence of systems thinking on public health policy.

MPHO 622 Environmental Health Law, Justice and Governance (3 Credit Hours)

This course surveys the basic legal concepts affecting environmental health services and program enforcement & administration. It is designed to provide a fundamental background of environmental and public health law for public health officers and other environmental health workers to fulfill their respective roles more successfully.

MPHO 626 Effective Information Technology for Healthcare Organizations (3 Credit Hours)

This course provided the key concepts related to information technology within healthcare organizations. Students will learn how information technology is used as a tool to improve performance within health care organizations for positive health outcomes.

MPHO 627 Data Visualization (3 Credit Hours)

This course is intended to be a step-by-step introduction to the world of visual analytics and is designed for the beginner and intermediate uses of data visualization. The course will help students to understand and apply important concepts and techniques in data visualization, moving from simple to complex situations and combine them in interactive dashboards. Topics to be covered include data connection, different graphs and charts, quick table calculations, designing interactive dashboards, mapping, unions and joints.

MPHO 630 Health Communication and Social Marketing for Public Health (3 Credit Hours)

This course examines social marketing concepts and tools for influencing health behavior change. Students learn how to design, implement, and evaluate strategies for social marketing campaigns.

MPHO 631 Statistical Software for Public Health (3 Credit Hours)

This course is a collection of modules that introduce students to selected statistical software that are used widely in many areas of public health and research. The course will familiarize students with the primary features of statistical software, as well as database management, basic programming skills and tools, and some simple statistical procedures.

MPHO 632 Environmental and Occupational Health Risk Assessment (3 Credit Hours)

This course is an introduction to risk assessment, as applied to environmental and workplace hazards. It examines the fundamental concepts of risk. Students will learn the United States Environmental Protection Agency (USEPA) standard and advanced methodology for quantitative risk assessment including hazard identification, exposure assessment, dose-response modeling, risk characterization, and risk communication. Utilization of qualitative assessment methods and ecological risk assessment are also explored.

MPHO 633 Financing Healthcare (3 Credit Hours)

Students will examine financial evaluation of the health care industry, the source of funds, and the effects of changing patient policies. Other topics of interest will be financial strategies, budgets and capital outlay.

MPHO 634 Health Law and Ethics (3 Credit Hours)

This course examines legal, regulatory and ethical issues health professionals are likely to confront. In this course, we will examine the legal principles needed to analyze regulatory and liability issues. We will study selected principles and policies under-girding health, the American system of health law, including common law principles of liability and federal/state legislation regulating health professionals and operations. We will also discuss the impact of state and federal law on the operation of various health-related organizations.

MPHO 635 Healthcare Marketing (3 Credit Hours)

This course examines marketing principles, concepts and skills applied to health care organizations and health care networks. Students will examine marketing methodologies and principles for evaluating consumer decision making actions for health care services. The course will place emphasis on social media and electronic forms of marketing health care services. The course will culminate with the development of a strategic health care marketing plan.

MPHO 640 Health Disparities and Social Justice (3 Credit Hours)

This course provides an introduction to the topic of global health disparities through an in-depth examination and discussion of the relationship between social injustice and inequitable health outcomes. Students will be introduced to the behavioral, social and environmental determinants of health disparities and the pathways and mechanisms leading to inequitable health outcomes in vulnerable groups, as well as strategies for addressing these determinants to improve health.

MPHO 643 Principles of Toxicology (3 Credit Hours)

This course is an introduction to the basic principles of toxicology, and the interactions between toxic agents and living systems. The course consists of a study of general principles, dose response, toxin recognition and evaluation, chemicals, the human environment, and ecological toxicology.

MPHO 651 Health Promotion Theory and Practice (3 Credit Hours)

This course provides public health promotion graduate students with a comprehensive overview of the practical and theoretical principles and skills needed to plan, implement, and evaluate health promotion programs in a variety of settings. The course will help students apply constructs from theories to understand the determinants of health behaviors and emphasizes the importance of addressing health behavior change at the individual, interpersonal, organizational, community and societal levels of the social ecological model.

MPHO 660 Healthcare Informatics (3 Credit Hours)

This course examines the availability, use of interpretation of data obtained from traditional and new data systems used for population health monitoring. Included are public health surveillance systems, vital statistics, hospital discharge data, Health Plan Employer Data and Set (HEDIS), immunization information, school health data, 1996 Health Insurance Portability and Accountability Act (HIPAA), and regulatory agency data related to health.

MPHO 661 Program Planning and Evaluation (3 Credit Hours)

This course provides public and community health graduate students with a comprehensive overview of the practical and theoretical principles and skills needed to plan, implement, and evaluate health programs in a variety of settings.

MPHO 669 Applied Practice Experience (3 Credit Hours)

In this course, students build on their earlier practice activities (i.e., Practice Labs) and undertake an extensive, hands-on activity at a field-based practice site. The Practice Labs, which are completed prior to taking this course, are designed to meet foundational and track competencies as well as prepare students for an on-site work experience.

MPHO 670 Cultural Issues in Health Promotion and Education (3 Credit Hours)

This course provides an introduction for multicultural communication for health promotion and disease management. Topics to be covered include how to work collaboratively in diverse groups with an understanding of health behaviors, values, and health benefits.

MPHO 673 Policy and Politics of Health (3 Credit Hours)

This course enables the student to develop systematic and analytical frameworks for understanding health and healthcare policy issues. It will introduce the policy process, background research necessary for policy implementation, and implementation strategies.

MPHO 680 Global Health Issues (3 Credit Hours)

An examination of the political, social, cultural, and ethical issues for disease prevention and health promotion in developing countries. Students will learn to identify international health prerogatives aimed at improving health status through education and intervention.

MPHO 686 Legal Aspects of Health Services (3 Credit Hours)

This course examines the legal requirements affecting the health care industry, including a survey of the basic concepts and content in the major areas of health law, an explanation and identification of sources of legal authority, and a familiarity with legal language.

MPHO 688 Grant Writing for Public Health Practice (3 Credit Hours)

This course covers issues and problems concerned with the development of grants and contracts as they relate to the health professions. The course focuses on the multiple roles of funding agencies and the importance of matching the interests of the grant seeker with the corresponding funding agency.

MPHO 689 Integrative Learning Experience (3 Credit Hours)

This is the culminating course for the MPH program. Students demonstrate an ability to integrate and synthesize foundational and concentration-specific competencies from their MPH program coursework. Students complete assignments that address timely public health issues culminating in high quality written products and an e-portfolio that demonstrate the analysis, synthesis and intersection of course work and concurrent practicum experiences. Students from all tracks are required to complete this course prior to graduation.

MPHO 690 Leadership (3 Credit Hours)

The emphasis of this course is on the practice of leadership. The course will equip the student with the basic managerial background, fundamentals and theories which will be applicable at any level in management and in leadership positions. Students will be exposed to the interaction of leadership, change, communication and power as seen in the healthcare environment. This course will examine the traits of leading, developing leadership skill, creating a vision, managing conflicts and obstacles in an organization.

MPHO 695 Topics in Public Health (1-3 Credit Hours)

Topics in Public Health.

MPHO 701 Introduction to Healthcare Analytics (3 Credit Hours)

Participants will learn cutting edge strategies for implementing change and achieving high performance in their work environments from recognized healthcare delivery experts.

MPHO 702 Biostatistics II (3 Credit Hours)

This course is a continuation of MPHO 612: Statistical Reasoning for Public Health. This course is designed to train students on regression methods commonly employed in healthcare research. The primary objective of the course is to provide students with the skills necessary to carry out regression analysis and interpret them. The course emphasizes basic and advanced treatment of experimental data and use of analytical frameworks to solve real world problems. While there are some theory and formula derivations, the lectures and homework will focus on more technical aspects and conceptual understanding of fundamental statistical models. SAS will be used to manipulate data into an analyzable form, fit regression models, and perform model diagnostics.

MPHO 703 Programming Tools and Techniques in Data Management (3 Credit Hours)

This course is designed to train students in basic and advanced statistical programming languages R, SAS, and SQL together with techniques and tools necessary for data management and data mining. It will provide you with the skills in the data management process for analytics including data acquisition, cleaning, debugging, and decision making tools through case studies and projects.

MPHO 704 Predictive Data Analysis (3 Credit Hours)

This course introduces the techniques of predictive analytics in the context of a healthcare environment. The aim is to provide students with the highly demanded skills in data analytics and data mining by training them on how to move from data collection to data analysis and how to use data as the basis to predict future outcomes. Topics to be covered include formulating a hypothesis, examining data structure, selecting data, determining and designing appropriate statistical models, evaluating the models and interpreting the results.

MPHO 705 Data Mining and Machine Learning (3 Credit Hours)

This course covers healthcare analytics using data mining and machine learning techniques. Statistical software, R, will be implemented for data exploration and visualization, classification, clustering and time series analysis. Decision trees, nearest neighbor algorithm, artificial neural networks and support vector machine methods will be introduced. Case studies and real-world data will be utilized to leverage data mining and machine learning outcomes.

MPHO 706 Categorical Data Analysis (3 Credit Hours)

This course is designed to prepare the graduate students, health professionals, or fellows to apply statistical methods for analyzing categorical data relevant to healthcare analytics and public health research. The topics to be covered in this course include statistical models (e.g., logistic regression models and loglinear models) for categorical responses. Another emphasis of this course is to demonstrate the statistical methods of categorical data analysis based on real-world data using R and SAS software packages.

MPHO 707 Survival Analysis (3 Credit Hours)

This course is designed to prepare the graduate students, health professionals, or fellows to apply basic methods of statistical analysis for survival (a.k.a. time-to-event) data relevant to clinical and public health research. The major topics to be covered include the Kaplan-Meier product-limit estimation, log-rank and related tests, the Cox regression model, parametric model, power and sample size justification, competing risk analysis, and recurrent event analysis. Interpretation of subsequent analysis results will be stressed. Concepts will be explored through critical review of the biomedical and public health literature, class exercises, two exams, and a data analysis project. Computations will be illustrated using the statistical software package SAS. The course is intended for graduate students and health professionals who will be actively involved in the analysis and interpretation of biomedical research or public health studies generating time-to-event data.

MPHO 710 Implementing Change (3 Credit Hours)

This course gives students the opportunity to learn innovative strategies for implementing change and achieving high performance in their work environments.

MPHO 711 Epidemiology Methods I (3 Credit Hours)

The focus of the course is on an in-depth understanding of epidemiologic concepts and methods learned in a previous introductory course. Including: study designs, measures of disease frequency, measures of association and impact, the role of chance, threats to validity (selection bias, information bias, confounding, interaction), dealing with threats to validity (randomization, restriction, matching, stratification, adjustment, regression, quality assurance and quality control), communicating and disseminating information that pertains to epidemiologic investigations. Students will apply learned concepts and methods through in class exercises, problem sets, and projects.

MPHO 712 Applied Biostatistics (3 Credit Hours)

This course presents modern methods for analyzing data from epidemiologic and public health studies using the latest statistical methods. Emphasis is placed on practical, applied theories/concepts, aspects of methods for the analysis of diverse types of data including from observational studies, and the use of a computer for quantitative data management. Emphasis will also be placed on technical and statistical report writing.

MPHO 713 Applied Statistical Programming (3 Credit Hours)

This course covers programming and computing techniques using contemporary statistical packages. Emphasis is placed on practical issues relating to organizing, modifying, and preparing data for analysis.

MPHO 715 Current Issues in Epidemiology (3 Credit Hours)

Discussions with experts experienced in the diverse applications of epidemiology in current research and practice. Emphasis on emerging infectious diseases, environmental and occupational health, chronic diseases and community intervention trials. Lectures, discussions, class presentations and development of research project.

MPHO 716 Application of Epidemiological Methods (3 Credit Hours)

The course aims to prepare graduate students with hands-on experience in producing common epidemiological measures while critically evaluating the quality of data and the design of epidemiological investigations.

MPHO 717 Epidemiology of Infectious Diseases (3 Credit Hours)

This course focuses on the epidemiology of infectious diseases from a public health perspective. It applies traditional and contemporary epidemiological methods used to deal with infectious diseases.

MPHO 718 Epidemiologic Methods II (3 Credit Hours)

This course provides an intermediate discussion of public health surveillance and an introduction of survival analysis approaches. Key content will include a review of the updated guidelines for evaluating public health surveillance systems, information systems, types of surveillance, and special topics in surveillance [e.g., syndromic surveillance, geographic information systems (GIS), and global health surveillance systems]. Additional topics using SAS will include nonparametric survival function estimation, estimating parametric regression and Cox regression models, and competing risks. Individual and group learning activities include journal reviews and syntheses, case studies, SAS dataset analyses and reports, and a comprehensive final exam.

MPHO 721 Healthcare Strategy (3 Credit Hours)

This course is designed to help students learn about essential aspects of strategic planning and strategic management in the context of healthcare service organizations. Students will acquire an enhanced understanding of the complex U.S. healthcare system, apply planning concepts to formulate mission and vision statements, and formulate goals and objectives as part of a strategic plan. The course content will also address aspects of organizational leadership, along with the importance of implementation and monitoring progress to achieve continuous quality improvement and to 'close the loop' with strategic planning initiatives.

MPHO 723 Policy and Politics of Health (3 Credit Hours)

This course is an introduction to policy process, frameworks for understanding health policy issues, background research necessary for policy implementation and implementation strategies.

MPHO 727 Organizational Management (3 Credit Hours)

This course examines issues and principles in the management of individuals, groups and organizations. Topics includes motivation and rewards systems, group dynamics and organizational design and change.

MPHO 733 Financing Healthcare (3 Credit Hours)

Students examine financial evaluation of the healthcare industry, the source of funds and effects of changing patient policies. Other topics of interest will be financial strategies, budgets and capital outlay.

MPHO 736 Conflict Analysis and Negotiations (3 Credit Hours)

This course will provide students with advanced knowledge and skills in the theory of conflict analysis and resolution and negotiations, including but not necessarily limited to: skill development and collaborative problem solving at the individual, group, and organizational level; conceptual and practical skills in negotiation that are essential for managers; and third-party conflict intervention, which can assume several forms such as fact-finding, conciliation, mediation, and arbitration.

MPHO 737 Infectious and Chronic Disease Epidemiology (3 Credit Hours)

This 3-credit hour course is offered to Epidemiology Track students as a required course and to Masters of Public Health students in the remaining tracks as an elective course. This course is focused on substantive areas in epidemiology with an emphasis on 'infectious disease epidemiology' and 'chronic disease epidemiology'. The course gives the introductory scientific and biomedical theories of modern public health problems and explores mechanisms and models of the major categories of disease.

MPHO 750 Community Practicum (3 Credit Hours)

This course is an opportunity to apply knowledge and skills gained in academic courses in a working environment or community setting under the supervision of a preceptor. This course requires a written report to the preceptor and the course director as well as oral presentation.

MPHO 772 International Health Exchange Program (3 Credit Hours)

This course exposes students to important issues in international public health and is unique in that it involves the analysis of health problems in the broad social, cultural, economic and political contexts that generate and sustain them.

MPHO 776 Global Health (3 Credit Hours)

This course introduces students to the political, social, cultural, environmental, and ethical issues globally involved in disease prevention and health promotion. Specific emphasis is on incidence/prevalence, morbidity/mortality, and identified health problems in specific regions and countries. This course also identifies global health prerogatives aimed at improving health status through education and intervention.

MPHO 778 Global Environmental Health (3 Credit Hours)

The goal of this course is to guide students with a public health perspective to develop skills to identify and analyze environmental health problems globally. It is designed to provide knowledge on recognizing and evaluating major environmental health issues and risk factors in developed and developing countries by using group discussions and real-life case studies.

MPHO 779 Intro to Research Methods (3 Credit Hours)

The goal of this course is to provide practical, step-by-step guidance in the research process. The organizing framework used is the scientific method, which is applied to current health initiatives. Students develop a unique research design proposal.

MPHO 784 Creating Sustainable Environmental Futures (3 Credit Hours)

This second-year MPH course examines the interrelationships between individual and societal decisions and the global environment, and the consequences these interrelationships have for public health. Students engage in an in-depth examination of key environmental health issues, analyze the public health implications, and consider various strategies for improving individual and population health, and enhancing sustainability, in the local area, the region, the nation and around the world.

MPHO 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

MSA - Surgical Assisting

MSA 602 Medical Terminology (2 Credit Hours)

The medical terminology class is an intense, three-week course taught at the beginning of the surgical assisting student's first year. The course employs a body systems-oriented, word-analysis approach to learning medical terminology. The goal of the class is to prepare students for the terminology they might encounter in their subsequent coursework, in their clinical rotations and ultimately in their roles as healthcare professionals.

MSA 603 Surgical Microbiology with Lab (3 Credit Hours)

Surgical Microbiology reviews the infectious processes and organisms, immune responses, risks to operating-room patients and personnel and universal precautions.

MSA 604 Advanced Topics of Surgical Assisting I (1 Credit Hour)

Advanced Topics of Surgical Assisting is a monthly journal club that investigates topics addressed in the core curriculum classes as well as current issues impacting the surgical assisting profession. Course readings will be provided by program faculty and surgical assistant professional organizations.

MSA 605 Advanced Topics of Surgical Assisting II (1 Credit Hour)

Advanced Topics of Surgical Assisting is a monthly journal club that investigates topics addressed in the core curriculum classes as well as current issues impacting the surgical assisting profession. Course readings will be provided by program faculty and surgical assistant professional organizations.

MSA 606 Operative Practices (2 Credit Hours)

Lecture series is a seminar course that explores the details of topics such as attitude and etiquette in the OR, casting and splinting, stress management, ethics, surgical technique, OR conduct and patient interaction, back-table setup and the SA, trauma, sterile technique, gowning and gloving review. The seminars are conducted by program alumni and other medical professionals.

MSA 607 Surgical Rounds (3 Credit Hours)

Surgical Rounds is a hands-on clinical training experience lead by surgical residents to complement the student's didactic experience through active participation as part of a surgical team to develop the critical clinical skills needed for a surgical assistant.

MSA 608 Clinical Anatomy for Health Professions (5 Credit Hours)

Gross Anatomy is a regional study of anatomy related to surgical procedures with cadaver lab. It also includes review of physiology relevant to survey and an introduction to basic embryology, histology and pathology.

MSA 610 Advanced Surgical Pharmacology (2 Credit Hours)

Advanced Pharmacology is a biophysical science based course which examines drugs used in surgery and emergency drugs, reviewing anaphylactic and toxicity reactions. The course also addresses anesthesia methods and agents and their methods of administration, describing how the surgical procedure may be affected by the agents used.

MSA 611 Minimally Invasive Surgery (4 Credit Hours)

This course is designed to give the surgical assistant student a broad look into minimally invasive surgery while introducing the techniques involved. Numerous subspecialties, how minimally invasive techniques are utilized, and the history of these techniques will be discussed. Students will engage in hands-on learning to help facilitate the learning curve once they are in their clinical year.

MSA 612 Surgical Physiology (4 Credit Hours)

Surgical Physiology is a course provided by the biophysiology and applied surgical pathology for the advancement of knowledge application in the surgical environment designed for Surgical Assistant students. Topics including cell injury, inflammation and wound healing are covered.

MSA 613 Principles of Surgical Assisting I Lecture (2 Credit Hours)

Principles of Surgical Assisting is a two-part course that teaches fundamental skills: Placement of monitoring devices, review of bladder catheterization, surgical positioning, application of tourniquets, prepping and draping, operative instrumentation, visualization techniques, hemostasis, suturing and knot tying techniques, dressings and drainage systems, post-operative pain control methods and the use of special equipment.

MSA 614 Principles of Surgical Assisting I Lab (2 Credit Hours)

Principles of Surgical Assisting is a two-part course that teaches fundamental skills: Placement of monitoring devices, review of bladder catheterization, surgical positioning, application of tourniquets, prepping and draping, operative instrumentation, visualization techniques, hemostasis, suturing and knot tying techniques, dressings and drainage systems, post-operative pain control methods and the use of special equipment.

MSA 615 Principles of Surgical Assisting II Lecture (2 Credit Hours)

Principles of Surgical Assisting is a two-part course that teaches fundamental skills: Placement of monitoring devices, review of bladder catheterization, surgical positioning, application of tourniquets, prepping and draping, operative instrumentation, visualization techniques, hemostasis, suturing and knot tying techniques, dressings and drainage systems, post-operative pain control methods and the use of special equipment.

MSA 616 Principles of Surgical Assisting II Lab (2 Credit Hours)

Principles of Surgical Assisting is a two-part course that teaches fundamental skills: Placement of monitoring devices, review of bladder catheterization, surgical positioning, application of tourniquets, prepping and draping, operative instrumentation, visualization techniques, hemostasis, suturing and knot tying techniques, dressings and drainage systems, post-operative pain control methods and the use of special equipment.

MSA 617 Clinical Reasoning for Surgical Assisting (1 Credit Hour)

Principles of Surgical Assisting is a two-part course that teaches fundamental skills: Placement of monitoring devices, review of bladder catheterization, surgical positioning, application of tourniquets, prepping and draping, operative instrumentation, visualization techniques, hemostasis, suturing and knot tying techniques, dressings and drainage systems, post-operative pain control methods and the use of special equipment.

MSA 618 Trauma (2 Credit Hours)

Expose the surgical assistant student to the specialty dedicated to the care of the individual who has been injured, whatever the mechanism.

MSA 619 Business of Surgical Assisting Services (3 Credit Hours)

This course presents an in-depth overview of the business of surgical assisting. Students are exposed to all aspects of the surgical assisting business to help them make informed career decisions.

MSA 620 Medical Ethics of Surgical Assisting (2 Credit Hours)

This course explores a variety of ethical and legal issues facing healthcare professionals and the Surgical Assisting profession.

MSA 621 Capstone Project (3 Credit Hours)

This is an applied science and practice application course. Students develop an educational resource product in their area of surgical specialty concentration for contribution to the program's resource library.

MSA 622 Leadership in Healthcare (1 Credit Hour)

Leadership in healthcare.

MSA 623 Guided Study (3 Credit Hours)

This course is designed to allow the student to explore a specified surgical topic under the direct supervision of the faculty member.

MSA 700 General Surgery (3 Credit Hours)**MSA 701 General Surgery (3 Credit Hours)****MSA 702 General Surgery (3 Credit Hours)****MSA 703 Orthopedic Surgery (3 Credit Hours)****MSA 704 Orthopedic Surgery (3 Credit Hours)****MSA 705 Orthopedic Surgery (3 Credit Hours)****MSA 706 Plastic Surgery (3 Credit Hours)****MSA 707 Plastic Surgery (3 Credit Hours)****MSA 708 Plastic Surgery (3 Credit Hours)****MSA 709 Vascular Surgery (3 Credit Hours)****MSA 710 Vascular Surgery (3 Credit Hours)****MSA 711 Vascular Surgery (3 Credit Hours)****MSA 712 OB/GYN (3 Credit Hours)****MSA 713 OB/GYN (3 Credit Hours)****MSA 714 OB/GYN (3 Credit Hours)****MSA 715 ENT (3 Credit Hours)****MSA 716 ENT (3 Credit Hours)****MSA 717 ENT (3 Credit Hours)****MSA 718 Cardiac Surgery (3 Credit Hours)****MSA 719 Cardiac Surgery (3 Credit Hours)****MSA 720 Cardiac Surgery (3 Credit Hours)****MSA 721 Surgical Elective (3 Credit Hours)****MSA 722 Surgical Elective (3 Credit Hours)****MSA 723 Surgical Elective (3 Credit Hours)****MSA 724 Pediatric Surgery (3 Credit Hours)****MSA 725 Pediatric Surgery (3 Credit Hours)****MSA 726 Pediatric Surgery (3 Credit Hours)****MSA 727 Robotics (3 Credit Hours)****MSA 728 Robotics (3 Credit Hours)****MSA 730 Neurosurgery (3 Credit Hours)****MSA 731 Neurosurgery (3 Credit Hours)****MSA 732 Neurosurgery (3 Credit Hours)**

MSCM - Maritime and Supply Chain Management

MSCM 530 Strategic Sourcing and Purchasing Management (3 Credit Hours)

An overview of the strategic sourcing of materials and services in the organization and its role in the supply chain. Topics include sourcing decisions, price/cost analysis, quality issues, purchasing, supplier selection, legal and ethical issues, third party logistics, freight forwarding, and acquisition of services and capital assets.

MSCM 568 Distribution Center and Material Handling Management (3 Credit Hours)

This course is designed to investigate the strategic role of distribution center and material management in the supply chain. Course content includes the analysis of distribution center operations through the study of design, system selection, and layout configuration as well as the evaluation of material handling and inventory management options.

Prerequisites: OPMT 303

MSCM 595 Topics in Maritime and Supply Chain Management (3 Credit Hours)

A study of selected topics within maritime and supply chain management designed to provide an in-depth exploration of current issues.

Prerequisites: Permission of the instructor

MSCM 610 International Shipping and Supply Chain Management (3 Credit Hours)

Examines international freight transportation and terms for movement of international trade; focuses on improving supply chain relationships in the movement of international trade/directing the flow of information, materials and products. (cross-listed with PORT 610)

MSCM 615 Maritime Security and Risk Analysis (3 Credit Hours)

An overview of international and U.S initiatives to ensure the security of vessels, cargo, people, and infrastructure within the maritime domain. In addition to the impacts of regulatory requirements on maritime commerce, the course also addresses maritime threats to the international economy (including maritime piracy and maritime terrorism), maritime coalitions , and state-of-the-art techniques and tools for safeguarding oceanborne commerce. (cross-listed with PORT 615)

MSCM 616 Reverse Logistics and Sustainable Operations (3 Credit Hours)

This course explores the theoretical foundations of global supply chain partnerships and reverse logistics systems, and examines the practices, risks, and opportunities found in today's systems. Fundamental tools and techniques are used to provide insights and solutions on how to best organize, manage, and optimize such systems to achieve sustainable performance. (cross-listed with PORT 616)

MSCM 617 Transportation Management (3 Credit Hours)

The course includes a review of the key elements of transportation such as: modes of transportation, transportation economics, and transportation technology and regulations. The relationships between intermediaries, carriers and shippers are discussed, as well as company roles and operations within the transportation field, transportation sourcing and management, and transportation risk management.

MSCM 630 Strategic Sourcing and Supply Management (3 Credit Hours)

An overview of the strategic sourcing of materials and services in the organization and its role in the supply chain. Emphasis is placed on effectively managing the supply management process. Topics include the analysis of sourcing decisions, price/cost analysis, purchasing, supplier selection and relationship management, legal and ethical issues, third party logistics, freight forwarding, and acquisition of services and capital assets.

MSCM 641 Supply Chain Management and Logistics (3 Credit Hours)

Supply chain management integrates all activities associated with the flows of materials, information, and funds. Examples include strategic sourcing, order processing, warehousing, inventory management, transportation and logistics, and the costs and information systems supporting these activities.

MSCM 648 Distribution Center Management (3 Credit Hours)

This course investigates the strategic role of distribution centers in the supply chain. Course content includes the analysis of distribution center operations through the study of design, system selection, and layout configuration as well as the evaluation of material handling and inventory management alternatives. Tactical, operational and strategic planning options are also discussed.

MSIM - Modeling and Simulation

MSIM 506 Introduction to Distributed Simulation (3 Credit Hours)

An introduction to distributed simulation. Topics include motivation for using distributed simulation, distributed simulation architectures, time management issues, and distributed simulation approaches. Current standards for distributed simulation are presented.

Prerequisites: ECE 348

MSIM 508 Introduction to Game Development (3 Credit Hours)

An introductory course focused on game development theory and modern practices with emphasis on educational game development. Topics include game architecture, computer graphics theory, user interaction, audio, high level shading language, animation, physics, and artificial intelligence. The developed games can run on a variety of computer, mobile, and gaming platforms.

Prerequisites: CS 361 or ECE 348 or instructor approval

MSIM 510 Model Engineering (3 Credit Hours)

The goal of this course is to develop understanding of the various modeling paradigms appropriate for capturing system behavior and conducting digital computer simulation of many types of systems. The techniques and concepts discussed typically include UML, concept graphs, Bayesian nets, Markov models, Petri nets, system dynamics, Bond graphs, etc. Students will report on a particular technique and team to implement a chosen system model. (cross-listed with ECE 510)

MSIM 516 Cyber Defense Fundamentals (3 Credit Hours)

This course focuses on cybersecurity theory, information protection and assurance, and computer systems and networks security. The objectives are to understand the basic security models and concepts, learn fundamental knowledge and tools for building, analyzing, and attacking modern security systems, and gain hands-on experience in cryptographic algorithms, security fundamental principles, and Internet security protocol and standards. Cross-listed with ECE 516.

MSIM 519 Cyber Physical Systems Security (3 Credit Hours)

Cyber Physical Systems (CPS) integrate computing, networking, and physical processes. The objectives of this course are to learn the basic concepts, technologies and applications of CPS, understand the fundamental CPS security challenges and national security impact, and gain hands-on experience in CPS infrastructures, critical vulnerabilities, and practical countermeasures. Cross-listed with ECE 519.

MSIM 541 Computer Graphics and Visualization (3 Credit Hours)

The course provides a practical treatment of computer graphics and visualization with emphasis on modeling and simulation applications. It covers digital image and signal processing basics such as sampling and discrete Fourier transform, computer graphics fundamentals, visualization principles, and software architecture for visualization in modeling and simulation. Written communication and information literacy skills are stressed in this course. (Cross listed with ECE 506.)(Offered fall).

Prerequisites: a grade of C or better in CS 361, or ECE 348, or MSIM 603

MSIM 551 Analysis for Modeling and Simulation (3 Credit Hours)

An introduction to analysis techniques appropriate to the conduct of modeling and simulation studies. Topics include input modeling, random number generation, output analysis, variance reduction techniques, and experimental design. In addition, techniques for verification & validation are introduced. Course concepts are applied to real systems and data.

Prerequisites: ECE 306; STAT 330 or ECE 304

MSIM 562 Introduction to Medical Image Analysis (3 Credit Hours)

Introduction to basic concepts in medical image analysis. Medical image registration, segmentation, feature extraction, and classification are discussed. Basic psychophysics, fundamental ROC analysis and FROC methodologies are covered. Cross-listed with ECE 462/ECE 562.

MSIM 563 Design and Modeling of Autonomous Robotic Systems (3 Credit Hours)

Course focuses on autonomous robotics systems with emphasis on using modeling and simulation (M&S) for system level design and testing. Fundamental concepts associated with autonomous robotic systems are discussed. Course topics include: robotic control, architectures, and sensors as well as more advanced concepts such as error propagation, localization, mapping and autonomy. Design strategies that leverage M&S to accelerate the development and testing of sophisticated autonomous robotic algorithms for individual or teams of robots are covered.

Prerequisites: CS 150 or ENGN 150 or ENGN 122

MSIM 570 Foundations of Cyber Security (3 Credit Hours)

Course provides an overview of theory, tools and practice of cyber security and information assurance through prevention, detection and modeling of cyber attacks and recovery from such attacks. Techniques for security modeling, attack modeling, risk analysis and cost-benefit analysis are described to manage the security of cyber systems. Fundamental principles of cyber security and their applications for protecting software and information assets of individual computers and large networked systems are explored. Anatomy of some sample attacks designed to compromise confidentiality, integrity and availability of cyber systems are discussed.

Prerequisites: CS 150 or ENGN 150 or ENGN 122

MSIM 574 Transportation Data Analytics (3 Credit Hours)

This course presents the basic techniques for transportation data analytics. It will discuss statistical modeling, prominent algorithms, and visualization approaches to analyze both small- and large-scale data sets generated from transportation systems. Practices of using different data for various real-world traffic/transportation applications and decision making will also be discussed.

Prerequisites: STAT 330 or ECE 304

MSIM 580 Introduction to Artificial Intelligence (3 Credit Hours)

Introduction to concepts, principles, challenges, and research in major areas of artificial intelligence. Areas of discussion include: natural language and vision processing, machine learning, machine logic and reasoning, robotics, expert and mundane systems. Laboratory work required.

Prerequisites: Instructor approval

MSIM 595 Topics in Modeling and Simulation Engineering (3 Credit Hours)

Special topics of interest with emphasis placed on recent developments in modeling and simulation engineering.

MSIM 596 Topics in Modeling and Simulation Engineering (1-3 Credit Hours)

Special topics of interest with emphasis placed on the recent developments in modeling and simulation engineering.

Prerequisites: permission of the instructor

MSIM 597 Independent Study in Modeling and Simulation Engineering (3 Credit Hours)

Individual analytical, computational, and/or experimental study in an area selected by the student. Supervised and approved by the advisor.

MSIM 601 Introduction to Modeling and Simulation (3 Credit Hours)

Modeling and simulation (M&S) discipline surveyed at an overview level of detail. Basic terminology, modeling methods, and simulation paradigms are introduced. Applications of M&S in various disciplines are discussed. The course provides a general conceptual framework for those interested in using M&S and for further studies in M&S. Not open to MSVE degree seeking students.

Prerequisites: graduate standing; undergraduate exposure to calculus and probability & statistics

MSIM 602 Simulation Fundamentals (3 Credit Hours)

An introduction to the modeling and simulation discipline. Introduction to discrete event simulation (DES) including simulation methodology, input data modeling, output data analysis, and an overview of DES tools. Introduction to continuous simulation (CS) including simulation methodology, differential equation models, numerical solution techniques, and an overview of CS tools.

Prerequisites: graduate standing; undergraduate preparation in calculus and probability & statistics; and computer literacy

MSIM 603 Simulation Design (3 Credit Hours)

Course develops the computer software skills necessary for the design and development of simulation software. Topics covered include software architectures, software engineering, software design, object-oriented programming, abstract data types and classes, data structures, algorithms, and testing and debugging techniques. Software design and development of simulation systems (discrete-event, continuous, and Monte Carlo) are emphasized.

Prerequisites: MSIM 602 and an introductory computer programming course

MSIM 607 Machine Learning I (3 Credit Hours)

Course provides a practical treatment of design, analysis, implementation and applications of algorithms. Topics include multiple learning models: linear models, neural networks, support vector machines, instance-based learning, Bayesian learning, genetic algorithms, ensemble learning, reinforcement learning, unsupervised learning, etc. (Cross listed with ECE 607)

MSIM 660 System Architecture and Modeling (3 Credit Hours)

Students will learn the essential aspects of the system architecture paradigm through environment and analysis of multiple architecture framework and enterprise engineering, such as IDEFO, TOGAF, DODAF and OPM. Emphasis on system modeling and enterprise engineering. (Cross listed with ENMA 660)

MSIM 667 Cooperative Education (1-3 Credit Hours)

Student participation for credit based on academic relevance of the work experience, criteria, and evaluation procedures. Available for pass/fail grading only. May be repeated for credit.

MSIM 668 Internship (1-3 Credit Hours)

Academic requirements will be established by the department and will vary with the amount of credit desired. Allows students an opportunity to gain short duration career-related experience.

Prerequisites: Approval by department is required; Additional support may be provided by the Monarch Internship and Co-Op Office in the semester prior to enrollment

MSIM 669 Practicum (1-3 Credit Hours)

Academic requirements will be established by the graduate program director and will vary with the amount of credit desired. Allows students an opportunity to gain short-duration career related experience. Student is usually employed—this is an additional project beyond the duties of the student's employment.

MSIM 670 Cyber Systems Engineering (3 Credit Hours)

This course provides an overview of functioning of cyber systems including how a computer interacts with the outside world. The composition of critical infrastructure and functioning of different engineered systems that form critical infrastructure are discussed. Mutual dependence and interactions between cyber systems and other engineered systems and the resulting security risks are also explored. (Cross-listed with ENMA 670.)

MSIM 673 Threat Modeling and Risk Analysis (3 Credit Hours)

This course discusses how to develop cyber threat models using attack graphs/trees, STRIDE, Universal Modeling Language (UML), attack graphs/trees and common of risk analysis tools. Course also discusses the need for quantitative security analysis and formal validation of security models and basic principles of formal model validation. (Cross-listed with ENMA 673.)

MSIM 695 Topics in Modeling and Simulation (3 Credit Hours)

Special topics of interest with emphasis placed on recent developments in modeling and simulation.

MSIM 697 Independent Study in Modeling and Simulation (3 Credit Hours)

Individual study selected by the student. Supervised and approved by a faculty member with the approval of the graduate program director.

Prerequisites: permission of instructor or graduate program director

MSIM 699 Thesis (1-6 Credit Hours)

Research leading to the Master of Science thesis.

Prerequisites: permission of instructor and graduate program director

MSIM 702 Systemic Decision Making (3 Credit Hours)

As machine age problems have given way to systems age messes, the underlying complexity associated with understanding these situations has increased exponentially. Accordingly, the methods we use to address these situations must evolve as well. This course will introduce students to a method for thinking holistically about problems and messes conceptually founded in systems theory. This paradigm, known as systemic thinking, will be contrasted with traditional systematic thinking, and practical guidelines for the deployment of a systemic thinking approach will be provided. This paradigm will increase the student's ability to make rational decisions in complex environments. (Cross listed with ENMA 702).

MSIM 703 Optimization Methods (3 Credit Hours)

Covers advanced methods in Operations Research and Optimization. Focus will be on developing models and their applications in different domains including manufacturing and service. Modern optimization tools will be used to implement models for case studies, projects and research papers. The knowledge of programming and spreadsheets is expected. Contact instructor for more details. (Cross-listed with ENMA 703).

MSIM 711 Finite Element Analysis (3 Credit Hours)

The purpose of the course is to provide an understanding of the finite element method (FEM) as derived from an integral formulation perspective. The course will demonstrate the solutions of (1-D and 2-D) continuum mechanics problems such as solid mechanics, fluid mechanics and heat transfer.

Prerequisites: permission of the instructor

MSIM 715 High Performance Computing Simulation and Data Analytics (3 Credit Hours)

Introduction to modern high performance computing platforms including top supercomputers and accelerators. Discussion of parallel architectures, performance, programming models, and software development issues. Case studies of scientific and engineering simulations will be explored. Students will have an opportunity to work on parallelization of problems from their research areas. Project presentations are required.

MSIM 722 Cluster Parallel Computing (3 Credit Hours)

This course provides detailed numerical step-by-step procedures to exploit parallel and sparse computation under MPI (Message Passing Interface) computer environments. Large-scale engineering/science applications are emphasized. Simultaneous linear equations are discussed.

MSIM 725 Principles of Combat Modeling and Simulation (3 Credit Hours)

Principles of combat modeling and simulation. Introduction including history, basic definitions, and best practice. Algorithms for modeling movement, sensing effects and behavior. Overview of modern combat models. Interoperability and integration into operational environments.

Prerequisites: MSIM 603

MSIM 730 Simulation Formalisms (3 Credit Hours)

The focus of the course is on identification and investigation of mathematical and logical structures that form the foundation for computational simulation. Topics include: foundations of simulation theory in logic, discrete mathematics, and computability; simulation formalisms, including DEVS; interoperability protocols; and computational complexity.

MSIM 741 Principles of Visualization (3 Credit Hours)

Well-designed graphical media capitalizes on human facilities for processing visual information and thereby improves comprehension, memory, inference, and decision making. This course teaches techniques and algorithms for creating effective visualizations based on principles and techniques from graphic design, visual art, perceptual psychology and cognitive science. Both users and developers of visualization tools and systems will benefit from this course.

MSIM 742 Synthetic Environments (3 Credit Hours)

The course covers the theory and techniques for building effective and efficient synthetic environments for modeling and simulation applications. Topics include physics, artificial intelligence, virtual reality, and advanced modeling and rendering. The emphasis is on producing visually realistic synthetic environments based on effective approximations of physics and other related principles.

Prerequisites: MSIM 541 or equivalent

MSIM 751 Advanced Analysis for Modeling and Simulation (3 Credit Hours)

An introduction to stochastic dependence and Bayesian analysis techniques for conducting modeling and simulation studies. Topics include: measures of dependence, common multivariate distributions, sampling from multivariate distributions, elementary time series models and Bayesian statistics.

Prerequisites: MSIM 451 or MSIM 551

MSIM 762 Applied Medical Image Analysis (3 Credit Hours)

Course explores hands-on exposure to state-of-the-art algorithms in medical image analysis, which builds on open-source software (Insight Segmentation and Registration Toolkit - ITK), as well as the principles of medical image acquisition in the modalities of clinical interest. Medical imaging modalities - X-rays, CT, and MRI/ITK image pipeline; image enhancement, feature detection; segmentation - basic techniques, feature-based classification and clustering, graph cuts, active contour and surface models; surface and volume meshing; registration - transformations, similarity criteria; shape and appearance models are all explored and discussed in this course.

Prerequisites: Knowledge of C++ and object-oriented programming

MSIM 772 Modeling Global Events (3 Credit Hours)

Modeling Global Events introduces modeling and simulation as a tool for expanding our understanding of events that have shaped the global environment of the 21st century. Students will review real-world case studies and then analyze these case studies via system dynamics, agent-based, social network, and game theory modeling paradigms. This course is designed to develop empirical research skills, conceptual modeling expertise, and model construction. Students will understand how to analyze, verify, and validate a model.

MSIM 774 Transportation Network Flow Models (3 Credit Hours)

This course provides a rigorous introduction to transportation network modeling, with special emphasis on network equilibrium problems. Topics include: elementary graph theory, shortest path problem nonlinear optimization, optimization of univariate functions, deterministic and stochastic user equilibrium. (Cross-listed with CEE 774).

MSIM 775 Transportation Network Algorithms (3 Credit Hours)

Fundamental models and algorithms in optimization, stochastic modeling and parallel computing will be discussed and illustrated with transportation applications. (Cross-listed with CEE 775)

MSIM 776 Simulation Modeling in Transportation Networks (3 Credit Hours)

Principles of simulation modeling, microscopic, mesoscopic, and macroscopic traffic simulation models. Course explores driver behavior in networks, calibration and validation of traffic simulation models, and use of traffic simulation software. (Cross-listed with CEE 776)

MSIM 780 Machine Learning II (3 Credit Hours)

Advanced topics in machine learning and pattern recognition systems. Data reduction techniques including principle component analysis, independent component analysis and manifold learning. Introduction to sparse coding and deep learning for data representation and feature extraction. (Cross-listed with ECE 780)

Prerequisites: MSIM 607 or equivalent

MSIM 795 Topics in Modeling and Simulation (3 Credit Hours)

Special topics of interest with emphasis placed on recent developments in modeling and simulation.

MSIM 797 Independent Study in Modeling and Simulation (3 Credit Hours)

Individual study selected by the student. Supervised and approved by a faculty member with the approval of the graduate program director.

Prerequisites: permission of instructor or graduate program director

MSIM 802 Systemic Decision Making (3 Credit Hours)

As machine age problems have given way to systems age messes, the underlying complexity associated with understanding these situations has increased exponentially. Accordingly, the methods we use to address these situations must evolve as well. This course will introduce students to a method for thinking holistically about problems and messes conceptually founded in systems theory. This paradigm, known as systemic thinking, will be contrasted with traditional systematic thinking, and practical guidelines for the deployment of a systemic thinking approach will be provided. This paradigm will increase the student's ability to make rational decisions in complex environments. (Cross listed with ENMA 802).

MSIM 803 Optimization Methods (3 Credit Hours)

Covers advanced methods in Operations Research and Optimization. Focus will be on developing models and their applications in different domains including manufacturing and service. Modern optimization tools will be used to implement models for case studies, projects and research papers. The knowledge of programming and spreadsheets is expected. Contact instructor for more details. (Cross-listed with ENMA 803).

MSIM 811 Finite Element Analysis (3 Credit Hours)

The purpose of the course is to provide an understanding of the finite element method (FEM) as derived from an integral formulation perspective. The course will demonstrate the solutions of (1-D and 2-D) continuum mechanics problems such as solid mechanics, fluid mechanics and heat transfer.

Prerequisites: permission of the instructor

MSIM 815 High Performance Computing Simulation and Data Analytics (3 Credit Hours)

Introduction to modern high performance computing platforms including top supercomputers and accelerators. Discussion of parallel architectures, performance, programming models, and software development issues. Case studies of scientific and engineering simulations will be explored. Students will have an opportunity to work on parallelization of problems from their research areas. Project presentations are required.

MSIM 822 Cluster Parallel Computing (3 Credit Hours)

This course provides detailed numerical step-by-step procedures to exploit parallel and sparse computation under MPI (Message Passing Interface) computer environments. Large-scale engineering/science applications are emphasized. Simultaneous linear equations are discussed.

MSIM 825 Principles of Combat Modeling and Simulation (3 Credit Hours)

Principles of combat modeling and simulation. Introduction including history, basic definitions, and best practice. Algorithms for modeling movement, sensing effects and behavior. Overview of modern combat models. Interoperability and integration into operational environments.

Prerequisites: MSIM 603

MSIM 830 Simulation Formalisms (3 Credit Hours)

The focus of the course is on identification and investigation of mathematical and logical structures that form the foundation for computational simulation. Topics include: foundations of simulation theory in logic, discrete mathematics, and computability; simulation formalisms, including DEVS; interoperability protocols; and computational complexity.

MSIM 841 Principles of Visualization (3 Credit Hours)

Well-designed graphical media capitalizes on human facilities for processing visual information and thereby improves comprehension, memory, inference, and decision making. This course teaches techniques and algorithms for creating effective visualizations based on principles and techniques from graphic design, visual art, perceptual psychology and cognitive science. Both users and developers of visualization tools and systems will benefit from this course.

MSIM 842 Synthetic Environments (3 Credit Hours)

The course covers the theory and techniques for building effective and efficient synthetic environments for modeling and simulation applications. Topics include physics, artificial intelligence, virtual reality, and advanced modeling and rendering. The emphasis is on producing visually realistic synthetic environments based on effective approximations of physics and other related principles.

Prerequisites: MSIM 541 or equivalent

MSIM 851 Advanced Analysis for Modeling and Simulation (3 Credit Hours)

An introduction to stochastic dependence and Bayesian analysis techniques for conducting modeling and simulation studies. Topics include: measures of dependence, common multivariate distributions, sampling from multivariate distributions, elementary time series models and Bayesian statistics.

Prerequisites: MSIM 451 or MSIM 551

MSIM 862 Applied Medical Image Analysis (3 Credit Hours)

Course explores hands-on exposure to state-of-the-art algorithms in medical image analysis, which builds on open-source software (Insight Segmentation and Registration Toolkit - ITK), as well as the principles of medical image acquisition in the modalities of clinical interest. Medical imaging modalities - X-rays, CT, and MRI/ITK image pipeline; image enhancement, feature detection; segmentation - basic techniques, feature-based classification and clustering, graph cuts, active contour and surface models; surface and volume meshing; registration - transformations, similarity criteria; shape and appearance models are all explored and discussed in this course.

MSIM 872 Modeling Global Events (3 Credit Hours)

Modeling Global Events introduces modeling and simulation as a tool for expanding our understanding of events that have shaped the global environment of the 21st century. Students will review real-world case studies and then analyze these case studies via system dynamics, agent-based, social network, and game theory modeling paradigms. This course is designed to develop empirical research skills, conceptual modeling expertise, and model construction. Students will understand how to analyze, verify, and validate a model.

MSIM 874 Transportation Network Flow Models (3 Credit Hours)

This course provides a rigorous introduction to transportation network modeling, with special emphasis on network equilibrium problems. Topics include: elementary graph theory, shortest path problem nonlinear optimization, optimization of univariate functions, deterministic and stochastic user equilibrium. (Cross-listed with CEE 874).

MSIM 875 Transportation Network Algorithms (3 Credit Hours)

Fundamental models and algorithms in optimization, stochastic modeling and parallel computing will be discussed and illustrated with transportation applications. (Cross-listed with CEE 875)

MSIM 876 Simulation Modeling in Transportation Networks (3 Credit Hours)

Principles of simulation modeling, microscopic, mesoscopic, and macroscopic traffic simulation models. Course explores driver behavior in networks, calibration and validation of traffic simulation models, and use of traffic simulation software. (Cross-listed with CEE 876)

MSIM 880 Machine Learning II (3 Credit Hours)

Advanced topics in machine learning and pattern recognition systems. Data reduction techniques including principle component analysis, independent component analysis and manifold learning. Introduction to sparse coding and deep learning for data representation and feature extraction. (Cross-listed with ECE 880)

Prerequisites: MSIM 607 or equivalent

MSIM 892 Doctor of Engineering Project (1-9 Credit Hours)

Directed individual study applying advanced level technical knowledge to identify, formulate and solve a complex, novel problem in Modeling and Simulation.

MSIM 895 Topics in Modeling and Simulation (3 Credit Hours)

Special topics of interest with emphasis placed on recent developments in modeling and simulation.

MSIM 897 Independent Study in Modeling and Simulation (1-3 Credit Hours)

Individual study selected by the student. Supervised and approved by a faculty member with the approval of the graduate program director.

Prerequisites: permission of the instructor or graduate program director

MSIM 898 Research in Modeling and Simulation (1-12 Credit Hours)

Supervised research prior to passing Ph.D. candidacy exam.

Prerequisites: permission of the instructor and graduate program director

MSIM 899 Dissertation (1-12 Credit Hours)

Directed research for the doctoral dissertation.

Prerequisites: permission of the instructor and graduate program director

MSIM 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

MSIM 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

MUSA - Music, Applied

MUSA 651 Advanced Applied Music (3 Credit Hours)

Graduate level applied performance level lesson.

Prerequisites: MUSC 452 or equivalent and permission of faculty; audition required

MUSA 652 Advanced Applied Music (3 Credit Hours)

Graduate level applied performance lesson. Completion of this level includes successful performance of a one-hour public recital.

Prerequisites: MUSC 651 or permission of the instructor; audition required

MUSC - Music

MUSC 510 Psychology of Music (3 Credit Hours)

This course is designed to assist students in enhancing their understanding of the aesthetic response to music in various settings. Students will learn to integrate their understanding of musical aptitude as it relates to human growth and development. In addition, students will study the psychological implication of personality types as they develop, implement, and assess their pedagogical approach.

MUSC 522 Form and Analysis (2 Credit Hours)

Aural analysis study and analysis of the principal traditional musical forms. Stylistic and harmonic analysis as it related to score study will be discussed.

MUSC 526 Marching Band Techniques and Arranging (2 Credit Hours)

Students will learn how to chart and arrange music for the marching band. In addition, basic vocal arranging techniques will be discussed. Students will be required to observe different styles of school marching bands.

MUSC 540 Scoring for Film (3 Credit Hours)

This is a hands-on course in the art of film composition. Students will analyze iconic film scores from Bernard Herrmann to John Powell, exploring music's narrative impact, gain insight into the modern composer's workflow and diverse skill sets, and apply the techniques learned in practical projects, transitioning from sketch to demo using a DAW. The course culminates in a recording session for the final project. This projects allows students to practice film spotting, thematic writing, sketch to demo production, arranging and music preparation for a live recording experience. Students elevate their skills in writing music that uniquely supports and enhances visual storytelling.

Prerequisites: MUSC 222 and MUSC 335T

MUSC 545 Applied Music Pedagogy (1 Credit Hour)

Teaching techniques, literature in the performing area. Seminar deals with resource materials. Laboratory: observation and teaching under supervision.

Prerequisites: senior standing, music major, or permission of the department

MUSC 560 History of Jazz (3 Credit Hours)

This course will study the historical development of jazz as an American art form. The emotion and meaning of this style will be investigated as well as the historical and contemporary aesthetic response. Emphasis will include the defining role of African American artists. The influence of jazz on the development of contemporary American music will be discussed. A research paper will be required.

MUSC 561 History of Recorded Music (3 Credit Hours)

The course covers how music has co-evolved with technology, the entertainment business, and cultural trends. The main theme is how recording technology has evolved, and with it, the music making and music listening experiences. Students will expand their musical vocabulary through the study of numerous musical genres, listening to and discussing the essential elements of impactful records, and learning about key artists, composers, producers, engineers, and other music professionals (both past and present). Students will gain a better understanding of the role music plays in the entertainment industry, including with film, TV, games, social media, live events, and more.

Prerequisites: ENGL 110C

MUSC 562 Hip-Hop Music and Culture (3 Credit Hours)

Hip-hop, from local roots to global dominance, has sparked extensive journalistic and academic exploration primarily focused on its social and cultural impacts. This course delves into the historical factors shaping hip-hop's origin and evolution, examines its global success and translation both musically and linguistically, and engages in contemplation regarding the essence and direction of hip-hop. No prior musical experience or knowledge of music notation is required, but students will develop a basic set of skills for discussing the structure and function of hip-hop songs.

Prerequisites: Graduate standing in music or permission of the instructor

MUSC 566 Music of the 20th Century to the Present (3 Credit Hours)

A study of the techniques and styles in music in the twentieth and twenty first century (offered spring).

Prerequisites: Graduate standing in music or permission of the instructor

MUSC 571 Musicians' Health: Music and Medicine (3 Credit Hours)

This course is designed to assist music students to enhance their understanding of musicians' health issues in order to prepare them to achieve their desired performance potential.

Prerequisites: Graduate standing or permission of the Graduate Program Director

MUSC 591 Music History from the Ancient to Baroque Era (3 Credit Hours)

Study of music history (specific topics vary) including historical perspective in relation to style and development of music, and the function of music in society and culture. Topics will be from the Ancient through the Baroque era (offered fall semester).

Prerequisites: Graduate standing in music or permission of the instructor

MUSC 592 Music History from the Classical through Modern Era (3 Credit Hours)

Study of music history (specific topics vary) including historical perspective in relation to style and development of music, and the function of music in society and culture. Topics will be from the Classical through Modern era.

Prerequisites: Graduate standing in music or permission of the instructor

MUSC 594 Music in the Romantic Era (3 Credit Hours)

A study of music history from the late works of Beethoven to Mahler and Strauss. A discussion of musical style within the context of cultural history. (offered spring, even years)

Prerequisites: Graduate standing in music or permission of the instructor

MUSC 595 Topics in Music (1-3 Credit Hours)

These courses will appear in the course schedule. Course descriptions and prerequisites for each course may be found in information distributed to all academic advisors.

MUSC 596 Topics in Music (1-3 Credit Hours)

These courses will appear in the course schedule. Course descriptions and prerequisites for each course may be found in information distributed to all academic advisors.

MUSC 600 Introduction to Graduate Research (1 Credit Hour)

This course should be taken among the first courses in the Master of Music Education program. Introduces graduate students to basic skills in Music Education research, including bibliographic searches, on-line searches, computer data analysis, and conventions of scholarly writing for reporting findings.

Prerequisites: Admission to the Master of Music Education program or instructor's permission

Pre- or corequisite: MUSC 630

MUSC 602 Analytical Techniques (3 Credit Hours)

Examines techniques and concepts applied to compositions of the eighteenth, nineteenth, and twentieth centuries as well as modern music, through analysis of contrapuntal and harmonic textures, form, and performance practice.

Prerequisites: Baccalaureate degree in music or permission of department chair and instructor

MUSC 603 Principles of Music Education (3 Credit Hours)

Methods, techniques, principles, and tools of music education, with reference to various types of school situations.

Prerequisites: Admission to the Master of Music Education program or instructor's permission

MUSC 604 Foundations of Music Education (3 Credit Hours)

This course involves the study of the philosophical, psychological and historical foundations of music related to curriculum development.

Prerequisites: Admission to the Master of Music Education program or instructor's permission

MUSC 605 Literature of the Wind Ensemble (3 Credit Hours)

The course centers upon the study of the performance, review and analysis of music for the Symphonic Band and Wind Ensemble. Suited especially to the needs of directors of secondary school and other nonprofessional wind ensembles.

Prerequisites: Baccalaureate degree in music or permission of the instructor

MUSC 606 Choral Music Literature (3 Credit Hours)

Survey of choral literature and practical performance practices from the Renaissance to the present.

Prerequisites: Baccalaureate degree in music or permission of the department chair and instructor

MUSC 607 Orff Schulwerk Level I (3 Credit Hours)

This course is a study of basic Orff Schulwerk techniques. Level I pedagogy includes instruction in the use of pentatonic scale, ostinato, elemental forms, improvisation, basic body movement and basic soprano recorder skills.

Prerequisites: undergraduate degree in music or music education

MUSC 608 Orff Schulwerk Level II (3 Credit Hours)

Introduction of Alto recorder occurs in Level II. Also included is an in-depth study of Orff Schulwerk Vol. III in which the student will be instructed in the use of I, IV, V harmony. Body movement and extensive study of folk dance are included.

Prerequisites: MUSC 607 and proficiency on the soprano recorder

MUSC 609 Literature of the Orchestra (3 Credit Hours)

This course is a survey of standard repertoire written for string and symphony orchestra, including score analysis and study of historical context and performance practice. Selected educational repertoire will also be explored in relation to similar counterparts in the standard repertoire. Suited for music educators and developing conductors.

Prerequisites: undergraduate degree in music or permission of the instructor

MUSC 610 Orff Schulwerk Level III (3 Credit Hours)

This course will build upon the skills and concepts introduced in Orff Schulwerk Levels I and II. Recorder technique will be expanded upon as well as eurhythmics and special topics.

Prerequisites: MUSC 607 and MUSC 608

MUSC 611 Current Trends in Elementary and Secondary Music (3 Credit Hours)

Designed for public school music teachers. This course involves the study of current methodology, its practice and uses in the elementary and secondary general/vocal/instrumental music program.

Prerequisites: Admission to the Master of Music Education program or instructor's permission

MUSC 612 Organization and Administration of Instrumental Music (3 Credit Hours)

The course involves the study of effective organization and implementation techniques for elementary and secondary instrumental ensembles; includes particular problems in the administration of high school instrumental groups.

Prerequisites: Baccalaureate degree in music or permission of instructor

MUSC 613 Workshop in Music Education (1 Credit Hour)

This course centers upon the development of performance and instructional skills in various aspects of music education. May be repeated twice with different emphases.

Prerequisites: Baccalaureate degree in music or permission of the department chair and instructor

MUSC 614 Workshop in Instrumental Music (1 Credit Hour)

The course centers upon the development of performance and instrumental skills in various aspects of instrumental music. May be repeated twice with different emphases.

Prerequisites: Baccalaureate degree in music or permission of the department chair and instructor

MUSC 615 Workshop in Choral Music (1 Credit Hour)

This course centers upon the development of conducting techniques, performance and instructional skills in various aspects of choral music. May be repeated twice with different emphases.

Prerequisites: Baccalaureate degree in music or permission of the department chair and instructor

MUSC 616 Advanced Conducting Seminar (3 Credit Hours)

Involves conducting techniques as applied to various mixed ensembles. Emphasizes the technical considerations common to all phases of choral and instrumental conducting with special concern for school problems.

Prerequisites: Baccalaureate degree in music or permission of instructor or department chair

MUSC 630 Research in Music Education (3 Credit Hours)

Types of research, selection of problems, location of educational information, collection and classification of data, organization, presentation and interpretation of materials in the area of music education.

Prerequisites: Admission to the Master of Music Education program or instructor's permission

Pre- or corequisite: MUSC 600

MUSC 635 Technology in the Music Classroom (3 Credit Hours)

This course supports music educators in their goal of producing engaging educational experiences for their students. Topics include essential audio skills, basic video production, the entertainment business, music composition for various contexts, music apps, and more. Students learn through practical projects, receiving detailed feedback on their work. The technological tools would be put within the context of culture, current musical and business trends, and creative pedagogy.

Prerequisites: Undergraduate degree in music or permission of the instructor

MUSC 636 Techniques of Jazz Education in the Secondary School (3 Credit Hours)

This course will deal with rehearsal techniques for the Jazz Ensemble, including articulation, style, phrasing, literature, and improvisational techniques. In addition, Jazz history and literature will be discussed in detail.

Prerequisites: undergraduate degree in music or permission of the instructor

MUSC 639 Vocal/Choral Arranging (3 Credit Hours)

Course is designed to develop the skills necessary to arrange a piece of vocal music for ensembles of various sizes and makeup. Techniques will be discussed and shown in class and students will complete written assignments to implement these techniques.

Prerequisites: passing the Theory Placement Test; undergraduate degree in music or permission of the instructor

MUSC 680 Performing Ensembles (1 Credit Hour)

Students are expected to help with sectional rehearsals and do in-depth score study on all music being performed.

Prerequisites: permission of the instructor and audition

MUSC 692 Portfolio (3 Credit Hours)

This course is designed to guide the student who is completing the Pedagogical Concentration in developing a professional teaching portfolio. It would typically be taken during the last semester of the degree program. The portfolio will be completed in digital format suitable for professional use. It will include information in the following areas: professional foundations, scholarship, performance, applied pedagogy and other professional data pertinent to the focus of the student.

Prerequisites: Admission to the Master of Music Education program or instructor's permission

MUSC 695 Topics in Music (1-3 Credit Hours)

These courses will appear in the course schedule. Course descriptions and prerequisites for each course may be found in information distributed to all academic advisors.

Prerequisites: undergraduate degree in music or permission of the instructor

MUSC 696 Topics in Music (1-3 Credit Hours)

These courses will appear in the course schedule. Course descriptions and prerequisites for each course may be found in information distributed to all academic advisors.

Prerequisites: undergraduate degree in music or permission of the instructor

MUSC 697 Independent Study (1-3 Credit Hours)

Designed for individualized study. Independent study projects will be related to music education and done under the supervision of a certified faculty member.

Prerequisites: permission of the graduate program director

MUSC 698 Thesis Research (3 Credit Hours)

Application of research procedures in music education, culminating in student study of selected topics.

Prerequisites: MUSC 600, MUSC 630, and permission of the graduate program director

MUSC 699 Thesis (3 Credit Hours)

Completion of thesis for the Master of Music Education degree.

Prerequisites: MUSC 698

MUSC 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

MUSC 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

NMED - Nuclear Medicine Technology

NMED 695 Topics in Nuclear Medicing Technology (1-3 Credit Hours)

Special topic related to the field of nuclear medicine technology and molecular imaging.

NMED 697 Directed Study in Nuclear Medicine Technology (1-3 Credit Hours)

Directed study in a topic or area relevant to nuclear medicine or nuclear medicine technology.

NMED 698 Research (3 Credit Hours)

Research on a topic or project related to nuclear medicine or nuclear medicine technology.

NMED 699 Thesis (3 Credit Hours)

Thesis on a topic in nuclear medicine/molecular imaging or nuclear medicine technology.

NURA - Nurse Anesthesia

NURA 745 Applied Chemistry and Physics for Nurse Anesthetists (2 Credit Hours)

This course is a review of the principles of organic chemistry, biochemistry, and physics. It is designed as a foundation for the students' understanding of pharmacology, physiology, and the anesthesia gas machine. This course will also provide an introduction to the chemical structure-activity relationships, metabolism and mechanism of action of selected agents.

NURA 753 Advanced Pharmacology for Nurse Anesthesia Practice (3 Credit Hours)

This is a course in advanced anesthesia pharmacotherapeutics that builds on prior knowledge of drug classification, actions, interactions and adverse drug reactions. The major focus of the course is synthesizing principles learned in Advanced Pharmacology for Nursing Practice and applying them to anesthetic pharmaceuticals. Emphasis is placed on the critical thinking process used to choose and prescribe drugs in the management of anesthetic. Core concepts include applied pharmacodynamics, pharmacokinetics, volatile agent delivery systems, theories of anesthetic action and the interactions between patient medication and anesthetic agents. This course consists of three hours of lecture/discussion/in-class clinical module work per week.

NURA 760 Evidence Based Seminar for Anesthesia Practice (1 Credit Hour)

This course helps prepare advanced practice nurses with an opportunity to assess clinical and scientific evidence through appraisal of the literature. The course explores the philosophical underpinnings for nursing knowledge and evidence in nursing practice.

NURA 761 Evidenced-Based Seminar for Anesthesia Practice I (1 Credit Hour)

This course is the first in a series of five seminar courses that helps prepare advanced practice nurses with an opportunity to assess clinical and scientific evidence through appraisal of the literature. The course explores the philosophical underpinnings for nursing knowledge and evidence in nursing practice.

Pre- or corequisite: NURA 752, NURA 754, and NURS 801

NURA 762 Evidenced-Based Seminar for Anesthesia Practice II (1 Credit Hour)

This course is the second in a series of five seminar courses that helps prepare advanced practice nurses with an opportunity to assess clinical and scientific evidence through appraisal of the literature. The course is designed to build on the understanding gained in NURA 761 and to expand the advanced practice nursing student's understanding of research methods, design, and statistics.

Prerequisites: NURA 761

NURA 797 Independent Study (1-10 Credit Hours)

Independent study in nurse anesthesia under the guidance of a faculty.

Prerequisites: admission to the nurse anesthesia program

NURA 836 Advanced Physiology and Pathophysiology for Nurse Anesthesia I (3 Credit Hours)

This course addresses normal and abnormal physiological functioning of body systems building on undergraduate anatomy and physiology. Structure and functions of the systems will be examined at the cellular, subcellular, genetic, and biochemical level. The goal is to provide an in-depth understanding of the dysfunction of body systems in a diseased state as well as comprehension of the normal function to maintain homeostasis. Systems to be addressed include: cellular and molecular physiology, immune system, nervous system, skeletal muscle system, and the cardiovascular system.

NURA 837 Advanced Physiology and Pathophysiology for Nurse Anesthesia II (3 Credit Hours)

This course addresses normal and abnormal physiological functioning of body systems building on undergraduate anatomy and physiology. Structure and functions of the systems will be examined at the cellular, subcellular, genetic, and biochemical level. The goal is to provide an in-depth understanding of the dysfunction of body systems in a diseased state as well as comprehension of the normal function to maintain homeostasis. Systems to be addressed include: respiratory system, digestive/hepatic system, endocrine system, and neoplasia mechanisms and treatments.

Prerequisites: NURA 836

NURA 838 Professional Aspects for Anesthesia (1 Credit Hour)

A study of the unique goals, distinctive content, and special problems of health/anesthesia care and education in this country. Includes such areas as management, organization, legal aspects, professional adjustments, ethics, psychology, and history.

NURA 841 Principles of Anesthesia Practice I (4 Credit Hours)

This course integrates scientific concepts with basic principles of anesthesia practice and prepares the student for their new role in the safe and effective delivery of anesthesia. Emphasis is on vital anesthesia monitoring and delivery systems. Airway management and general anesthesia techniques will also be discussed. Simulation is incorporated into the learning process to reinforce principles introduced in class.

Prerequisites: NURA 745

NURA 842 Principles of Anesthesia Practice II (4 Credit Hours)

This course formulates a basic level of cognitive, affective, and psychomotor expertise for the preoperative, intraoperative, and postoperative anesthesia periods. Students will analyze and apply basic physiological principles in preparation for the anesthesia management of patients undergoing complex surgical procedures. Human simulation is incorporated into the learning process to reinforce principles introduced in class.

NURA 843 Principles of Anesthesia Practice III (4 Credit Hours)

This course is the third course in a series of three and is intended to further the foundation for safe and effective delivery of anesthesia. It is designed to prepare the student for the decision making necessary for the complex issues of anesthesia in clinical practice. Students will apply knowledge of pathophysiological conditions to formulate safe plans of care for patients undergoing complex surgical procedures. Human Simulation is incorporated into the learning process to reinforce principles introduced in class.

NURA 844 Principles of Anesthesia Practice IV (1 Credit Hour)

This course is the fourth in an increasingly more complex eight-course series intended to accompany NURA 842. It is designed to review basic sciences and equipment, instrumentation and technology related to clinical practice.

Pre- or corequisite: NURA 843

NURA 845 Principles of Anesthesia Practice V (1 Credit Hour)

This course is the fifth in an increasingly more complex eight-course series intended to accompany NURA 843. It is designed to review basic sciences and equipment, instrumentation and technology related to clinical practice. This course also incorporates preoperative, intraoperative, and postoperative care of patients.

Pre- or corequisite: NURA 844

NURA 846 Principles of Anesthesia Practice VI (1 Credit Hour)

This course is the sixth in an increasingly more complex eight-course series intended to accompany NURA 844. This course is designed to review anesthesia concepts and begin the preparation to take the National Certification Exam.

Pre- or corequisite: NURA 845

NURA 847 Principles of Anesthesia Practice VII (1 Credit Hour)

This course is the seventh in an increasingly more complex eight-course series intended to accompany NURA 845. This course is designed to review anesthesia concepts and continue the preparation to take the National Certification Exam

Pre- or corequisite: NURA 846

NURA 848 Principles of Anesthesia Practice VIII (1 Credit Hour)

This course is the final in an increasingly more complex eight-course series intended to accompany NURA 846. This course is designed to review anesthesia concepts and examine student readiness of the National Certification Exam.

Pre- or corequisite: NURA 847

NURA 853 Nurse Anesthesia Practicum: Orientation for Clinical Anesthesia (2 Credit Hours)

This introductory-level course is designed to integrate didactic knowledge with basic practical application. The student will apply knowledge concerning preoperative assessment, care plan development, induction sequence, basic airway management, function and usage of anesthesia equipment, pharmacology dosing and mathematics for anesthesia. Course content is based on the American Association of Nurse Anesthetists Standards for Nurse Anesthesia Practice and the American Association of Colleges of Nursing DNP Essentials.

Prerequisites: Successful completion of all first, second and third semester courses in the Nurse Anesthesia program

NURA 854 Nurse Anesthesia Practicum I (3 Credit Hours)

This introductory-level course is designed to integrate didactic knowledge with basic practical application to the art and science of nurse anesthesia. It is designed to cultivate the novice student nurse anesthetist in selected clinical settings under direct supervision of qualified clinical preceptors. The student will be immersed in the anesthesia clinical environment for this course. Course content is based on the American Association of Nurse Anesthetists Standards for Nurse Anesthesia Practice and the American Association of Colleges of Nursing DNP Essentials.

Prerequisites: NURA 853

NURA 855 Nurse Anesthesia Practicum II (4 Credit Hours)

This clinical course is the second in an increasingly more complex six-course series and continues the integration of didactic knowledge and practical application to the art and science of nurse anesthesia. It is designed to cultivate the advanced beginner student nurse anesthetist in selected clinical settings under close direction of qualified clinical preceptors. The student will be immersed in the anesthesia clinical environment for this course. Course content is based on the American Association of Nurse Anesthetists Standards for Nurse Anesthesia Practice and the American Association of Colleges of Nursing DNP Essentials.

Prerequisites: NURA 854

NURA 856 Nurse Anesthesia Practicum III (4 Credit Hours)

This clinical course is the third in an increasingly more complex six-course series and continues the integration of didactic knowledge and practical application to the art and science of nurse anesthesia. It is designed to cultivate the competent student nurse anesthetist in a variety of clinical settings under the guidance of qualified clinical preceptors. The student will be immersed in the anesthesia clinical environment for this course. Course content is based on the American Association of Nurse Anesthetists Standards for Nurse Anesthesia Practice and the American Association of Colleges of Nursing DNP Essentials.

Prerequisites: NURA 855

NURA 857 Nurse Anesthesia Practicum IV (4 Credit Hours)

This clinical course is the fourth in an increasingly more complex six-course series and continues the integration of didactic knowledge and practical application to the art and science of nurse anesthesia. It is designed to cultivate the proficient student nurse anesthetist in a variety of clinical settings under the guidance of qualified clinical preceptors. The student will be immersed in the anesthesia clinical environment for this course. Course content is based on the American Association of Nurse Anesthetists Standards for Nurse Anesthesia Practice and the American Association of Colleges of Nursing DNP Essentials.

Prerequisites: NURA 856

NURA 858 Nurse Anesthesia Practicum V (4 Credit Hours)

This clinical course is the fifth of six in an increasingly more complex six-course series, and continues the integration of didactic knowledge and practical application to the art and science of nurse anesthesia. It is designed to cultivate the proficient student nurse anesthetist in a variety of clinical settings in collaboration with qualified clinical preceptors. The student will be immersed in the anesthesia clinical environment for this course. Course content is based on the American Association of Nurse Anesthetists Standards for Nurse Anesthesia Practice and the American Association of Colleges of Nursing DNP Essentials.

Prerequisites: NURA 857

NURA 859 Nurse Anesthesia Practicum VI (3 Credit Hours)

This clinical course is the final in an increasingly more complex six-course series and continues the integration of didactic knowledge and practical application to the art and science of nurse anesthesia. It is designed to cultivate the proficient student nurse anesthetist in a variety of clinical settings in collaboration with qualified clinical preceptors. The student will be immersed in the anesthesia clinical environment for this course. Course content is based on the American Association of Nurse Anesthetists Standards for Nurse Anesthesia Practice and the American Association of Colleges of Nursing DNP Essentials.

Prerequisites: NURA 858

NURA 863 Evidenced-Based Seminar for Anesthesia Practice III (1 Credit Hour)

This course is the third in a series of five seminar courses designed to enhance the nurse anesthesia student's understanding of research methods, design and analysis. A journal club format is used to evaluate anesthesia care for optimum outcomes using published research studies.

Prerequisites: NURA 762

NURA 864 Evidenced-Based Seminar for Anesthesia Practice IV (1 Credit Hour)

This course is the fourth in a series of five seminar courses designed to enhance the nurse anesthesia student's understanding of research methods, design and analysis. A journal club format is used to evaluate anesthesia care for optimum outcomes using published research studies.

Prerequisites: NURA 863

NURA 865 Evidenced Based Seminar for Anesthesia Practice V (1 Credit Hour)

This course is the fifth in a series of five seminar courses designed to enhance the nurse anesthesia student's understanding of research methods, design and analysis. A journal club format is used to evaluate anesthesia care for optimum outcomes using published research studies.

Prerequisites: NURA 864

NURA 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

NURS - Nursing

NURS 530 Principles of Practice: Contemporary Issues in Nursing Care of the Older Adult (2 Credit Hours)

This course focuses on the nursing needs of the well gerontological client. Emphasis is on the multi-complex needs of the older adult.

NURS 595 Topics in Nursing (1-3 Credit Hours)

The study of selected topics that may not be offered regularly. Special topics will appear in the schedule of classes each semester.

Prerequisites: Permission of the instructor

NURS 650 Shenandoah University Midwifery Courses (19 Credit Hours)

This course provides for the award of credit for selected courses taken at Shenandoah University in fulfillment of Midwifery program requirements: NM 610, NM 620, NMLB 630, NM 640, NMLB 651, NM 652, and NM 660.

NURS 651 Shenandoah University Psychiatric Mental Health Courses (27 Credit Hours)

This course provides for the award of credit for selected courses taken at Shenandoah University in fulfillment of the Psychiatric Mental Health Nurse Practitioner program requirements: NP 525, PMH 635, PMH 680, PMH 640, PMH 685, PMH 660, HP 576, PMH 695.

NURS 654 Assessment and Evaluation in Nursing Education (3 Credit Hours)

This course concentrates on strategies to measure and improve nursing student performance in the classroom, as well as enhance course and program effectiveness. Emphasis is on the selection of instruments, data collection methods and reporting procedures to guide assessment and evaluation processes that are appropriate for what is being examined.

Prerequisites: NURS 634, NURS 636, NURS 644, NURS 645, and NURS 649

NURS 676 Professional, Ethical and Legal Concepts of Nursing Education (3 Credit Hours)

This course is designed to prepare students for the role of educator in higher education environments. Emphasis is on the identification of functions, rights, and responsibilities of nursing faculty in relation to students, colleagues, administrators, the institution, community, and profession.

NURS 699 Thesis/Research Project (1-3 Credit Hours)

Thesis/research project completion. Variable credit to be determined by research advisor. May be repeated as needed.

Prerequisites: NURS 611, NURS 640

NURS 700 Interprofessional Study Abroad on Global Health (1-3 Credit Hours)

This study abroad service learning course will introduce the student to the political, social, cultural, and ethical issues involved in prevention and health promotion globally. Students will travel to another country and learn the incidence/prevalence, morbidity/mortality, and identified public health problems in specific regions and countries.

NURS 705 Primary Care Approaches for Children (3 Credit Hours)

This course focuses upon primary health care problems in the pediatric population. Emphasis is placed upon assessment and management of healthy and ill children.

Prerequisites: NURS 770, NURS 771, NURS 761

NURS 707 Informatics and Healthcare Technology (3 Credit Hours)

This course will cover the use of data in health care as well as other informatics applications. Students will explore healthcare technology used to improve the delivery and evaluation of care.

NURS 709 Evidence-Based Research for Nursing Practice (3 Credit Hours)

This course focuses on the development of advanced nursing knowledge related to the utilization of evidence-based research for best practice. Emphasis is placed on the evaluation and application of research and evidence for use in advanced practice including models, concepts, and theories as a supporting framework for research.

NURS 713 Telehealth for Providers (1 Credit Hour)

This course is designed to provide the student involved in healthcare or healthcare supportive roles with knowledge and skills to become actively involved in the implementation and delivery of telehealth services.

NURS 714 Competitive Resource Design and Utilization (3 Credit Hours)

This course focuses on the competitive design and utilization of organizational and human resources. Emphasis will be placed on the strategic process to ensure that resources are applied in ways to ensure high-quality care and excellent patient outcomes. The course will cover the business models for effective financial and personnel management of healthcare organizations. Analysis of the costs and quality of care will be performed.

NURS 717 Strategic Leadership Practicum (3 Credit Hours)

This practicum course emphasizes the advanced practice nurse's role in strategic planning and program development. Students enrolled in this advanced practice course will participate in clinical practice experiences in a chosen focus area. This course is designed to provide students with experiences in applying the knowledge acquired in Strategic Leadership.

Pre- or corequisite: NURS 740 or permission of instructor

NURS 718 Practicum Immersion for Novice Nurse Executives (3 Credit Hours)

This practicum course serves as a bridge between the roles of nurse administrators and nurse executives. Targeted practicum experiences will enable the nurse administrator to examine the role of the nurse executive related to implementation of change, meeting strategic initiatives, program evaluation, and outcome management in a chosen focus area. Application of futuristic and visionary theory to health care system trends is explored to provide optimal strategic positioning in the future healthcare market.

NURS 719 Family and Community Primary Care Assessment (1 Credit Hour)

This course provides students with the opportunity to develop advanced practice skills for assessing families and family members across the life span and throughout generations. This course will focus on theoretical, research and practice foundations used to develop strategies to maximize safe, comprehensive, and holistic care given by the advanced practice nurse.

NURS 720 Instructional Delivery Methods & Learner Assessment (3 Credit Hours)

The enhancement of nursing education through an array of instructional delivery methods based on reports of best practices, research findings, instructional-related theories, and learning-related theories is examined. Emphasis is on identifying ways to blend traditional teaching strategies for classroom and clinical instruction with technology-based instruction utilizing a variety of resources and models.

Pre- or corequisite: NURS 734 or permission of instructor

NURS 721 Aging in the 21st Century (3 Credit Hours)

This course explains the history of the specialty of geriatrics, the social impact, health maintenance goals and physical changes associated with aging. The role of interprofessional teams in meeting the needs of the aging population will be explored.

NURS 722 Psychiatric Assessment and Differential Diagnosis (1 Credit Hour)

This didactic course will introduce students to the process of history-taking and assessment of psychiatric mental health problems in the diagnosis of children through older adults and the process of using data from the patient's history and assessment to formulate a differential diagnosis. Cultural, genetic, religious, behavioral, educational, physical, and laboratory data will be utilized in the formulation of differential diagnoses.

NURS 723 Psychotherapeutic Approaches & Treatment Modalities (3 Credit Hours)

This course provides the history and current methods of psychotherapy as well as current methods of diagnosis of mental health disorders and differential diagnosis. Knowledge will be applied across the lifespan including: adult, child, adolescent, older adults and special populations.

Prerequisites: Admission to the Psych Mental Health MSN, DNP or certificate concentration

NURS 725 Psychopharmacology and Neurobiology (3 Credit Hours)

This course will examine the psychopharmacology of medications used to treat mental health disorders. It will also examine basic neurobiology and evaluate the intrinsic and extrinsic factors associated with the development of mental health disorders.

Prerequisites: Admission to PMH MSN, DNP or certificate concentration

NURS 726 Managing Psychiatric Disorders Across the Lifespan (3 Credit Hours)

This course provides the opportunity to gain knowledge of the management of mental health conditions across the lifespan, including child, adolescent, adult and older adult. Disparities across populations will be a component of the course. Culturally-centered, collaborative care will be emphasized in the preventive care and management of mental health disorders.

Prerequisites: Admission to PMH MSN, DNP or certificate

NURS 727 Psychiatric Mental Health Nurse Practitioner Practicum I (4 Credit Hours)

This course provides the opportunity for students to work in various psychiatric mental health environments focusing on a diverse population. The course will offer the opportunity to work with clinical mentors in their own communities. The time in these settings will allow students to begin their diagnosis and selection of appropriate treatment strategies, including medications and therapy, for individuals, families and groups with a wide variety of psychiatric mental health concerns.

Prerequisites: NURS 723, NURS 725, NURS 761, NURS 770, and NURS 771

Pre- or corequisite: NURS 726

NURS 728 Psychiatric Mental Health Nurse Practitioner Practicum II (5 Credit Hours)

This course provides the opportunity for students to build on previous clinical course work in various psychiatric mental health environments focusing on a diverse population. The time in these settings will allow students to enhance their diagnosis and selection of appropriate treatment strategies for individuals (child, adolescent, adult and older adult), families, and groups with a wide variety of psychiatric mental health concerns. This course requires 280 clinical hours.

Prerequisites: NURS 727

NURS 730 Nursing Curricular Design and Program Evaluation (3 Credit Hours)

This course focuses on factors impacting the development of nursing curricula including theory, professional practice trends, education standards, accreditation guidelines and institutional policy/procedure. Components of curricula are evaluated, and strategies for program evaluation are explored.

NURS 734 Educator Internship: Classroom Instruction (3 Credit Hours)

This internship course is designed to provide the student with experience facilitating classroom instruction in an entry level nursing program.

NURS 736 Managing Psychiatric Disorders in Specific Populations: The Adult/Geriatric Patient (4 Credit Hours)

This course provides the opportunity to gain knowledge of the management of mental health conditions with the adult and geriatric patient populations. Disparities across the two populations will be a component of the course. Culturally centered, collaborative care will be emphasized in the preventive care and management of mental health disorders. Appropriate care in a variety of treatment settings (inpatient, intensive outpatient, outpatient, forensic, long-term care) will be examined as well as legal ramifications for the PMHNP in treating this patient population.

NURS 738 Clinical Nurse Specialist I: Introduction to Practice (2 Credit Hours)

This course provides the graduate student with knowledge of core concepts that provide the foundation for Clinical Nurse Specialist practice.

NURS 739 Clinical Nurse Specialist Practicum I: Role Socialization (4 Credit Hours)

This course is designed to acquaint the student with the role of the Clinical Nurse Specialist in the practice environment.

NURS 751 Developmental Neonatal Physiology (2 Credit Hours)

This course provides an in-depth examination of human genetics, embryologic development and normal physiologic functioning of developing body systems. Mechanisms involved in cell division, gametogenesis, and inheritance patterns will be addressed. Basic genetics and epigenetics will be included. The structural and functional development of fetal systems, during critical periods, will be emphasized. Abnormalities and alterations in fetal development will be explored.

NURS 756 Clinical Nurse Specialist II: Transition to Practice (3 Credit Hours)

This course provides the graduate student with knowledge necessary for developing Clinical Nurse Specialist practice and leadership skills.

Pre- or corequisite: NURS 757

NURS 757 Clinical Nurse Specialist Practicum II: Role Transition (5 Credit Hours)

This clinical course focuses on Clinical Nurse Specialist practice. Concepts presented in the didactic component (NURS 756) will be actualized in the clinical setting.

Pre- or corequisite: NURS 756

NURS 758 Clinical Nurse Specialist Practicum III: Role Synthesis (3 Credit Hours)

This capstone course focuses on synthesis and application of key concepts related to the Clinical Nurse Specialist practice.

Prerequisites: NURS 738, NURS 739, NURS 756, and NURS 757

NURS 760 Advanced Family Nursing I Practicum (3 Credit Hours)

This course provides the opportunity to practice clinical decision-making and primary care assessment skills within a primary care setting. Collaborative strategies will be emphasized in the position of health promotion/maintenance strategies and the management of common health problems.

NURS 761 Pharmacology for Advanced Practice Nursing (3 Credit Hours)

This course will develop and enhance the advanced practice nurse's knowledge of pharmacological management of the patient. Expanded knowledge and application of advanced pharmacologic concepts across the lifespan will build upon previous elemental concepts in pharmacology and pharmacotherapeutics obtained in undergraduate education and clinical practice.

Prerequisites: Admission to the MSN or DNP program is required

NURS 762 Advanced Family Nursing I: Management of Acute Illnesses (3 Credit Hours)

Focus is on acute health problems in the primary care setting, including assessment and management. Inclusion of geriatric content relating to acute illnesses will be added.

Prerequisites: NURS 761, NURS 770, and NURS 771

NURS 764 Advanced Family Nursing II Practicum (4 Credit Hours)

This course provides the opportunity to practice clinical decision-making and primary care assessment skills within a primary care setting. Collaborative strategies will be emphasized related to health promotion/maintenance and the management of common health problems for patients.

Prerequisites: NURS 761, NURS 770, and NURS 771

NURS 765 Advanced Family Nursing II: Management of Chronic Illnesses (3 Credit Hours)

The focus of this course is on the accurate diagnosis and management of chronic health problems within the primary care setting for the family nurse practitioner (FNP).

Prerequisites: NURS 761, NURS 763, NURS 770, and NURS 771

NURS 766 Primary Care Approaches for Women (3 Credit Hours)

This course will explore current clinical concepts related to the care of healthy and pregnant women. Roles and responsibilities of the family nurse practitioner in these sub-specialties will also be discussed.

NURS 767 Advanced Family Nursing III Practicum (3-4 Credit Hours)

This course provides the opportunity to practice clinical decision-making and primary care assessment skills within a primary care setting. Collaborative strategies will be emphasized related to health promotion/maintenance and the management of common health problems for patients.

Prerequisites: NURS 761, NURS 760, NURS 770, NURS 771, NURS 762, and NURS 764

NURS 770 Pathophysiology for Advanced Nursing Practice (3 Credit Hours)

This course explains the pathophysiology of disease as a basis for advanced practice and assessment for prevention and management of health conditions.

Prerequisites: Admission to the MSN or DNP program is required to enroll in this course

NURS 771 Physical Assessment for Advanced Nursing Practice (3 Credit Hours)

Emphasis is on advanced history taking, physical assessment and interviewing skills for advanced practice nursing. Advanced practice students will participate in lab sessions with experiential activities allowing for the development of physical assessment skills across the lifespan.

Prerequisites: Admission to either the MSN or DNP program is required to enroll in this course

NURS 772 Foundations of Advanced Neonatal Care (3 Credit Hours)

The foundations of advanced neonatal care course provides the theoretical and practical knowledge for the neonatal nurse practitioner or physician assistant to manage the health care needs of the neonate in the newborn nursery or level II neonatal intensive care unit.

Prerequisites: NURS 768, NURS 770 and NURS 771

NURS 773 Pharmacology for Advanced Neonatal Care (3 Credit Hours)

The course offers scientific inquiry into the use of pharmacologic agents in the advanced nursing care of infants, including fetal, neonatal life, and early childhood. Pharmacokinetics, pharmacodynamics, drug use in pregnancy and lactation, pharmacologic agents used in disease prevention and treatment, drug monitoring and drug safety in the home are explored.

Pre- or corequisite: NURS 761

NURS 774 Advanced Neonatal Care: High Risk Management I (3 Credit Hours)

This course develops the students' ability to manage high-risk neonates. This is the second of three sequential management courses that provide the theoretical and practical knowledge for the neonatal nurse practitioner to manage the health care needs of the neonate at the highest level of nursing practice.

Prerequisites: NURS 772

NURS 775 Advanced Neonatal Care: High Risk Management II (3 Credit Hours)

This course develops the students' ability to manage high-risk neonates. This is the third and final sequential management course that provides the theoretical and practical knowledge for the neonatal nurse practitioner, or physician assistant, to manage the health care needs of the neonate at the highest level of nursing practice.

Prerequisites: NURS 774

NURS 776 Advance Neonatal Nursing Practicum I (3 Credit Hours)

The development of foundational skills associated with the physical assessment and management of the neonate is the focus of this practicum experience.

Pre- or corequisite: NURS 768, NURS 770 and NURS 771

NURS 778 Advanced Neonatal Nursing: Practicum II (4 Credit Hours)

The focus of this course is the accurate diagnosis and management of high risk neonatal clinical problems.

Prerequisites: NURS 776

Pre- or corequisite: NURS 774

NURS 779 Seminar in Pediatrics: Management of Chronic and Complex Neonatal Clinical Problems (2 Credit Hours)

This course utilizes a journal club approach and is designed to acquaint the advance practice neonatal nurse with issues associated with the management of chronic and complex clinical problems. Emphasis is on the identification of clinical conditions requiring timely referral for diagnosis and treatment. Topics will include, but are not limited to, genetics and congenital conditions, palliative/end-of-life care and complications of prematurity.

NURS 781 Advanced Pediatric Nursing: Practicum I Primary Care (3 Credit Hours)

This course provides the opportunity to practice clinical decision-making and primary care assessment skills within a primary care setting. Collaborative strategies will be emphasized related to health promotion/maintenance and the management of common health problems for pediatric patients and their families.

NURS 782 The Growth and Development of Children in the 21st Century (3 Credit Hours)

Physical, cognitive, psychosocial, psychosexual, and social-moral growth and development milestones from infancy through adolescence will be explored from a nursing perspective. Emphasis is on the assessment and management of the child within the context of environmental, cultural, and social factors affecting growth and development.

Prerequisites: NURS 771

NURS 783 Management of Acute Pediatric Conditions I (3 Credit Hours)

An organ systems approach is used to explore the diagnosis and management of childhood disorders. The actions of the PNP and PEDS CNS and the needs of the child are considered across the continuum of care from urgent/primary care to acute care.

Prerequisites: NURS 770, NURS 771, NURS 761

Corequisites: NURS 784

NURS 784 Advanced Pediatric Nursing: Practicum II (4 Credit Hours)

This course provides the opportunity to practice clinical decision-making and primary care assessment skills within a primary care setting. Collaborative strategies will be emphasized related to health promotion/maintenance and the management of common health problems for pediatric patients and their families.

NURS 785 Seminar in Pediatrics: Management of Chronic and Complex Clinical Conditions (3 Credit Hours)

This course explores issues associated with the management of chronic and complex clinical conditions for children. Emphasis is on the identification of clinical conditions requiring timely referral for diagnosis and treatment. Topics will include, but are not limited to genetics, palliative/end-of-life care, and psychiatric/mental issues.

Pre- or corequisite: NURS 783 and NURS 784

NURS 786 Management of Acute/Critical Pediatric Conditions II (3 Credit Hours)

An organ systems approach is used to explore the diagnosis and management of childhood disorders. The actions of the PNP and the needs of the child are considered across the continuum of care from urgent/primary care to acute / critical care.

Corequisites: NURS 788

NURS 788 Advanced Pediatric Nursing: Practicum III (3 Credit Hours)

This course provides the opportunity to practice clinical decision-making and primary care assessment skills in various clinical settings. Collaborative strategies will be emphasized related to health promotion/maintenance and the management of common health problems for pediatric patients and their families.

NURS 789 Advanced Neonatal Nursing Practicum III (4 Credit Hours)

The focus of this course is on the accurate diagnosis and management of high risk neonatal clinical problems.

Prerequisites: NURS 776; NURS 778

Pre- or corequisite: NURS 775

NURS 795 Topics (3 Credit Hours)

Designed to provide the advanced student with an opportunity to investigate specific topics of current interest in the health services.

Prerequisites: Ph.D. standing or permission of the instructor

NURS 797 Independent Study (1-3 Credit Hours)

This course is for students completing an independent study or independent clinical hours.

NURS 798 Independent Clinical Study (1-3 Credit Hours)

This course focuses on clinical and/or research-related competencies of graduate nursing students. Students enroll on an as-needed basis as determined by the instructor or student.

Prerequisites: Enrollment in the graduate nursing program and permission of the instructor

NURS 800 Integrative Concepts for Advanced Nursing Practice Roles (3 Credit Hours)

This course focuses on four integrative concepts including leadership, advocacy, practice, and translational research. Issues related to planning and providing care related to disparity and issues for vulnerable and underserved populations will be highlighted. The role of epidemiology will be explored.

NURS 801 Roles and Responsibilities for Transforming Practice (3 Credit Hours)

This course focuses on role expectations for advanced practice nurses; the intersection of models of leadership, advocacy, practice and translational research will be emphasized. Personal strategic planning of the students will be addressed as it applies to disparity issues and vulnerable and underserved populations.

NURS 802 The Business of Advanced Nursing Practice (3 Credit Hours)

This course will explore the business dimensions of practice including legal, safety, quality and financial. The course will focus on SWOT analysis, developing business plans and community assessments.

NURS 803 Leadership and Interprofessional Practice in Healthcare (3 Credit Hours)

This is an interprofessional course that explores organizational and structural opportunities and barriers within healthcare organizations through interprofessional collaboration and teamwork. Ethical issues will be explored. The focus is on the role of the healthcare provider as a leader of their profession within healthcare and on healthcare teams. Emphasis is on meeting the needs of underserved populations.

Prerequisites: NURS 801

NURS 805 Application of Practice-Based Research Methods (2 Credit Hours)

This course focuses on the research process used to conduct practice-based research. It prepares advanced practice nurses to develop, implement, and evaluate programs that focus on improving healthcare outcomes.

NURS 806 Proposal Development and Database Management (4 Credit Hours)

This research course is designed to provide the Advanced Practice Nurse and Nurse Executive student with knowledge and skills regarding the design and methodology used to conduct a practice focused research study. Focus will be on human subjects protection, statistical analysis and database management.

Prerequisites: NURS 805

NURS 807 Informatics and Healthcare Technology (3 Credit Hours)

This course will cover the use of data in health care as well as other informatics applications. Students will explore healthcare technology used to improve the delivery and evaluation of care.

NURS 809 Advocacy for Healthcare Public Policy for Advanced Practice (3 Credit Hours)

This course will prepare the DNP to assume a leadership role in developing, implementing, and advocating for health care policy that results in quality, accessible, comprehensive health care for vulnerable populations.

NURS 810 Leadership in Complex Systems and Organizations (3 Credit Hours)

This course will focus on the leadership that comprises two types: informal and formal leadership. Competencies will include communication, knowledge of health care environment, leadership, professionalism, and business skills.

NURS 812 Evidence-Based Management for Quality Healthcare (3 Credit Hours)

The focus of the course is on the development of systems processes to ensure quality healthcare. The evidence-based model will be applied to organizational systems.

NURS 814 Competitive Resource Design and Utilization (3 Credit Hours)

This course focuses on the competitive design and utilization of organizational and human resources. Emphasis will be placed on the strategic process to ensure that resources are applied in ways to ensure high-quality care and excellent patient outcomes. The course will cover the business models for effective financial and personnel management of healthcare organizations. Analysis of the costs of care and quality of care will be performed.

NURS 816 DNP Executive Practicum I (2-5 Credit Hours)

This practicum focuses on the application of nurse executive leadership skills in the practice environment. Focus will be on the role of the nurse executive and evidence-based research.

Corequisites: NURS 805

NURS 817 DNP Executive Practicum II (2-5 Credit Hours)

This experience focuses on the application of executive leadership skills in nursing. Focus will be on the role of the nurse executive and evidence-based research.

Corequisites: NURS 806

NURS 818 DNP Executive Practicum III (3-5 Credit Hours)

This practicum focuses on the application of executive leadership skills in the practice environment. Focus will be on the role of the nurse executive, evidence-based research and the use of healthcare technology.

NURS 819 DNP Executive Practicum IV (3-5 Credit Hours)

An examination of the application of executive leadership skills in the practice environment. Focus will be on the role of the nurse executive, evidence-based research, and practice dissemination.

NURS 865 DNP Clinical Practicum I (1-2 Credit Hours)

This course is designed to provide the Advanced Practice Nurse with the knowledge and skills to practice at an advanced level in a practice-based setting. Focus will be on enhanced clinical skills and evidence-based research.

Corequisites: NURS 805

NURS 866 DNP Clinical Practicum II (1-2 Credit Hours)

This course is designed to provide the Advanced Practice Nurse with the knowledge and skills to practice at an advanced level in a practice-based setting. Focus will be on evidence-based practice, teamwork, evidence-based research, and advanced clinical diagnostics.

Corequisites: NURS 806

NURS 867 DNP Clinical Practicum III (1-3 Credit Hours)

This course is designed to provide the Advanced Practice Nurse with the knowledge and skills to practice as an expert clinician, a program evaluator, and a team leader within a practice-based setting focusing on evidence-based practice. Healthcare technology will be explored.

NURS 868 DNP Clinical Practicum IV (1-3 Credit Hours)

This course is designed to provide the Advanced Practice Nurse with the knowledge and skills to practice as an expert clinician, a program evaluator, a team leader, and a change agent with emphasis on translational and evidence-based research.

Corequisites: NURS 890

NURS 890 DNP Nursing Capstone (3 Credit Hours)

This capstone course is designed to facilitate the ability of the advanced practice nurse to synthesize, translate, and disseminate practice-focused research findings and apply them to practice settings.

NURS 895 Topics (1-3 Credit Hours)

Designed to provide the advanced doctoral student with an opportunity to investigate specific topics of current interest in the health services.

Prerequisites: DNP standing or permission of the instructor

NURS 897 Independent Study (1-3 Credit Hours)

This course focuses on research-related competencies of graduate nursing students. Students enroll on an as-needed basis as determined by the instructor.

Prerequisites: Enrollment in the graduate nursing DNP program and permission of instructor

NURS 898 Independent Clinical Study (1-3 Credit Hours)

This course focuses on clinical and/or research-related competencies of DNP graduate nursing students. Students enroll on an as-needed basis as determined by the instructor.

Prerequisites: Enrollment in the graduate nursing program and permission of instructor

NURS 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

NURS 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

OCCT - Occupational Therapy

OCCT 721 Foundations of Occupational Therapy Practice (2 Credit Hours)

Students examine the historical and philosophical foundations that have shaped the profession of occupational therapy, its domain, values, and theories, and the foundations of practice with individuals, groups, and populations. Students explore the value of occupation and the role of occupational therapy in promoting health and wellness.

OCCT 749 Occupations I (6 Credit Hours)

Students analyze the domains and dimensions of occupations, occupational performance skills and patterns, and the structures, functions, and processes of the body and body systems. Students conduct biomechanical assessments and identify essential performance for health and function.

Prerequisites: Admission into the Doctor of Occupational Therapy Program

OCCT 750 Occupations II (4 Credit Hours)

Students analyze the domains and dimensions of occupations, occupational performance skills and patterns, and the structures, functions, and processes of the body and body systems. Students will examine the structures and function of the central, autonomic and peripheral nervous systems and apply neuroscience principles to clinical conditions that disrupt human engagement and performance.

Prerequisites: OCCT 749

OCCT 751 Occupations III (3 Credit Hours)

Students analyze the domains and dimensions of occupations, occupational performance skills and patterns, and the structures, functions, and processes of the body and body systems. Students examine human development and occupational patterns across the lifespan and the cultures that enable individuals, groups and populations to optimally participate in occupations that promote health.

Prerequisites: OCCT 750

OCCT 752 Occupation, Health and Wellness Across the Lifespan (3 Credit Hours)

Students examine human development, occupational patterns, and cultural influences across the lifespan that enable individuals, groups and populations to optimally participate in occupations that promote health. Students apply critical reasoning to consider the impact of disorders on participation and health.

Prerequisites: OCCT 721 and OCCT 749

OCCT 753 Pediatric Habilitation and Rehabilitation: Theory and Practice (6 Credit Hours)

Students examine occupations and the evaluation and treatment of physical, developmental, psychosocial, and mental health disorders of children and youth. Students design evaluation and intervention plans for clients receiving services in hospital, developmental, and school settings.

Prerequisites: OCCT 750, OCCT 752, OCCT 754, and OCCT 756

OCCT 754 Professional Reasoning and the Occupational Therapy Process (3 Credit Hours)

Students utilize professional and clinical reasoning to apply the occupational therapy process in client care. Students analyze information that supports team collaboration, clinical decision making, effective client care, and service reporting.

Prerequisites: OCCT 721 and OCCT 749

OCCT 755 Evaluation of Occupational Performance (3 Credit Hours)

Students explore the evaluation process in occupational therapy practice including observation, interviewing, assessment administration and interpretation, decision making, and reporting. Tests and measurement theory, psychometrics, methods, procedures, and test interpretation are examined.

Prerequisites: OCCT 750, OCCT 752, OCCT 754, and OCCT 756

OCCT 756 Professional Identity and Ethical Formation (3 Credit Hours)

Students integrate foundational concepts to promote professionalism, ethical reasoning, therapeutic use of self, and lifelong competent and interprofessional practice. Students examine professional identity and the role of professional relationships in occupational therapy practice.

Prerequisites: OCCT 721 and OCCT 749

OCCT 768 Fieldwork I Pediatrics (1 Credit Hour)

Immersed in a setting that serves the needs of children and youth, students develop a summary of a client's occupational history and experiences, patterns of daily living, interests, values, needs, and relevant environments and contexts, and examine client-centered outcomes.

Prerequisites: OCCT 750, OCCT 752, OCCT 754, and OCCT 756

OCCT 821 Elements of Research I: Theories of Inquiry and Scholarly Literature (3 Credit Hours)

Students develop knowledge of the application of statistics for the healthcare professional. Students utilize descriptive statistics, normality, parametric and non-parametric hypothesis testing and simple linear regression to evaluate research and form clinical decisions.

Prerequisites: OCCT 721 and OCCT 749

OCCT 822 Elements of Research II: Using Evidence to Inform Practice (3 Credit Hours)

Students apply knowledge of practice and research to design effective intervention to meet clients' needs. Students design clinical questions related to diagnosis, prognosis, and intervention, and critically appraise the research literature on a topic of interest to the practice community.

Prerequisites: OCCT 821

OCCT 841 Education and Learning in Healthcare and Academic Settings (2 Credit Hours)

Students explore teaching and learning theory, threshold concepts, and signature pedagogy in occupational therapy academic and fieldwork education. Activity analysis and learning strategies to promote health literacy, performance, engagement, and behavioral change are examined.

Prerequisites: OCCT 751, OCCT 752, OCCT 754, and OCCT 756

OCCT 843 Leadership and Advocacy (2 Credit Hours)

Students will examine approaches to professional development and strategic planning and examine their leadership competencies. They will discuss roles and responsibilities and develop a professional leadership and business plan.

Prerequisites: OCCT 751, OCCT 752, OCCT 754, and OCCT 756

OCCT 845 Health Care Policy and Program Management (2 Credit Hours)

Factors, forces, and dynamics of the healthcare system and service delivery environment are examined, and students compare the interrelationships of health policy, healthcare, and practice. Students conduct an epidemiological analysis of a challenging healthcare issue.

Prerequisites: OCCT 751, OCCT 752, OCCT 754, and OCCT 756

OCCT 847 Therapeutic Relationships and Client Communication (2 Credit Hours)

Students examine the elements of developing and maintaining relationships, communicating with clients and members of the team, and resolving interpersonal challenges in the roles of practitioner, practice scholar, and leader/advocate.

Prerequisites: OCCT 751, OCCT 752, OCCT 754, and OCCT 756

OCCT 848 Fieldwork I Adults (1 Credit Hour)

Students conduct an occupation-based assessment of a client in a clinical or community-based setting that serves the needs of adults with disabilities. Students examine occupational performance and its impact on participation and health and wellness in individuals and groups.

Prerequisites: OCCT 751, OCCT 754, and OCCT 755

OCCT 850 Adult Rehabilitation: Theory and Practice (6 Credit Hours)

Students examine occupations and the evaluation and treatment of physical, psychosocial, and mental health disorders of adults. Students design evaluation and intervention plans for clients receiving services in acute and sub-acute care, inpatient and outpatient rehabilitation, and community-based settings.

Prerequisites: OCCT 751, OCCT 753, and OCCT 755

OCCT 851 Productive Aging and Rehabilitation: Theory and Practice (3 Credit Hours)

Students examine the aging process and the evaluation and treatment of physical, developmental, psychosocial, and mental health disorders of older adults. Students design evaluation and intervention plans for clients receiving services in home, community, and skilled nursing settings.

Prerequisites: OCCT 751 and OCCT 850

OCCT 852 Evaluation and Intervention of the Upper Extremity (3 Credit Hours)

Interventions to optimize functional use of the hand and arm are analyzed. Emphasis on physical agent modalities, orthotics fabrication and application, shoulder, arm, and hand rehabilitation methods, and prosthetics and robotics is explored.

Prerequisites: OCCT 751, OCCT 754, and OCCT 755

OCCT 853 Mental Health Promotion and Recovery: Theory and Practice (6 Credit Hours)

Students examine the influence of psychosocial factors on occupational performance and participation in individuals, groups, and populations. Use of self as a therapeutic agent and group process skills are emphasized.

Prerequisites: OCCT 747 and OCCT 755

OCCT 854 Technology and Environment Adaptation (3 Credit Hours)

Students examine the role of technology in the occupational therapy process from evaluation to intervention planning and implementation. The regulation and ethics of technology use in therapy are considered and students explore the array of technological resources available for patient care.

Pre- or corequisite: OCCT 751 and OCCT 755

OCCT 855 Occupational Adaptation in the Community (2 Credit Hours)

Students apply professional reasoning and activity analysis to meet clients' occupational needs. Students analyze, grade, modify, and adapt occupations and activities to support occupational performance and participation.

Pre- or corequisite: OCCT 751, OCCT 850, OCCT 852, and OCCT 854

OCCT 856 Interprofessional Telehealth (1 Credit Hour)

Students interact with other health professionals to make patient care decisions in the virtual environment. Students examine the process and technologies required to provide interdisciplinary telehealth care, explore the legal, regulatory and reimbursement issues in telehealth care, and deliver healthcare via videoconferencing.

OCCT 857 Fieldwork I Psychosocial (1 Credit Hour)

Students conduct evaluations and design a group-based intervention in a clinical or community-based setting that serves the needs of adults with disabilities. Students examine occupational performance and its impact on participation and health and wellness in individuals and groups.

Prerequisites: OCCT 751, OCCT 754, and OCCT 755

OCCT 858 Elements of Research III: Critical Analysis of Occupational Therapy Practice (3 Credit Hours)

Students analyze the external and internal criticisms of the profession and examine the evidence addressing practice. Students examine the body of evidence addressing an intervention of interest and complete a systematic review of the evidence.

Prerequisites: OCCT 822

OCCT 859 Elements of Research IV: Scholarship of Practice Approaches and Design (2 Credit Hours)

Students explore research approaches and design and participate in grant writing and a mentored research project with a faculty member that links theory and practice, facilitates understanding of complex real-world issues, and facilitates knowledge translation.

Prerequisites: OCCT 858

OCCT 868 Fieldwork II A (6 Credit Hours)

In this twelve-week full-time course, students are provided supervised field experiences applying the occupational therapy process with individuals, groups and/or populations with occupational performance and participation needs.

Prerequisites: OCCT 721, OCCT 749, OCCT 750, OCCT 751, OCCT 752, OCCT 753, OCCT 754, OCCT 755, OCCT 756, OCCT 768, OCCT 821, OCCT 822, OCCT 841, OCCT 843, OCCT 845, OCCT 847, OCCT 848, OCCT 850, OCCT 851, OCCT 852, OCCT 853, OCCT 854, OCCT 855, OCCT 856, OCCT 857, OCCT 858, OCCT 859, and OCCT 890

OCCT 869 Fieldwork II B (6 Credit Hours)

In this twelve-week full-time course, students are provided supervised field experiences applying the occupational therapy process with individuals, groups and/or populations with occupational performance and participation needs.

Prerequisites: OCCT 868

OCCT 870 Community and Population Health (1 Credit Hour)

Students examine the role of occupation in health promotion, health education, and prevention of illness. Key concepts of population health, social determinates of health, health promotion, and health behavior will be applied to develop community and population-based approaches.

Pre- or corequisite: OCCT 868

OCCT 871 Professional Development Planning (2 Credit Hours)

Students examine their knowledge, skills and professional competencies and establish a resume and professional development plan. Students examine the value of supervision and mentorship relationships.

Pre- or corequisite: OCCT 869

OCCT 890 Practice-Scholar Seminar I (1 Credit Hour)

Students examine the formation of their identity as an occupation-based practice scholar and ethical leader and explore challenges in service delivery systems of significance to occupational therapy's value and role in health and wellness promotion.

Prerequisites: OCCT 756, OCCT 843, and OCCT 847

OCCT 891 Practice-Scholar Seminar II (1 Credit Hour)

Students examine innovative approaches to service delivery and discuss their formative capstone experience and their potential role as a practitioner, practice scholar, and leader/advocate in health management and promotion.

Prerequisites: OCCT 890

OCCT 892 Practice-Scholar Seminar III (1 Credit Hour)

Students examine their capacity for leadership and advocacy for the role of occupation in achieving health and wellbeing of individuals, groups, and populations. Students reflect on their own plans for leadership and advocacy in their upcoming capstone project.

Pre- or corequisite: OCCT 891

OCCT 893 Doctoral Capstone (7 Credit Hours)

The doctoral capstone project is a 14-week full-time experiential course designed to develop students' skills role related focus areas. Students implement an individually mentored, increasingly self-directed capstone project as the culminating learning activity of the doctoral program.

Prerequisites: OCCT 869 and OCCT 892

OCCT 894 Practice Scholar Symposium (2 Credit Hours)

The synthesis of knowledge gained throughout the didactic curriculum, service-learning and field experiences, and in-depth scholarly capstone experience and project is demonstrated through the completion and presentation of a scholarly product.

Prerequisites: OCCT 869 and OCCT 892

OEAS - Ocean and Earth Sciences

OEAS 502 Field Experiences in Oceanography for Teachers (3 Credit Hours)

Field and laboratory experiences in oceanography including hands-on experience using equipment and methods suitable for middle and secondary education professionals. Course will provide understanding of oceanic processes using simple field and laboratory experiments. Not available for credit for OES majors and minors.

Prerequisites: background in K-12 Education

OEAS 503 Aquatic Pollution (3 Credit Hours)

This course will present basic ecological principles relevant to water pollution and ecotoxicology. Topics will include runoff, eutrophication, water and sewage treatment, industrial waste, oil pollution, pesticides, and plastics in the sea. Case studies provide focal points for consideration of issues in making decisions and setting policy. This is a writing intensive course.

OEAS 505 Physical Oceanography (3 Credit Hours)

Physics of the ocean: properties of seawater and their distribution; water mass formation; mass and energy flows; waves; tides; models; estuarine and coastal processes. An elective for science and engineering majors.

Prerequisites: C or better in MATH 211 and either PHYS 232N or two semesters of hydraulics

OEAS 506 Matlab (1 Credit Hour)

This course is designed to introduce students to Matlab programming and to develop skills utilizing this program for data analysis.

Prerequisites: Junior standing or permission of instructor

OEAS 510 Chemical Oceanography (3 Credit Hours)

Chemical composition of the ocean and the chemical, biological, geological and physical processes controlling it.

OEAS 512 Global Environmental Change (3 Credit Hours)

An examination of the development of the earth as a habitable planet, from its origin to human impacts on global biogeochemical cycles on land, and in the oceans and atmosphere.

OEAS 513 Environmental Geochemistry (3 Credit Hours)

This course examines geochemical processes at and near the Earth's surface, focusing on the concentration, speciation and reactivity of elements in soils, waters, sediments and the atmosphere. The course examines both the thermodynamic and kinetic controls on these processes, and the role of biology as a mediator (or facilitator) of these processes. Anthropogenic impacts on natural geochemical processes are also examined.

OEAS 515 Waves and Tides (3 Credit Hours)

Causes, nature, measurement and analysis of water waves and tides.

Mathematical and graphical application to wave and tide problems.

Prerequisites: C or better in MATH 212 and PHYS 232N or permission of the instructor

OEAS 516 Electronics and Oceanographic Instrumentation (3 Credit Hours)

The course will consist of brief lectures and hands-on laboratory exercises, in which students will learn to build, use, and debug electronic devices relevant to ocean and earth science applications. Topics covered will include circuit theory, power supplies and budgets, transducers and amplifiers, computerized data acquisition, instrument control, signal conditioning and resolution.

OEAS 518 Limnology: Biogeochemistry of Lakes (3 Credit Hours)

Chemical cycling in lakes and reservoirs, and interactions with biological and physical processes; quantitative modeling of lake geochemistry.

OEAS 519 Spatial Analysis of Coastal Environments (3 Credit Hours)

The course integrates remotely sensed and field techniques for scientific investigation and practical management of coastal environmental systems. Spatial modeling of coastal processes and management tools using geographic information system (GIS).

Prerequisites: GEOG 300, GEOG 402 or GEOG 502, or permission of instructor

OEAS 520 Hydrogeology (3 Credit Hours)

Topics covered will include the occurrence and movement of surface and subsurface water, the nature and distribution of permeable rocks and strata, field techniques used in ground-water studies, and the flow of ground-water to wells.

OEAS 526 Concepts in Oceanography for Teachers (3 Credit Hours)

This web-based course will provide a practical introduction to oceanography for earth science teachers. It is particularly aimed at current science teachers attempting to become certified in earth science education. Topics will include discussions of geological, biological, physical and chemical oceanography. Not available for credit for OES majors and minors.

OEAS 530 Introduction to Geophysics (3 Credit Hours)

Introduction to the physics of the earth, including plate tectonics, volcanism, earthquakes and seismology, gravity, the earth's magnetic field, geophysical remote sensing, and mantle convection.

OEAS 534 Geodynamics (3 Credit Hours)

A qualitative and quantitative description of physical processes in the Earth and environmental sciences. Topics include stress and strain, plate elasticity and flexure, heat flow, fluid mechanics, material rheology, and groundwater flow. Emphasis will be placed on developing an understanding of Earth dynamics using real-world examples, including numerical exercises.

Prerequisites: MATH 211, MATH 212, PHYS 231N, and PHYS 232N or equivalents

OEAS 540 Biological Oceanography (4 Credit Hours)

Marine organisms and their relationship to physical and chemical processes in the ocean. Laboratory study of local marine organisms, marine ecosystem and sampling techniques. Includes identification, data analysis and field trips.

OEAS 551 Data Collection and Analysis in Oceanography (4 Credit Hours)

This course introduces students to the basic oceanographic instruments used to obtain and analyze information by investigating different locations in the Chesapeake Bay. Data obtained with these instruments will be processed and analyzed using the data analysis techniques discussed in class. The data will then be used to answer a particular question related to the temporal and spatial variability in a natural system.

Prerequisites: College level statistics (at least one semester)

OEAS 553 Marine Molecular Ecology (4 Credit Hours)

This course will explore the ecology of marine organisms using molecular techniques and data. Molecular ecology covers a wide variety of sub-disciplines, including genetics, physiology, ecology, and evolution. The course will explore basic theory in population genetics, ecology, and evolution and cover nucleic acid techniques and their applications.

OEAS 566 Introduction to Mitigation and Adaptation (3 Credit Hours)

Students will be introduced to the science underpinning mitigation of human-induced changes in the Earth system, including but not limited to climate change and sea level rise, and adaptation to the impacts of these changes. The course will cover the environmental hazards and the opportunities and limitations for conservation, mitigation and adaptation. Cross listed with BIOL 566.

OEAS 567 Sustainability Leadership (3 Credit Hours)

In this class, students will discover what makes a leader for sustainability. They will consider a range of global and local crises from a leadership point of view in the context of sustainability science, which addresses the development of communities in a rapidly changing social, economic, and environmental system-of-systems environment. The course will be based on taking a problem-motivated and solution-focused approach to the challenges considered. The course includes a service learning project focusing on a leadership experience in solving a real-world environmental problem.

Prerequisites: BIOL 566 or OEAS 566

OEAS 570 Proxy Reconstruction of Late Cenozoic Climate: Calibrations and Applications (3 Credit Hours)

This course will examine recent developments in paleo-proxy calibration and their application in reconstructing Late Cenozoic climate history. Students will read several papers covering the theoretical basis and empirical evidence supporting some of the most common proxies used in paleoclimatology/paleoceanography each week. Each week will begin with a lecture on the topic, followed by an in-depth discussion. Students will be required to present two of the weekly topics and lead the class discussion.

OEAS 595 Special Topics (1-4 Credit Hours)

Lectures, field and laboratory studies. An investigation of a selected problem in physical, geological, chemical, or biological oceanography.

Prerequisites: permission of the instructor

OEAS 603 Geobiology (3 Credit Hours)

Geobiology and the associated field of biosedimentology reflect the interdisciplinary approach to environmental problems, questions related to Earth history, and the exploration of extraterrestrial worlds. The course elaborates our understanding of geobiology and biosedimentology by conducting a study on benthic cyanobacteria and their influences on sedimentary processes in marine environments. Study area is Fisherman's Island, located close to Norfolk, VA. The course includes aspects of astrobiology (the "sister of geobiology"), and discusses the evolution of life on Earth.

OEAS 604 Introduction to Physical Oceanography (3 Credit Hours)

Introduction to descriptive and dynamical physical oceanography. Properties of sea water; distribution of temperature, salinity and density; water, salt, and heat budgets; techniques for describing the ocean; circulation and water masses of the world's oceans and coastal waters.

OEAS 605 Introduction to Ocean Modeling and Prediction (3 Credit Hours)

Instructor approval required. Introduction to concepts and theories of numerical ocean models and their applications in physical oceanography, computational fluid dynamics, environmental problems and ocean forecast systems.

Prerequisites: OEAS 505 or OEAS 604

OEAS 606 Experimental Procedures in Physical Oceanography (3 Credit Hours)

Provides basic knowledge for conducting field experiments in physical oceanography. Fundamentals of experimental design and sampling theory. Standard methods of data reduction, analysis, and reporting.

OEAS 607 Introduction to Python for Data Analysis (1 Credit Hour)

The goal of this class is to introduce students to the Python programming language, and to equip them with basic coding, data management and version control skills that will allow them to get more research done in less time and with less pain (computationally-speaking).

OEAS 610 Advanced Chemical Oceanography (3 Credit Hours)

Chemical properties of seawater; chemical composition of the ocean including major and trace elements, dissolved gases, micronutrient elements, and organic compounds; processes controlling this composition.

OEAS 611 Chemical Oceanography Laboratory (3 Credit Hours)

Basic analytical chemistry of seawater; field work in chemical oceanography.

OEAS 613 Geochemistry of Marine Sediments (3 Credit Hours)

An introduction to the geochemistry of marine sediments, with an emphasis on nutrient (C,N,P,S) and trace element cycling in marine sediments.

Prerequisites: OEAS 610 and OEAS 612

OEAS 614 Estuarine and Coastal Biogeochemical Cycles (3 Credit Hours)

Chemical dynamics within water and sediments of estuaries, salt marshes, and the continental shelf; river-sea, air-sea, and sediment-water interactions; modeling techniques.

Prerequisites: OEAS 610

OEAS 620 Advanced Geological Sciences (3 Credit Hours)

Survey of marine and terrestrial geology and geophysics; plate tectonics and basin formation; marine sediments and sediment dynamics; marine depositional environments and depositional systems; marine stratigraphy dynamics and the formation of marine basins.

OEAS 622 Wetland & Coastal Hydrogeology (3 Credit Hours)

Techniques used to calculate components of water budgets and groundwater fluxes in coastal systems, including wetlands, tidal rivers, estuaries, and shelf waters. Hydrologic criteria used to delineate wetlands. Many lab exercises will require field work in local wetlands and coastal systems.

OEAS 625 Marine Sedimentary Environments (3 Credit Hours)

Attributes of marine sediments; main sedimentary facies zones in marine and coastal environments (deep sea, shelf, tidal flats, lagoons, barrier islands); modern depositional systems versus ancient depositional systems; reefs (brachiopoda, corals, sponges, foraminifers, etc); traces and trace fossils.

Prerequisites: OEAS 620

OEAS 630 Dynamical Oceanography I (3 Credit Hours)

Dynamics of rotating, stratified fluids, geostrophic adjustment, potential vorticity, Ekman layers, gravity waves, and large scale ocean circulation.

Prerequisites: OEAS 604

OEAS 640 Advanced Biological Oceanography (4 Credit Hours)

Marine organisms and their interactions with the physical and chemical environments of the sea; primary production, population ecology, nutrition, reproduction, and marine biogeography; related laboratory exercises.

OEAS 651 Introduction to Physics of Estuaries (3 Credit Hours)

This course considers the physical oceanography of estuaries. In particular, it explores how circulation and mixing in estuaries are influenced by atmospheric forcing, tidal forcing, coastal influences and bathymetric variability. Topics to be treated include classification of estuaries, typical steady dynamical balances, transport of salt and other quantities, mixing, and time-space scales of variability.

Prerequisites: OEAS 604

OEAS 658 Participatory and Agent-Based Modeling, Simulation, and Visualization (3 Credit Hours)

Many societal challenges are "wicked problems," i.e., social or cultural problems that are difficult or impossible to solve. The class will introduce the students to the theory of wicked problems, engage them in transdisciplinary approaches to address such problems using collaborative strategies such as participatory modeling combined with conceptual and agent-based models. Scenario-based simulations and visualizations will be used to explore possible futures and to create foresight related to wicked problems.

Prerequisites: OEAS 566/BIOL 566 or permission of the instructors

OEAS 667 Cooperative Education (1-3 Credit Hours)

Available for pass/fail grading only. May be repeated for credit. Student participation for credit based on the academic relevance of the work experience, criteria, and evaluative procedures as formally determined by the department prior to the semester in which the work experience is to take place.

Prerequisites: Approval by department is required; Additional support may be provided by the Monarch Internship and Co-Op Office in the semester prior to enrollment

OEAS 669 Internship in Oceanography (1-3 Credit Hours)

1-3 credits.

Prerequisites: permission of the department

OEAS 695 Special Topics in Oceanography (1-3 Credit Hours)

An advanced investigation in a selected problem in physical, geological, chemical, or biological oceanography under the direction of the faculty of the Department of Ocean, Earth and Atmospheric Sciences.

OEAS 696 Selected Topics (1-3 Credit Hours)

An advanced investigation in a selected problem in physical, geological, chemical, or biological oceanography under the direction of the faculty of the Department of Ocean, Earth and Atmospheric Sciences.

Prerequisites: permission of the instructor

OEAS 698 Research (1-9 Credit Hours)

Any semester; hours to be arranged; variable credit. 1-9 credits per semester. M.S.-level research.

OEAS 699 Thesis (1-9 Credit Hours)

Any semester; hours to be arranged; variable credit. 1-9 credits per semester. M.S.-level work primarily devoted to the writing of the thesis.

OEAS 701 Scientific Computing for Environmental Sciences (3 Credit Hours)

This course is designed for incoming graduate students in environmental science disciplines (e.g. oceanography, geography, ecology, geology, biology, etc.) to introduce modern computing software, programming tools and best practices that are broadly applicable to carrying out research in the environmental sciences. Material covered will include an introduction to Unix, programming using commonly used open-source languages (Python and R), version control and data backup, and data visualization tools for environmental data and making maps. Students will also be introduced to high performance computing and tools for analyzing 'big data' on remote clusters. This course is not discipline specific and is designed to be accessible to any students who want to work with environmental data.

OEAS 704 Time Series in Oceanography (3 Credit Hours)

A study of the basic techniques used to model and analyze time series of oceanographic data. These include temporal spatial and frequency/wave number domain techniques.

Prerequisites: calculus

OEAS 705 Advanced Environmental Data Science (3 Credit Hours)

This is an advanced computational analysis course designed to introduce students to data management and analysis methods commonly used in data science applications. The data analysis portion of the course will be primarily based on machine learning methods. The course will also give an overview of a selection of scientific databases which host freely available oceanographic data and output from numerical model simulations. This course is not discipline specific and will be useful for any students who want to work with data efficiently and gain experience in data management, proper techniques in developing analytical pipelines and applying machine learning to their research.

Prerequisites: Permission of instructor

OEAS 708 Simulation Techniques for Ocean Circulation (3 Credit Hours)

Emphasis is on the construction of working ocean models, both vorticity-stream function and primitive equation models analyzed, mostly finite difference techniques, implicit and explicit schemes, staggered grids, discussion of ocean general circulation models.

Prerequisites: OEAS 730, and knowledge of a computer program language (FORTRAN preferred)

OEAS 711 Regional Oceanography (3 Credit Hours)

The regional oceanography of the major ocean basins, marginal seas, and coastal oceans. Seasonal and interannual variability. Heat and salt cycles.

Prerequisites: OEAS 604

OEAS 730 Dynamical Oceanography II (3 Credit Hours)

Dynamics of rotating stratified fluids. Inertial waves, equatorial dynamics, coastal dynamics, dynamic instability.

OEAS 733 Marine Microbiology (3 Credit Hours)

The course covers the distribution, abundance, and biogeochemical activities of microorganisms in the oceans, with emphasis on prokaryotic microbes and viruses. Symbioses with higher organisms, and applied aspects of marine microbiology, including biofouling and corrosion, invasive species, and marine biotechnology are also addressed.

OEAS 735 Paleoclimatology (3 Credit Hours)

This course focuses on the causes (forcings) of climate change; natural response time of the climate system; interactions and feedbacks; and the geologic record in climate change.

OEAS 741 Fisheries Population Dynamics (4 Credit Hours)

An introduction to the major questions in the management of marine fisheries: abundance, estimation, distribution, recruitment and optimum yield. Topics are presented within the context of fisheries management, marine productivity and population ecology, all of which shape the direction of the primary literature.

OEAS 755 Mathematical Modeling of Marine Ecosystems (3 Credit Hours)

This course is focused on the theory and techniques of mathematical model development for marine ecosystems. The course is designed to provide an understanding of how to parameterize interaction among components of marine food webs and interaction of food web components with physical environments.

OEAS 764 Coastal Sedimentology (3 Credit Hours)

Sedimentary processes in different coastal zones will be described: carbonate, evaporitic, and clastic depositional systems. We will conduct a small research project along the coast of Virginia. Field trip required.

OEAS 765 Marine Biogeochemistry (3 Credit Hours)

This class will focus on biologically mediated elemental cycling in aquatic systems. Assimilatory and dissimilatory biological processes involving auto- and heterotrophic organisms frequently mediate elemental cycling of these elements. Inorganic compounds and dissolved and particulate organic material will be discussed in terms of their biological reactivity and turnover times in aquatic systems and their contribution to elemental cycling on a variety of temporal and spatial scales. Also included is the issue of how community structure and function alter biogeochemical cycles.

OEAS 770 Aquatic Photosynthesis (4 Credit Hours)

This course examines the physics, chemistry, biology and ecology of photosynthesis by aquatic organisms. Topics include light harvesting, energy transfer, carbon metabolism and biosynthesis and their ecological consequences.

OEAS 772 Aquatic Optics (4 Credit Hours)

The course covers the physics of light transmission through the aquatic medium as affected by scattering and absorption, the optical properties of seawater, suspended particles of living cells, underwater vision and ocean color.

OEAS 791 Seminar (1 Credit Hour)

Techniques for presenting scientific data at professional meetings and seminars. Practical experience and feedback from discussions with visiting speakers.

OEAS 795 Advanced Topics in Oceanography (1-4 Credit Hours)

An advanced investigation of a selected problem in physical, geological, chemical, or biological oceanography under the direction of the faculty of the Department of Ocean, Earth and Atmospheric Sciences.

OEAS 801 Scientific Computing for Environmental Sciences (3 Credit Hours)

This course is designed for incoming graduate students in environmental science disciplines (e.g. oceanography, geography, ecology, geology, biology, etc.) to introduce modern computing software, programming tools and best practices that are broadly applicable to carrying out research in the environmental sciences. Material covered will include an introduction to Unix, programming using commonly used open-source languages (Python and R), version control and data backup, and data visualization tools for environmental data and making maps. Students will also be introduced to high performance computing and tools for analyzing 'big data' on remote clusters. This course is not discipline specific and is designed to be accessible to any students who want to work with environmental data.

OEAS 804 Time Series in Oceanography (3 Credit Hours)

A study of the basic techniques used to model and analyze time series of oceanographic data. These include temporal spatial and frequency/wave number domain techniques.

Prerequisites: calculus

OEAS 805 Advanced Environmental Data Science (3 Credit Hours)

This is an advanced computational analysis course designed to introduce students to data management and analysis methods commonly used in data science applications. The data analysis portion of the course will be primarily based on machine learning methods. The course will also give an overview of a selection of scientific databases which host freely available oceanographic data and output from numerical model simulations. This course is not discipline specific and will be useful for any students who want to work with data efficiently and gain experience in data management, proper techniques in developing analytical pipelines and applying machine learning to their research.

Prerequisites: Permission of instructor

OEAS 808 Simulation Techniques for Ocean Circulation (3 Credit Hours)

Emphasis is on the construction of working ocean models, both vorticity-stream function and primitive equation models analyzed, mostly finite difference techniques, implicit and explicit schemes, staggered grids, discussion of ocean general circulation models.

Prerequisites: OEAS 730, and knowledge of a computer program language (FORTRAN preferred)

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The regional oceanography of the major ocean basins, marginal seas, and coastal oceans. Seasonal and interannual variability. Heat and salt cycles.

Prerequisites: OEAS 604

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Dynamics of rotating stratified fluids. Inertial waves, equatorial dynamics, coastal dynamics, dynamic instability.

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The course covers the distribution, abundance, and biogeochemical activities of microorganisms in the oceans, with emphasis on prokaryotic microbes and viruses. Symbioses with higher organisms, and applied aspects of marine microbiology, including biofouling and corrosion, invasive species, and marine biotechnology are also addressed.

OEAS 840 Plankton Dynamics (3 Credit Hours)

This course emphasizes the ecology of heterotrophic plankton from bacteria to protists, from metazoan invertebrate plankton to fish larvae. Students will explore the role of plankton groups and species in the context of pelagic ecosystems. Planktonic processes are not only relevant for the ocean ecosystem but also for fisheries, aquaculture, environmental and human health, and global climate. The course consists of lectures, discussion groups on selected reading material, and laboratory demonstrations.

OEAS 841 Fisheries Population Dynamics (4 Credit Hours)

An introduction to the major questions in the management of marine fisheries: abundance, estimation, distribution, recruitment and optimum yield. Topics are presented within the context of fisheries management, marine productivity and population ecology, all of which shape the direction of the primary literature.

OEAS 855 Mathematical Modeling of Marine Ecosystems (3 Credit Hours)

This course is focused on the theory and techniques of mathematical model development for marine ecosystems. The course is designed to provide an understanding of how to parameterize interaction among components of marine food webs and interaction of food web components with physical environments.

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The course covers the physics of light transmission through the aquatic medium as affected by scattering and absorption, the optical properties of seawater, suspended particles of living cells, underwater vision and ocean color.

OEAS 891 Seminar (1 Credit Hour)

Techniques for presenting scientific data at professional meetings and seminars. Practical experience and feedback from discussions with visiting speakers.

OEAS 895 Advanced Topics in Oceanography (1-4 Credit Hours)

An advanced investigation of a selected problem in physical, geological, chemical, or biological oceanography under the direction of the faculty of the Department of Ocean and Earth Sciences.

OEAS 898 Doctoral Research (1-9 Credit Hours)

Any semester; hours to be arranged; variable credit, 1-9 credits per semester. Ph.D.-level research.

OEAS 899 Dissertation (1-9 Credit Hours)

Any semester; hours to be arranged; variable credit, 1-9 credits per semester. Ph.D.-level work primarily devoted to the writing of the dissertation.

OPMT - Operations Management

OPMT 670 Operations and Supply Chain Management (3 Credit Hours)

This course provides a comprehensive understanding of operations and supply chain management. Students learn how to optimize processes, manage inventory, coordinate logistics, and improve overall efficiency in delivering goods and services. Topics include the management of operations and the efficient flow of goods and services in a supply chain, operations and supply chain management strategy, process analysis, facility layout, capacity management, inventory management, and sustainable supply chain practices.

Prerequisites: Admission to the MBA program OR approval by the MBA program office

OPMT 695 Selected Topics in Operations Management (3 Credit Hours)

Study of selected topics in operations management.

Prerequisites: permission of the department chair and the graduate program director

OPMT 697 Independent Study in Operations Management (3 Credit Hours)

Affords students the opportunity to undertake independent study under the direction of a faculty member.

Prerequisites: OPMT 611

OPMT 795 Topics (3 Credit Hours)

Study of selected topics.

OPMT 895 Topics (3 Credit Hours)

Study of selected topics.

PADM - Public Administration

PADM 634 Regional Planning (3 Credit Hours)

The course analyzes the origins of regional planning agencies, current organizational structures, financing and functional activities. The focus is on the application of the systems approach to metropolitan planning issues. This latter objective is achieved through participation in exercises dealing with economics, transportation and land-use allocation modeling.

PADM 651 Administrative Theory I: The Context of Public Administration (3 Credit Hours)

Introduction to the profession of public administration; the evolution and development of the field, the role of organizations in contemporary American government, and the roles of politics and administration. The course also provides an introduction to the necessary skills for successful graduate study.

PADM 652 Administrative Theory II: The Process of Public Administration (3 Credit Hours)

Introduction to management in the public sector. Topics include: organizing public agencies, managing people and work groups, introduction to organizational systems (human resources, budget, and information systems), and effective leadership and decision-making processes.

PADM 653 Wicked Problems in Public Administration (3 Credit Hours)

This course deals with some of the many complex, intractable, or "wicked" problems that public and non-profit sector professionals will struggle with during the course of their careers. In the context of public administration, a wicked problem is a set of conditions and circumstances that seems to defy resolution or even amelioration because of the incredibly complex nature of the situation.

PADM 668 Internship/Field Experience (1-6 Credit Hours)

Required of all students without previous experience in government service. Supervised work experience in a public agency. A written report will be required.

PADM 671 Public Budgeting and Financial Management (3 Credit Hours)

The purpose of this course is to examine the institutions, principles, and techniques of national, state, and local budgeting processes and financial administration. The course explores the allocation as well as the re-distributive role of government and the market. While applying information technology, students will analyze the practices and fundamental concepts of government budgeting, financial management, and public finance, with an emphasis on revenue, expenditure, capital budgeting and debt structures.

PADM 695 Advanced Topics (1-3 Credit Hours)

Topics vary each semester.

PADM 696 Directed Readings (1-3 Credit Hours)

Specifically planned readings for the graduate student who wishes to pursue special interests outside the scope of formal studies. Supervised on an individual basis.

PADM 698 Directed Research (1-6 Credit Hours)

Supervised research on a specific program. A written report will be required.

PADM 699 Thesis (3-6 Credit Hours)

An approved research project, written under the supervision of a faculty committee, in which the student demonstrates the capacity to design and complete independent scholarly investigation. The completed project must be approved by the thesis committee.

PADM 701 Public Policy and Evaluation (3 Credit Hours)

Exploration of key theories and approaches to public policy. This course covers all phases of the policy process, from formulation to evaluation, with particular focus upon the substance, political dynamics, and evolution of public policy.

PADM 704 Methods of Public Program Evaluation (3 Credit Hours)

Examination of various methodologies for designing and conducting program evaluation and research. Experimental, quasi-experimental and nonexperimental procedures will be covered. (Cross listed with PPCM 704)

Prerequisites: PADM 753/PADM 853

PADM 708 Urban and Regional Economic Development (3 Credit Hours)

This course examines the theory and practice of urban and regional economic development. The tools, institutions, and analytical techniques of urban and regional economic development are examined in light of relevant public policy issues.

PADM 711 Tools of Government (3 Credit Hours)

Analysis of the range of administrative tools and strategies for the delivery of government services. Emphasizes new administrative alternatives under conditions of constant change.

PADM 712 Emergency Management and Policy (3 Credit Hours)

Explores policy and regulatory issues of emergency management; intergovernmental responsibilities and relationships among local, state and federal agencies in an "all hazards" approach to preparing and responding to manmade and natural disasters. Examines challenges faced by local, state, and federal managers during a large scale disaster.

PADM 713 Fundraising for Nonprofit Organizations (3 Credit Hours)

This course introduces students to fundraising principles of nonprofit organizations with an emphasis on different types of philanthropy, fundraising theories and practices, and motivations of givers. They will develop skills in creative problem solving for fundraising practice while learning to analyze and evaluate the fundraising process and methods. Additionally, students will develop the ability to synthesize and integrate current information and emerging ideas into a fundraising strategy and to think critically and analytically about a variety of fundraising perspectives.

PADM 714 Public-Private Partnerships (3 Credit Hours)

An in-depth analysis of the forces behind the privatization movement. Examines the context of privatization, the theoretical and empirical arguments on both sides of the debate, and the different forms of privatization practiced in the U.S. The course draws on a wide range of disciplines in a quest for an understanding of the privatization phenomenon-political science, public administration, public policy, sociology, economics, management, and others. (Cross listed with PPCM 714)

PADM 715 Management and Governance of Nonprofit Organizations (3 Credit Hours)

Successful nonprofit organizations require substantial capability in key areas of management such as developing a strong board of directors, recruiting and motivating talented staff and volunteers, creating a strategic plan, and wisely managing fiscal and human resources. The course is built around understanding nonprofit governance structures, relationships, and responsibilities as well as unique management issues associated with them. This course addresses these topics from theoretical and practitioner perspectives.

PADM 716 Introduction to Nonprofit Sector (3 Credit Hours)

This course offers a broad introduction to the study and practice of the nonprofit sector. The course explores the history, scope, and significance of the nonprofit sector as it relates to philanthropy, voluntary action, civil society, and civic engagement.

PADM 717 Nonprofit Financial Management (3 Credit Hours)

This course provides students with the knowledge to become effective financial managers by giving them practical applications of theory and skill-building in fiscal and accounting processes of nonprofit organizations.

PADM 718 Public Sector Contract Administration (3 Credit Hours)

Examines the actions that must be taken following the award of a contract, including assurance of required outcomes, assurance of compliance, proper contract launch, proper contract close-out, and documentation and carrying forward lessons learned. Connections to steps that must be taken in the other two phases of the procurement process are noted. (Course is cross listed with PPCM 718)

PADM 719 Leadership (3 Credit Hours)

Examines leadership through theoretical and practice-based frameworks. Offers analytical and intellectual examination and reflection on core issues in the practice of leadership. These objectives will be achieved through open discussion, honest self-assessment, experiential exercises, and observation of real-life leadership practice. (Cross listed with PPCM 719)

PADM 720 Public Human Resources Management (3 Credit Hours)

Examines the basic framework of the public personnel system beginning with the legal requirements imposed by federal and state laws and regulations. General considerations of policy and procedures development, the organization of the public personnel system, the adoption of the personnel ordinance, the determination of various levels of employee status and the coverage of the personnel system are included.

PADM 721 Transportation Policy (3 Credit Hours)

Lecture, 3 hours; 3 credits. This course focuses on surface transportation policy and planning, and highways and roads in particular. Topics include local, state and federal policies, public involvement in transportation planning, transportation and highway finance, privatization and public-private partnerships, critical issues and policy questions.

PADM 723 Ethics in Public Administration (3 Credit Hours)

This course reviews the theory and application of ethics in the public sector, identifying public values and how they apply in the administration of government. It reviews sources of values employed in public sector decision-making, and reviews how values in public administration are managed and applied. Systems of professional ethics are reviewed in the context of public professions. Case studies and best practices are examined to help the student understand the application of administrative ethics in public management.

PADM 724 Administration of Human Services (3 Credit Hours)

Analysis of human services involving direct client/agency interaction. Problems of discretion and control are examined as alternative service delivery strategies which can deal with these problems.

PADM 725 Government, Society, and Business (3 Credit Hours)

This course studies the interdependencies and interactions among three broad entities - business, government, and society - in the delivery of public services, paying special attention to their implications for public policy.

Prerequisites: six completed hours of graduate work in MBA or MPA program

PADM 726 Introduction to Public Procurement (3 Credit Hours)

This course provides an overview of procurement and contract management as a core function in public sector organizations. The course introduces the student to how properly-aligned, best practice acquisitions can support public entities' strategic goals. Challenges and opportunities for all stakeholders are addressed. Special attention is given to ongoing changes in public procurement. (Cross listed with PPCM 726)

PADM 727 Public Procurement and Project Management (3 Credit Hours)

Course covers each phase of the public procurement project cycle, with an emphasis on tools and techniques to manage a public procurement project. (Cross listed with PPCM 727)

PADM 728 Public Sector Contract Planning and Formation (3 Credit Hours)

This course provides insight into why and how public sector contracts should be planned and formed properly. A strong emphasis is placed on the strategic role that procurement can play in public sector organizations and how procurement planning and source selection, in particular, fit into that role. (Cross listed with PPCM 728.)

PADM 731 Public Sector Procurement Law and Ethics (3 Credit Hours)

This course surveys the laws and ethics applicable to public sector procurement and contract management. A theoretical and problem-based, interdisciplinary approach is used to address the major legal and ethical issues that arise when public sector organizations plan, form, and administer contracts. Attention is given to the role of professionalization in socializing appropriate ethics. (Cross listed with PPCM 731)

PADM 734 Negotiation and Dispute Resolution (3 Credit Hours)

The course provides conceptual and practical skills in negotiations. It examines the underlying cultural, legal, and organizational issues and problems that affect managing human resources in the workplace. (Cross listed with PPCM 734)

PADM 735 History of Race and Government Institutions (3 Credit Hours)

U.S. history is examined through a racial lens in the context of public administration: policies, laws, and court actions at the federal, state, and local levels. Three historical eras will be examined from colonial days to the present: Pre-Civil War Slavery, Jim Crow Segregation, and Mass Incarceration/ Colorblind Racism. Two transitional periods will also be covered: Post-Civil War Reconstruction and the Civil Rights Movement.

PADM 736 Diversity, Equity, & Inclusion: A Public Administration and Public Policy Perspective (3 Credit Hours)

Across every economic and social indicator, there are disparities that are based on race, gender, and culture. In the U.S., some of the disparities have been created by explicit and intentional discrimination that was incorporated into the U.S. Constitution and various federal, state, and local laws. Other disparities grew out of unconscious or unintended impacts of federal, state, and local laws, policies, and practices. This course will examine these issues within the context of public administration, developing an awareness of inequities and the skills to dismantle discriminatory policies and practices.

PADM 739 Cultural Competency (3 Credit Hours)

This course focuses on the growing challenges and opportunities created by our interconnected world and the knowledge and abilities necessary to lead through situations in which there are misunderstandings or conflicts rooted in differences. The course explores the structure and dynamics of all forms of diversity in public, non-profit, and governmental organizations, the resulting implications for organizational health, and the critical role of cultural-competent leadership.

PADM 740 Community Participation and Civic Engagement (3 Credit Hours)

This course examines the importance of social, economic, cultural, religious, and civic organizations in building or restoring communities. The course focuses on the revitalization, restoration, or upgrading of communities, cities, and localities or neighborhoods within or adjacent to cities, by the residents themselves. Viewed through the lens of social capital theory, the course further explores examples of short- and long-term change accomplished by community members on their own, within organizations, or in partnership with government officials.

PADM 745 Managing Development and Change in Organizations (3 Credit Hours)

Examination of the theory and practice of organization development. Participants will take the role of change agent and public manager and apply a range of organization development techniques to public agency situations while giving attention to the particular cultural, political, legal and organizational characteristics of public organizations.

PADM 746 Capstone Seminar in Public Administration (3 Credit Hours)

Presents an integrated approach to the field of public administration, and examines the political, administrative, and social implications of administrative choices. The emphasis of the course will be a case approach to public administration and public management.

Prerequisites: Completion of 30 hours in the MPA program or permission of instructor

Pre- or corequisite: PADM 651, PADM 671, and PADM 701

PADM 750 Performance Measurement and Management (3 Credit Hours)

This course focuses on performance-based management approaches in public and non-profit settings. It addresses the performance measurement and management process, the identification of appropriate performance measures, and the implementation of a performance measurement system, as well as managing for performance.

PADM 752 Introduction to Data Analysis (3 Credit Hours)

An introduction to statistics for students in Public Administration and related fields. Emphasis is placed on the quantitative analysis of demographics and factors affecting public administrators in the field.

PADM 753 Research Methods in Public Administration (3 Credit Hours)

This course examines various methods for designing and conducting research, collecting and organizing data, and disseminating results. Information technology and applications to practical management problems and public research topics are emphasized.

PADM 760 Collaboration in Public Administration (3 Credit Hours)

An examination of the fundamental concepts of collaborative governance in the field of public administration and public policy. Emphasis is placed on the government and/or nonprofit management and process of collaborative problem solving and policy implementation in cross-sector and intra-sector environments.

PADM 772 Public Financial Management (3 Credit Hours)

Examination of public sector financial principles, practices, and processes. A public manager's perspective of the decision making and practices of managing public funds. Introduction to governmental accounting practices. Emphasis on analyzing financial statements for decision making. Extensive use of Excel spreadsheet. Exploration of public financial management research and the link between public financial management practices and public fiscal and monetary policies.

PADM 780 Local Government Management (3 Credit Hours)

This course provides students with the professional knowledge, skills, and abilities to engage successfully with local governments from the following perspectives: as a generalist public administrator, as a local government specialist, and as a citizen, non-profit leader, or businessperson. In addition, this course provides students with the theoretical and policy context within which local governments operate. Students will master that knowledge by researching how local governments use those concepts in every day administration.

PADM 781 Intergovernmental Management (3 Credit Hours)

Analysis of relationships among federal, state, and local governmental units in the delivery of governmental programs. Focus on intergovernmental issues in urban metropolitan regions. (Cross listed with PPCM 781)

PADM 785 Social Marketing in the Public Sector (3 Credit Hours)

The course is an examination of the principles, practices, and use of Social Marketing - the use of techniques to influence a target audience to voluntarily accept, reject, modify, or abandon a behavior for the benefit of individuals, groups, or society as a whole - in the public sector. In addition, the course will familiarize students with current and potential uses of Social Marketing to accomplish public sector goals.

PADM 800 Colloquium - Public Administration and Policy (1 Credit Hour)

This course introduces students to the field, the academy, the School of Public Service faculty, and university resources; it also sets program expectations for students. Topics include: research process, developing a research agenda, critical analysis of literature, professional development, comprehensive exams process, and academic v. nonacademic careers.

PADM 801 Policy Theory (3 Credit Hours)

This course provides an overview of theories of public policy. It provides a solid foundation for knowledge in this area. Students will be introduced to the leading theories, frameworks, and models that help describe and explain the policy process. The course examines the historical heritages of the policy sciences and the bases upon which public policy discussions take place at all stages of the policy process.

PADM 802 Public Administration I (3 Credit Hours)

The course reviews the history of administrative theory and the broad topics of administrative theory. The course is intended to address the impact that organizational structure and political/social environment have on administration. This course will not cover every theory, model, or framework relevant to public administration. However, this course is intended to provide the doctoral student with the theoretical foundations of public administration and understanding of their historical context in the field.

PADM 803 Public Administration II (3 Credit Hours)

This course is a continuation of PADM 802 and is intended to provide a framework for doctoral students to develop their understanding of public and nonprofit management organizational practices in the American context. The course is not exclusively directed to any one level of government, but includes national, state, and local management and organizational behavior. The course provides material on the concepts and perspectives on managerial rationale, responsibilities, decision making, and approaches to administration.

Prerequisites: PADM 802

PADM 804 Multi-Sector Administration (3 Credit Hours)

The course explores public administration from Neoliberalism and beyond to focus on the development of multi-sector administration, where multi-sector is defined as policy action across governments, nonprofit organizations, for-profit organizations, and/or grass-roots groups and individuals. The course is expected to cover the methods, challenges, and consequences of multi-sector administration. This course will also address the management and evaluation of multi-sector relationships. This is not an introduction to organizational structure or theory.

PADM 805 Research Design (3 Credit Hours)

The course examines advanced research design and evaluation methods used in public administration and management research. Experimental, quasi-experimental, and nonexperimental procedures in the context of urban settings will be emphasized. Includes usage of various statistical software.

PADM 806 Multivariate Analysis in Public Administration (3 Credit Hours)

This course explores the proper use, calculation, and interpretation of multivariate statistics as commonly found in the literature in public administration. The course will prepare students to choose the appropriate statistical tools, generate testable hypotheses, correctly apply the statistical tool, analyze the results, and present and interpret the results of those tests in a manner appropriate for public administration in the field.

Prerequisites: FOUN 722

PADM 808 Urban and Regional Economic Development (3 Credit Hours)

This course examines the theory and practice of urban and regional economic development. The tools, institutions, and analytical techniques of urban and regional economic development are examined in light of relevant public policy issues.

PADM 810 Policy and Program Evaluation (3 Credit Hours)

Examination of various methodologies for designing and conducting public policy and program evaluation and research. Experimental, quasi-experimental and non-experimental procedures will be covered.

PADM 811 Tools of Government (3 Credit Hours)

Analysis of the range of administrative tools and strategies for the delivery of government services. Emphasizes new administrative alternatives under conditions of constant change.

PADM 812 Emergency Management and Policy (3 Credit Hours)

Explores policy and regulatory issues of emergency management; intergovernmental responsibilities and relationships among local, state and federal agencies in an "all hazards" approach to preparing and responding to manmade and natural disasters. Examines challenges faced by local, state, and federal managers during a large scale disaster.

PADM 813 Fundraising for Nonprofit Organizations (3 Credit Hours)

This course introduces students to fundraising principles of nonprofit organizations with an emphasis on different types of philanthropy, fundraising theories and practices, and motivations of givers. They will develop skills in creative problem solving for fundraising practice while learning to analyze and evaluate the fundraising process and methods. Additionally, students will develop the ability to synthesize and integrate current information and emerging ideas into a fundraising strategy and to think critically and analytically about a variety of fundraising perspectives.

PADM 814 Public-Private Partnerships (3 Credit Hours)

An in-depth analysis of the forces behind the privatization movement. Examines the context of privatization, the theoretical and empirical arguments on both sides of the debate, and the different forms of privatization practiced in the U.S. The course draws on a wide range of disciplines in a quest for an understanding of the privatization phenomenon-political science, public administration, public policy, sociology, economics, management, and others.

PADM 815 Management and Governance of Nonprofit Organizations (3 Credit Hours)

Successful nonprofit organizations require substantial capability in key areas of management such as developing a strong board of directors, recruiting and motivating talented staff and volunteers, creating a strategic plan, and wisely managing fiscal and human resources. The course is built around understanding nonprofit governance structures, relationships, and responsibilities as well as unique management issues associated with them. This course addresses these topics from theoretical and practitioner perspectives.

PADM 816 Introduction to Nonprofit Sector (3 Credit Hours)

This course offers a broad introduction to the study and practice of the nonprofit sector. The course explores the history, scope, and significance of the nonprofit sector as it relates to philanthropy, voluntary action, civil society, and civic engagement.

PADM 817 Nonprofit Financial Management and Fund Raising (3 Credit Hours)

Lecture 3 hours; 3 credits. This course provides students with the knowledge to become effective financial managers by giving them practical applications of theory and skill-building in fiscal processes and fundraising of nonprofit organizations.

PADM 818 Public Sector Contract Administration (3 Credit Hours)

Examines leadership through theoretical and practice-based frameworks. Offers analytical and intellectual examination and reflection on core issues in the practice of leadership. These objectives will be achieved through open discussion, honest self-assessment, experiential exercises, and observation of real-life leadership practice.

PADM 819 Leadership (3 Credit Hours)

Examines leadership through theoretical and practice-based frameworks. Offers analytical and intellectual examination and reflection on core issues in the practice of leadership. These objectives will be achieved through open discussion, honest self-assessment, experiential exercises, and observation of real-life leadership practice.

PADM 820 Public Human Resources Management (3 Credit Hours)

Examines the basic framework of the public personnel system beginning with the legal requirements imposed by federal and state laws and regulations. General considerations of policy and procedures development, the organization of the public personnel system, the adoption of the personnel ordinance, the determination of various levels of employee status and the coverage of the personnel system are included.

PADM 823 Ethics in Public Administration (3 Credit Hours)

This course reviews the theory and application of ethics in the public sector, identifying public values and how they apply in the administration of government. It reviews sources of values employed in public sector decision-making, and reviews how values in public administration are managed and applied. Systems of professional ethics are reviewed in the context of public professions. Case studies and best practices are examined to help the student understand the application of administrative ethics in public management.

PADM 824 Administration of Human Services (3 Credit Hours)

Analysis of human services involving direct client/agency interaction. Problems of discretion and control are examined as alternative service delivery strategies which can deal with these problems.

PADM 825 Government, Society and Business (3 Credit Hours)

An overview of business-government society interactions, with special attention to the influence of public policy and corporate strategy on corporate social responsibility. An important theme is the ethical component of management decision making.

PADM 826 Introduction to Public Procurement (3 Credit Hours)

This course provides an overview of procurement and contract management as a core function in public sector organizations. The course introduces the student to how properly-aligned, best practice acquisitions can support public entities' strategic goals. Challenges and opportunities for all stakeholders are addressed. Special attention is given to ongoing changes in public procurement.

PADM 827 Public Procurement and Project Management (3 Credit Hours)

Course covers each phase of the public procurement project cycle, with an emphasis on tools and techniques to manage a public procurement project.

PADM 828 Public Sector Contract Planning and Formation (3 Credit Hours)

This course provides insight into why and how public sector contracts should be planned and formed properly. A strong emphasis is placed on the strategic role that procurement can play in public sector organizations and how procurement planning and source selection, in particular, fit into that role.

PADM 831 Public Sector Procurement Law and Ethics (3 Credit Hours)

This course surveys the laws and ethics applicable to public sector procurement and contract management. A theoretical and problem-based, interdisciplinary approach is used to address the major legal and ethical issues that arise when public sector organizations plan, form, and administer contracts. Attention is given to the role of professionalization in socializing appropriate ethics.

PADM 834 Negotiation and Dispute Resolution (3 Credit Hours)

The course provides conceptual and practical skills in negotiations. It examines the underlying cultural, legal, and organizational issues and problems that affect managing human resources in the workplace.

PADM 835 History of Race and Government Institutions (3 Credit Hours)

U.S. history is examined through a racial lens in the context of public administration: policies, laws, and court actions at the federal, state, and local levels. Three historical eras will be examined from colonial days to the present: Pre-Civil War Slavery, Jim Crow Segregation, and Mass Incarceration/ Colorblind Racism. Two transitional periods will also be covered: Post-Civil War Reconstruction and the Civil Rights Movement.

PADM 836 Diversity, Equity, & Inclusion: A Public Administration and Public Policy Perspective (3 Credit Hours)

Across every economic and social indicator, there are disparities that are based on race, gender, and culture. In the U.S., some of the disparities have been created by explicit and intentional discrimination that was incorporated into the U.S. Constitution and various federal, state, and local laws. Other disparities grew out of unconscious or unintended impacts of federal, state, and local laws, policies, and practices. This course will examine these issues within the context of public administration, developing an awareness of inequities and the skills to dismantle discriminatory policies and practices.

PADM 839 Cultural Competency (3 Credit Hours)

This course focuses on the growing challenges and opportunities created by our interconnected world and the knowledge and abilities necessary to lead through situations in which there are misunderstandings or conflicts rooted in differences. The course explores the structure and dynamics of all forms of diversity in public, non-profit, and governmental organizations, the resulting implications for organizational health, and the critical role of cultural-competent leadership.

PADM 840 Community Participation and Civic Engagement (3 Credit Hours)

This course examines the importance of social, economic, cultural, religious, and civic organizations in building or restoring communities. The course focuses on the revitalization, restoration, or upgrading of communities, cities, and localities or neighborhoods within or adjacent to cities, by the residents themselves. Viewed through the lens of social capital theory, the course further explores examples of short- and long-term change accomplished by community members on their own, within organizations, or in partnership with government officials.

PADM 845 Managing Development and Change in Organizations (3 Credit Hours)**PADM 850 Performance Measurement and Management (3 Credit Hours)**

This course focuses on performance-based management approaches in public and non-profit settings. It addresses the performance measurement and management process, the identification of appropriate performance measures, and the implementation of a performance measurement system, as well as managing for performance.

PADM 860 Collaboration in Public Administration (3 Credit Hours)

An examination of the fundamental concepts of collaborative governance in the field of public administration and public policy. Emphasis is placed on the government and/or nonprofit management and process of collaborative problem solving and policy implementation in cross-sector and intra-sector environments.

PADM 872 Public Financial Management (3 Credit Hours)

Examination of public sector financial principles, practices, and processes. A public manager's perspective of the decision making and practices of managing public funds. Introduction to governmental accounting practices. Emphasis on analyzing financial statements for decision making. Extensive use of Excel spreadsheet. Exploration of public financial management research and the link between public financial management practices and public fiscal and monetary policies.

PADM 880 Local Government Management (3 Credit Hours)

This course provides students with the professional knowledge, skills, and abilities to engage successfully with local governments from the following perspectives: as a generalist public administrator, as a local government specialist, and as a citizen, non-profit leader, or businessperson. In addition, this course provides students with the theoretical and policy context within which local governments operate. Students will master that knowledge by researching how local governments use those concepts in every day administration.

PADM 881 Intergovernmental Relations (3 Credit Hours)

Analysis of relationship among federal, state, and local governmental units in the delivery of governmental programs. Focus on intergovernmental issues in urban metropolitan regions.

PADM 885 Social Marketing in the Public Sector (3 Credit Hours)

Analysis of relationships among federal, state, and local governmental units in the delivery of governmental programs. Focus on intergovernmental issues in urban metropolitan regions.

PADM 895 Advanced Topics (3 Credit Hours)

Advanced topics in public administration.

PADM 898 Directed Research (3 Credit Hours)

Supervised research on a specific problem. A written report is required.

PADM 899 Dissertation (1-12 Credit Hours)

An approved research project, written under the supervision of a faculty advisor, in which the student demonstrates the capacity of design and completes independent applied research. The completed project must be approved by the dissertation committee.

PADM 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

PADM 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

PATH - Pathology

PATH 500 Introduction to Anatomical Laboratories (1 Credit Hour)

This course serves as an introduction to laboratory environments commonly seen in the practice of Pathology and fulfills training requirements necessary for continued study in the Pathologists' Assistant Program. Training will address bloodborne pathogen safety, laboratory safety and handling of biohazardous materials and waste. Proper use of Personal Protective Equipment (PPE) and laboratory regulations of the College of American Pathologists (CAP), OSHA and the Joint Commission will also be addressed. Training in human subjects' research regulations and requirements (via CITI training) will also be a component of this course. As a requirement for completion of this course, students will attain a two-year certification (by the American Heart Association) in Basic Life Support for Healthcare Providers (BLS-P). This course will also serve as an introduction to the functional, operational and administrative aspects of laboratories including the Surgical Pathology Laboratory at Sentara Norfolk General Hospital, the EVMS Biorepository and LifeNet Health.

PATH 501 Medical Ethics (2 Credit Hours)

This is a hybrid course having both an online component and face-to-face classroom discussions. The course was developed by Edx Inc., in collaboration with the faculty of Georgetown University, Kennedy Institute of Ethics. The course content and videos are equivalent to the (PHLX101-03X) course offered at Georgetown University. The in-house utilization of the course has supplemental features that include periodic interactive face-to-face classroom discussions on selected topics and themes. These discussions, conducted either as Blackboard postings or as classroom exchanges, personalize the course content. The course presents five major themes of bioethics and each of the five major themes is highlighted by a classroom discussion on the topic. Each week, a new unit will become available to the students either online or Blackboard. Presented in this course are the following themes: Autonomy, Bioethics and the human body, Bioethics as it pertains to the beginning and end of life and bioethics that have a global impact.

PATH 502 Educational Methodologies (2 Credit Hours)

This is an online component course that introduces the student to a variety of learning and teaching methods for health professionals. The course emphasizes the integration of knowledge and experience in preparing the student to function effectively in clinical clerkships. It covers a broad range of topics designed to improve learning skills, teaching, interactions with supervisors, residents, how to interact effectively with preceptors, how to become an effective preceptor to students and residents. Core themes include orienting the student learner, defining and applying feedback, application and analysis of effective questioning to promote knowledge and comprehension, strategies used in clinical educational encounters, role modeling, entrustment and behavioral elements of professionalism in the clinical setting.

PATH 503 Essential Physiology & Anatomy (5 Credit Hours)

This is a comprehensive introductory course to integrative organ system physiology and homeostatic regulatory mechanisms. Interrelationships of structure and function are reinforced throughout the course. The flow of the course is intended to interphase closely with the topic material being taught concurrently in Histology (PATH 513). The anatomy primer portion of the course introduces interactive learning exercises, videos and diagrams that expose the student to the major structural features that they will encounter in Anatomical Foundations (PATH 504).

PATH 504 Anatomical Foundations (5 Credit Hours)

The course is divided into 4 modular units of learning. The sequence is: back & upper extremities; head and neck; thorax & abdomen; pelvis & lower extremity. This course affords the student a coherent, sequential approach to the dissection and study of human anatomy at the gross level with applied clinical relationships for PA, SA & PathA students. The general objective is for the experience of dissection to lead to a 3-D visual concept of the human body in order to relate this to future professional settings. This 3-D dissection experience is extrapolated to all the other bodies in the anatomy lab providing the student with the anatomical basis for understanding and appreciating the variations and complexities of the human body. Students should be able to demonstrate to each other all the different normal structures and any pathological structures detailed in the student learning objectives for specific lectures. Students should be able to integrate materials in a particular module to talk about clinical/surgical functions. These objectives are evaluated by clinical scenario types of questions on exams.

PATH 506 Microbiology (2 Credit Hours)

This course will cover Medical Bacteriology and includes an introduction to bacteria biology including structure, growth, genetics, pathogenesis, mechanism-of-action of antimicrobial drugs and the fundamentals of disease prevention. Specific bacteria pathogens along with the human diseases they cause will be discussed. Emphasis will be on optimum methods of obtaining samples for culture and identification. Essential concepts related to life cycles, pathogenicity and aseptic technique will be introduced. One lecture each will introduce basic concepts in medical virology, medical mycology and medical parasitology.

PATH 507 Neuroanatomy (2 Credit Hours)

This course is a comprehensive introduction to integrative nervous system anatomy and physiology. Interrelationships of structure and function are reinforced throughout the course, including neurological cases. The flow of the course is intended to interphase closely with the topic material being taught concurrently in Mechanism of Disease (PATH 516) and Pathophysiology (PATH 510). The Neuroanatomy course introduces interactive learning exercises based on interactive lectures, clinical cases and material demonstrations using videos, materials and diagrams that expose the student to the major structural and functional features.

PATH 508 Medical Photography (2 Credit Hours)

This course applies the basic foundations of digital photography to medical photo documentation techniques. Students will learn principles of light, optics, exposure, metering, lighting, special filters, annotation and archiving of images both at the macro and microscopic level. Learning methodologies include lectures and application in a practicum setting.

PATH 509 Autopsy & Surgical Path Techniques (3 Credit Hours)

This course is a combination of lectures and laboratory sessions. Students will be taught established surgical pathology and autopsy techniques. Autopsy techniques will include evisceration and dissection methods. Historical context and legal considerations will also be introduced. Surgical pathology topics will include general dictation and grossing techniques as well as specific organ/system methods, as well as the AJCC Cancer Staging Manual criteria and CAP protocols. There will be a review of laboratory operations, coding and laboratory safety as it applies to the Pathologists' Assistant. The laboratory portion of the course will include fixed, porcine organ/tissue grossing, frozen sections and dictation exercises. Students will be oriented to the facilities of Sentara Norfolk General Hospital Surgical Pathology and the Tidewater District Office of the Virginia Medical Examiner's Office.

PATH 510 Pathophysiology (4 Credit Hours)

This course is a didactic presentation of human pathophysiology designed for Health Professions students. A clear understanding of the etiology, pathogenesis, pathophysiology and morphologic changes of disease serves as an essential basis for the understanding and competent practice in all areas of medicine. Students in this course will: Develop a background and vocabulary in pathophysiology; acquire an understanding of general physiologic/pathophysiologic processes such as inflammation, repair, neoplasia and senescence; survey pathophysiologic processes and morphologic changes which manifest in organ systems and establish a basis for the understanding of disease; exercise an approach to clinical problems which evaluates symptoms, signs and findings with a knowledge of pathophysiology to formulate a diagnosis with due consideration of differential diagnoses.

PATH 511 Organ System Pathology (4 Credit Hours)

This course is a comprehensive introduction to integrative organ system pathology, and will include interrelationships of structure and function are reinforced throughout the course. The flow of the course is intended to interphase with topic material being taught concurrently in Autopsy and Surgical Pathology Techniques (PATH 509). The course introduces an interactive learning experience that exposes the student to all the major organ system pathology as is presented in Robbins Pathology and will provide the student with a strong background for fulfilling the competency requirements for a career as a Pathologists' Assistant.

PATH 512 Histotechnology I (2 Credit Hours)

This course focuses on the laboratory skills required to function in a clinical or research histology facility including specimen acquisition and fixation, tissue processing, embedding, sectioning and staining. Paraffin-based techniques with H&E/special stains are introduced. The student is expected to gain experience in cryomicrotomy and is introduced to a variety of immunohistochemical techniques. Chemical and environmental safety issues are covered in depth and emphasized. Proper record-keeping practices including quality control and quality assurance requirements are also reinforced. Responsible lab management procedures are emphasized including essential inventory control concerns, as well as instrumentation, care, quality assurance and maintenance.

PATH 513 Histology Health Professions (2 Credit Hours)

This course provides students with an understanding of the normal architecture of cells and an opportunity to gain appreciation of how cellular components specialize to form primary tissues and how these tissues give rise to organs and organ systems. The course allows for the evaluation of the structure-function relationships in normal cells, tissues and organs. Students will acquire morphological pattern recognition and cell/tissue/organ identification skills at the light microscopic level and to a lesser extent at the electron microscope level through a lecture-lab combination, systems-based approach. Students will be introduced to proper use of a light microscope and essentials of microscopy. Utilizing light microscopes in a laboratory setting and on-line tutorials to recognize the morphology of structures, students will relate these structures to their function. This course is a critical prerequisite to Pathology and Pathophysiology.

PATH 514 Medical Terminology (2 Credit Hours)

This is an interactive online and temporally guided self-paced course conducted using Quizlet. The course provides the student with an extensive vocabulary building set of exercises in medical terminology. The course is constructed with multiple sets of self-educational exercises that instruct the student in: General rules governing medical nomenclature, general rules pertaining to plurality and pronunciation, common medical terms and conditions, prefixes and suffixes of medical terms, covering AAPA suggested list of medical terms derived from Robbins Pathology textbook. The individual study sets are designed to cover each individual chapter of Robbins Pathology textbook. The students are introduced to CPT coding for surgical pathology used by the American Medical Association.

PATH 515 Embryology (2 Credit Hours)

This course is a comprehensive introduction to human embryology with application to pathology. The course is intended to interface with the topics taught concurrently in Anatomical Foundations (PATH 504).

PATH 516 General Mechanisms of Disease (3 Credit Hours)

The General Mechanisms of Disease module serves as a transition from the foundational modules to the organ systems modules. It focuses on the general mechanisms of disease, introducing students to microbiology and infectious disease, principles for discriminating healthy from unhealthy conditions and predicting clinical manifestations. The course consists of face-to-face lectures by basic science faculty focusing on major principles and their biomedical applications. Exams are used to assess foundational knowledge and facilitate knowledge integration and are designed to facilitate student review and self-assessment. The PathA student will complete approximately 60 contact hours. The course will have three major non-comprehensive multiple choice exams each covering approximately 6 to 8 hours of lecture content. The course will assess topic-specific foundational knowledge and facilitate disease knowledge integration.

PATH 600 Clinical Rotations (8 Credit Hours)

This course is the first of three consecutive courses comprising the Supervised Clinical Practice (SCP) component of the EVMS Pathologists' Assistant Program. This course consists of immersive clinical experiences in the various disciplines where Pathologists' Assistants may serve. Students will function under the direct supervision and guidance of site preceptors (Pathologists, Pathologists' Assistants, or other appropriate laboratory professionals). These rotations will include experience in Surgical Pathology, Medical Autopsy Pathology, Forensic Autopsy Pathology, Laboratory Management and Bio-Banking/Biorepository Sciences. The settings for these experiences will include district offices of the Virginia Medical Examiner's Office, military and Veterans Administration hospitals, community hospitals, larger private hospital complexes, academic medical centers and the EVMS Biorepository. Students will apply the knowledge and the skills developed in previous didactical courses to develop skills necessary for clinical practice. This course will introduce the student to the demands of the working environment and expectations of a practicing Pathologists' Assistant.

PATH 601 Certificate Completion Program (2 Credit Hours)

A new self-paced online certificate program, University of Pathology Informatics (UPI) leverages case-based learning to develop critical knowledge of informatics concepts. UPI is a joint effort between the American Society for Clinical Pathology (ASCP) and the Association for Pathology Informatics (API) focusing on the four laboratory informatics competencies: Information Fundamentals, Information Systems, Workflow & Processes and Governance & Management. This certificate program consists of 20 custom courses; 12 core and eight elective courses are required to earn the certificate. UPI utilizes a case-based approach, where you will act as the project leader in developing a pathology informatics needs assessment for a laboratory.

PATH 602 Special Topics: Pediatric Pathology (2 Credit Hours)

This is an online course that introduces the student to a variety of commonly encountered pediatric pathology cases. The course emphasizes the integration of knowledge obtained from prior pathology courses and prepares the student to function effectively in clinical clerkships where pediatric samples are encountered. It covers a broad range of topics designed to improve knowledge specific to pediatric cases and samples. Following successful completion of this course the student should be able to interact with pathologists and residents specialized in the field of pediatric pathology to carry out the function of a Pathologists' Assistant.

PATH 603 Clinical Rotations (8 Credit Hours)

This course is the second of three consecutive courses comprising the Supervised Clinical Practice (SCP) component of the EVMS Pathologists' Assistant Program. This course also consists of immersive clinical experiences in the various disciplines where Pathologists' Assistants may serve. Students will function under the direct supervision and guidance of site preceptors (Pathologists, Pathologists' Assistants, or other appropriate laboratory professionals). These rotations will include experience in Surgical Pathology, Medical Autopsy Pathology, Forensic Autopsy Pathology, Laboratory Management and Bio-Banking/Biorepository Sciences. The settings for these experiences will include district offices of Virginia Medical Examiner's Office, military and Veterans Administration hospitals, community hospitals, larger private hospital complexes, academic medical centers and the EVMS Biorepository. Students will continue to develop skills for clinical practice, an emphasis will be placed in functioning with greater autonomy and efficiency. They will expand their repertoire of specimen types and perform duties of progressively increasing complexity. Learning objectives addressed in prior courses or clinical rotations will be reinforced and emphasized. This course will prepare the student to meet the demands of the working environment and expectations of a practicing Pathologists' Assistant.

PATH 604 Lab Management Certificate (2 Credit Hours)

This course uses the Lab Management University (LMU) self-paced online certificate program that improves competencies in laboratory management. It will teach the student practical, day-to-day skills needed to function successfully in a laboratory environment. All core concepts of laboratory management are introduced. The Fundamentals Certificate of Completion in Laboratory Management is awarded on completion of 25 courses across six core competencies: Leadership, Personnel Management, Operations, Financial Management, Informatics and Compliance. Students select and complete 25 courses under the Fundamentals program at their own pace, receiving their Certificate of Completion in Laboratory Management upon successful completion.

PATH 605 Gross Anatomy Teaching Assistant (1 Credit Hour)

The students will participate in ongoing educational activity in the Gross Anatomy course for first year medical students or physician assistants and surgical assistants. It is anticipated that the PathA teaching assistant rotation (60 contact hours; approx. 8 weeks) will facilitate the learning experience of students currently enrolled in the course. Activities that the teaching assistant will conduct include dissection of cadavers for prosection presentation, photo documentation of dissection specimens of sufficient quality to be used for educational purposes. Conduct processing, dictation, and photo documentation of collected specimens of various pathologies encountered in the cadavers. The teaching assistants will participate in setting up formative quizzes, assisting in setting up of laboratory practical exams, opening of the calvarium and removal of brains and evaluations of student presentations.

PATH 606 Special Topics: Neuropathology (1 Credit Hour)

This is an online course that introduces the student to a variety of commonly encountered neuropathology cases. The course emphasizes the integration of knowledge obtained from prior pathology courses and prepares the student to function effectively in clinical clerkships where neuropathology samples are encountered. It covers a broad range of topics designed to improve knowledge specific to neuropathology cases and samples. Following successful completion of this course the student should be able to interact with pathologists and residents specialized in the field of neuropathology to carry out the function of a Pathologists' Assistant.

PATH 607 Clinical Rotations (4 Credit Hours)

This course is the final course of the Supervised Clinical Practice (SCP) component of the EVMS Pathologists' Assistant Program. This course consists of immersive clinical experiences in the various disciplines where Pathologists' Assistants may serve. Students will function under the direct supervision and guidance of site preceptors (Pathologists, Pathologists' Assistants, or other appropriate laboratory professionals). These rotations will include experience in Surgical Pathology, Medical Autopsy Pathology, Forensic Autopsy Pathology, Laboratory Management and Bio-Banking/Biorepository Sciences. The settings for these experiences will include district offices of Virginia Medical Examiner's Office, military and Veterans Administration hospitals, community hospitals, larger private hospital complexes, academic medical centers and the EVMS Biorepository. In this course, students will emphasize and refine the skills and abilities required of a practicing Pathologists' Assistant and will be capable of working with indirect supervision and with the independence expected of a PathA program graduate. Upon completion of this course, students will be fully competent in all essential duties of a PathA.

PATH 608 ASCP Certification Exam Prep (4 Credit Hours)

This seminar course is designed as a comprehensive review, study guide and self-evaluation tool with the goal of preparation for the American Society for Clinical Pathology Board of Certification (ASCP-BOC) Pathologists' Assistant certification examination. Students will have access to pre-course and post-course practice examinations and interactive study materials. Appropriate reference texts will be available as well as other review materials. This course will make use of the seminar format with students synthesizing material from multiple courses and disciplines into presentations to be shared with the class. The course will begin with a pre-course practice test to evaluate individual strengths and weaknesses in preparation of review for the ASCP-BOC Pathologists' Assistant Examination. Students will then be assigned seminar topics and will work in groups of two or three, to synthesize material and create presentations. Multiple disciplines (anatomy, pathology, histology, embryology, surgical pathology techniques, etc.) shall be included in the generation of review presentations and presentations will provide the foundation for seminars led by the assigned group. A post-course practice examination will allow the student to track their progress and identify any remaining points of weakness.

PATH 609 Graduate Seminar (2 Credit Hours)

This is a capstone research project designed to introduce the student to multiple elements of an original research project. The student will be responsible for selecting a topic in the discipline of Pathology to be worked up as a case-study finding or original research finding. The student will be responsible for the selection of the topic of interest, conducting literature search, compilation and analysis of the data material and writing of the findings in the form of an abstract and/or manuscript. Although not required, the reported findings should be of sufficient originality and scientific merit that it could be suitable for peer-review publication or presentation at a scientific meeting. The student will be responsible for writing and editing the final abstract, manuscript or report under the guidance of the Program Director. If the findings are submitted for publication, the student will be responsible for addressing reviewer comments and re-submission for publication with assistance from the Program Director. The course presents several major themes and opportunities of instructional methods related to research techniques and methods in health profession education. This course will allow the student to receive instructional and scientific guidance from the Program Director for initiating and completing a case-study report or other approved research project of interest. The culmination of the project will require that the student present the findings in an open seminar setting either in-house or at an approved scientific meeting to enhance the learning experience. The students will have the opportunity to participate in multiple discussions from the audience during their presentation.

PAUP - Public Administration and Urban Policy

PAUP 890 Dissertation Seminar (3 Credit Hours)

A multidisciplinary seminar that focuses on the design, implementation, and evaluation of urban programs under real-life conditions in the field. Students and faculty work with urban decision makers utilizing problem-solving skills and analysis.

PAUP 895 Advanced Topics (3 Credit Hours)

Advanced topics in public administration.

PAUP 898 Directed Research (1-6 Credit Hours)

Supervised research on a specific problem. A written report is required.

PAUP 899 Dissertation (1-12 Credit Hours)

An approved research project, written under the supervision of a faculty advisor, in which the student demonstrates the capacity of design and completes independent applied research. The completed project must be approved by the dissertation committee.

PE - Physical Education

PE 597 Topics in Health and Physical Education (1-3 Credit Hours)

This course provides an opportunity for in-depth study of selected topics in health and physical education.

Prerequisites: approval of program advisor

PHIL - Philosophy

PHIL 500 Philosophy and Video Games (3 Credit Hours)

An examination of the metaphysical, aesthetic, and ethical philosophical issues that accompany the creation, play, and critique of video games. Students will learn and analyze theories about what games are. They will think about and discuss the aesthetic qualities of video games and critically engage with attempts to fit video games into the larger art world. Students will engage with moral issues that arise from creating and consuming video games with morally problematic content. Finally, students will learn how to think critically about and interpret larger philosophical problems raised by video games and their themes.

Prerequisites: Junior standing and a grade of C or better in PHIL 110P or ENMA 480, or instructor permission

PHIL 501 Responsible Innovation and Inclusive Design (3 Credit Hours)

Provides training in inclusive and social-critical technology development and product design methodologies intended to directly transfer to use in industrial and organizational settings. The course's work-based learning is grounded in foundational work in philosophy of technology. Topics covered include SCOT (social construction of technology), ANT (actor-network theory), VSD (value-sensitive design), CBPR (community-based participatory research), and postphenomenological methodologies.

Prerequisites: ENGL 211C, ENGL 221C, or ENGL 231C and 3 credit-hours in PHIL or REL

PHIL 502 Gender and Philosophy (3 Credit Hours)

A philosophical survey of approaches to understanding gender and gender differences. The course will also serve as an introduction to feminist philosophy, with a particular emphasis on feminist ethics.

PHIL 504 Existentialism and Phenomenology (3 Credit Hours)

This course is an examination of the writings of some of the major philosophers in the Existentialist and Phenomenology movements of the 19th and 20th centuries.

Prerequisites: ENGL 211C and six credit hours in PHIL or REL, or permission of the instructor

PHIL 505 American Pragmatist Philosophy (3 Credit Hours)

This course is an examination of the writings of some of the major American philosophers in the Pragmatist tradition.

Prerequisites: ENGL 211C and six credit hours in PHIL or REL, or permission of the instructor

PHIL 506 Language and Thought: History of Analytic Philosophy (3 Credit Hours)

This course is a study of the history of the Analytic tradition in philosophy up through the 20th century.

Prerequisites: ENGL 211C and six credit hours in PHIL or REL, or permission of the instructor

PHIL 508 20th Century and Contemporary French Philosophy (3 Credit Hours)

This course explores French philosophy from the 20th century to today, examining how geopolitical events, technological change, and social movements have shaped and been shaped by key currents in French philosophical thought. Themes could include technology, biopolitics, deconstruction, feminism, May 1968, secularism, existentialism, postmodernism, and psychoanalysis, with a focus on whether there is a distinct 'French' approach to these topics.

PHIL 510 Social and Political Philosophy (3 Credit Hours)

A philosophical analysis of the relation between man, society, and the state, studying about a dozen philosophers since Plato on such topics as justice, authority, law, freedom, and civil rights.

PHIL 511 Post-Modernism and Post-Structuralism (3 Credit Hours)

This course is an examination of intellectual currents in postmodernism and post-structuralism as they pertain to central questions in social and political thought.

PHIL 512 Philosophy of Law (3 Credit Hours)

An examination of the nature of law and philosophical issues concerning the law.

PHIL 514 Feminist Philosophy (3 Credit Hours)

This course addresses feminist philosophy as a distinctive field of philosophy, offering a pluralist survey of both analytic and Continental approaches to feminist epistemology, ontology, phenomenology, ethics, and politics. Importantly, students will develop an intersectional lens of analysis to consider the lived reality and politics of gender, race, sexuality, disability, and other entwining marginalized identities.

PHIL 525 Kant and Hume (3 Credit Hours)

This course is an examination of the philosophical writings of Hume and Kant and their influence.

PHIL 530 Marx and Hegel (3 Credit Hours)

This course is an examination of the philosophical writings of Hegel and Marx and their influence

PHIL 532 Nietzsche and Life Affirmation (3 Credit Hours)

This course is an examination of Nietzsche's attempt to provide a life-affirming philosophy after laying waste to many traditional Western efforts to find life meaningful.

PHIL 534 Contemporary Theory of Knowledge (3 Credit Hours)

This course provides students with a problem-oriented, critical, and comparative understanding of problems in contemporary epistemology. Topics include skepticism and responses thereto, analyses of knowledge, the externalist versus internalist debate, foundationalism and coherentism, and social approaches to knowledge including contextualism and feminism.

PHIL 535 Philosophy of Psychology (3 Credit Hours)

An examination of various ways in which the mind has been understood in philosophy and in psychology and of the methods that have been used in the study of the mind.

PHIL 540 Philosophy of Science (3 Credit Hours)

A study of the concepts and philosophical problems in the sciences: scientific reasoning, confirmation, explanation, laws, meaning, theories, revolutions, progress, and values.

PHIL 542 Studies in Applied Ethics (3 Credit Hours)

An intensive examination of ethical issues in a particular field or profession; an emphasis on ethical theory underlying practical decisions.

PHIL 546 Artificial Intelligence (AI) Ethics and Policy (3 Credit Hours)

This course explores whether and how ethical AI is possible by examining moral standards as they apply to the various dimensions of AI development and use. It reviews the major ethical theories and discusses how principles such as transparency, privacy, safety, non-discrimination, and sustainability should govern the creation and use of AI technologies. Moreover, it considers how these principles could serve as the ethical framework for the social and policy structures that regulate and shape the future development of these technologies.

PHIL 547 Philosophy of Information (3 Credit Hours)

An in-depth study of the core topics of philosophy of information, including the nature of information across its primary forms (e.g. semantic, physical, biological, economic), personal and social impacts of information and information transfers, formulation of information as data, theory-ladenness of data, problematics of data analytics, and inferential validity of prior data. Project-based assessment is structured to provide individualized work-based learning.

Prerequisites: ENGL 211C, ENGL 221C, or ENGL 231C and 3 credit-hours in PHIL or REL

PHIL 551 Native American Philosophies (3 Credit Hours)

This course will provide students with an introduction to Native American philosophies with a focus on issues of identity, genocide, personhood, gender, sovereignty, and decolonization. Topics will be approached through a consideration of Native American philosophical methodologies and Native views regarding metaphysics, epistemology, and ethics. (Cross-listed with REL 551)

Prerequisites: ENGL 110C and 3 credit hours in PHIL or REL, or permission of instructor

PHIL 582 Chinese Religion and Philosophy (3 Credit Hours)

A study of Chinese thought emphasizing Early and Classical Confucianism and Taoism, Chinese Buddhism, and NeoConfucianism. Modern currents of Chinese thought are also discussed.

PHIL 585 Japanese Religion and Philosophy (3 Credit Hours)

A study of the religious and philosophical traditions of Japan. Emphasis will be given to Shintoism, Buddhism, and Neo-Confucianism and their contemporary status and influence in Japanese culture.

PHIL 591 Seminar in Philosophy (3 Credit Hours)

Intensive examination of the thought of one major philosopher or philosophical movement.

PHIL 595 Topics in Philosophy (1-3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule, and will be more fully described in information distributed to all academic advisors.

PHIL 596 Topics in Philosophy (1-3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule, and will be more fully described in information distributed to all academic advisors.

PHIL 597 Tutorial Work in Special Topics in Philosophy (1-3 Credit Hours)

Independent reading and study of a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

PHIL 598 Tutorial Work in Special Topics in Philosophy (1-3 Credit Hours)

Independent reading and study of a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

PHIL 610 Studies in the Philosophy of Art (3 Credit Hours)

An evaluation of the field of art in relation to the rest of human culture, emphasizing the various approaches that may be used.

Prerequisites: One 500-level Philosophy course with a grade of B or higher (or equivalent)

PHIL 695 Topics in Philosophy (3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work in subjects of mutual interest that, due to their specialized nature, may not be offered regularly.

Prerequisites: One 500-level Philosophy course with a grade of B or higher (or equivalent)

PHIL 697 Tutorial Work in Special Topics in Philosophy (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: approval of the department chair and one 500-level Philosophy course with a grade of “B” or higher (or equivalent)

PHIL 698 Tutorial Work in Special Topics in Philosophy (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: approval of the department chair and one 500-level Philosophy course with a grade of “B” or higher (or equivalent)

PHIL 704 Technology and the Humanities (3 Credit Hours)

A seminar providing foundations for and experience in the critical examination of technologies and their human and social impact. Topics will vary and may include AI, innovation, social media, robotics, healthcare, gaming, art, and music.

PHIL 707 Ethics in Public Health Practice (1-3 Credit Hours)

An investigation of ethical issues in public health policy, practice, and research. Students will develop a capacity for reasoned judgments in these matters by understanding and applying basic moral concepts, theories, and ideals.

Prerequisites: open to all graduate students in relevant fields

PHIL 710 International Rights (3 Credit Hours)

A philosophical study of rights applicable to the international arena. Theories from the early Modern European period to the present day will be treated. Coverage includes international law, the rights of nations, and human rights.

Prerequisites: approval of instructor

PHIL 795 Topics in Philosophy (3 Credit Hours)

The advanced study of special topics that may not be offered regularly.

PHIL 797 Tutorial in Philosophy (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: approval of the department chair

PHIL 804 Technology and the Humanities (3 Credit Hours)

A seminar providing foundations for and experience in the critical examination of technologies and their human and social impact. Topics will vary and may include AI, innovation, social media, robotics, healthcare, gaming, art, and music.

PHIL 807 Ethics in Public Health Practice (1-3 Credit Hours)

An investigation of ethical issues in public health policy, practice, and research. Students will develop a capacity for reasoned judgments in these matters by understanding and applying basic moral concepts, theories, and ideals.

Prerequisites: Open to all graduate students in relevant fields

PHIL 810 International Rights (3 Credit Hours)

A philosophical study of rights applicable to the international arena. Theories from the early Modern European period to the present day will be treated. Coverage includes international law, the rights of nations, and human rights.

Prerequisites: approval of instructor

PHIL 895 Topics in Philosophy (3 Credit Hours)

The advanced study of special topics that may not be offered regularly.

PHIL 897 Tutorial in Philosophy (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: approval of the department chair

PHYS - Physics

PHYS 503 Electronic Instrumentation (3 Credit Hours)**PHYS 513 Methods of Experimental Physics (3 Credit Hours)**

Experiments in classical and modern physics, designed to develop skills in the collection, analysis, and interpretation of experimental data.

PHYS 515 Introduction to Nuclear Particle Physics (3 Credit Hours)

An introduction to the structure of the atomic nucleus, natural and artificial radioactivity, nuclear decay processes and stability of nuclei, nuclear reactions, properties of nuclear forces, and nuclear models. Also, particle phenomenology, experimental techniques and the standard model. Topics include the spectra of leptons, mesons, and baryons; strong, weak, and electromagnetic interactions.

PHYS 516 Introduction to Solid State Physics (3 Credit Hours)

Introduction to solid state physics and materials science, with emphasis placed on the applications of each topic to experimental and analytical techniques. Topics include crystallography, thermal and vibrational properties of crystals and semiconductors, metals and the band theory of solids, superconductivity and the magnetic properties of materials.

PHYS 517 Introduction to Particle Accelerator Physics (3 Credit Hours)

Fundamentals of relativistic particle dynamics including particle acceleration; weak and strong focusing; linear beam optics and particle transfer matrices; linear and non-linear synchrotron motion; introduction to the statistical descriptions of particle beams; and radiation production by accelerated relativistic particles. Examples relevant to betatrons, cyclotrons, synchrotrons, and linear accelerators will be given.

Prerequisites: PHYS 319 or MAE 205, and PHYS 425 or ECE 323

PHYS 520 Introductory Computational Physics (3 Credit Hours)

Introduction to computationally based problem solving in physics with an emphasis on understanding and applying various numerical algorithms to different types of physics problems. Topics will include numerical integration (quadrature), numerical solution of ordinary differential equations, Runge-Kutta and Numerov methods, polynomial approximations, numerical linear algebra, and Monte-Carlo methods. These computational methods will be applied to problems in classical and quantum mechanics, as well as electromagnetic theory.

Prerequisites: CS 150, CS 151 or CS 153; PHYS 319; PHYS 323; and MATH 212

PHYS 525 Electromagnetism I (3 Credit Hours)

A study of the classical theory and phenomena of electricity and magnetism. Topics include the calculation of electric and magnetic fields, magnetic and dielectric properties of matter, and an introduction to Maxwell's equations. The course contains a mandatory recitation section.

PHYS 551 Theoretical Mechanics (3 Credit Hours)

A mathematical study of the concepts of mechanics. Vector calculus methods are used. Topics include mechanics of a system of particles, Lagrangian mechanics, Hamilton's canonical equations, and motion of a rigid body.

PHYS 552 Introduction to Quantum Mechanics (3 Credit Hours)

Introduction to the physical and mathematical structure of quantum theory. Dirac notation, Spin systems, EPR paradox and Bell's inequality. The Schrödinger equation is introduced for simple systems. Quantization of bound states, scattering, and tunneling are introduced for the 1-dimensional square-wave potential. In three dimensions, angular momentum and the harmonic oscillator are developed. The course contains a mandatory recitation section.

Prerequisites: PHYS 319 and PHYS 323

PHYS 553 Electromagnetism II (3 Credit Hours)

A course in electrodynamics developed from Maxwell's Equations. Topics include Maxwell's Equations, Conservation Laws, Electromagnetic Waves, Potentials and Fields, Radiation, and the interplay of electrodynamics and special relativity. The course contains a mandatory recitation section.

PHYS 554 Thermal and Statistical Physics (3 Credit Hours)

A study of the fundamental concepts of thermodynamics, kinetic theory, and statistical mechanics. Topics include the thermodynamics of simple systems, kinetic theory of gases, statistical mechanics of gases and an introduction to quantum statistics.

PHYS 556 Intermediate Quantum Mechanics (3 Credit Hours)

Techniques for solving the Schrödinger equation in one, two, and three dimensions. Solution of the Hydrogen atom, variational techniques, perturbation theory and scattering. The Pauli exclusion principle. Optional topics include atoms in an electromagnetic field (Stark effect, Zeeman effect), spontaneous and stimulated emission, hydrogen molecular ion and helium ground states, Bloch waves and elementary theory of solids.

PHYS 595 Special Topics in Physics (1-3 Credit Hours)

In-depth study of a selected topic in physics at the graduate level. May include a laboratory or computational component.

Prerequisites: Permission of the instructor

PHYS 597 Special Problems and Research (1-3 Credit Hours)

These courses afford the student an opportunity to pursue individual study and research.

Prerequisites: permission of the instructor

PHYS 601 Mathematical Methods of Physics I (3 Credit Hours)

Basic mathematical methods with applications: vector analysis, linear algebra, series and series of functions, Hilbert spaces, complex variable theory.

PHYS 602 Mathematical Methods of Physics II (1 Credit Hour)

Continuation of PHYS 601. Basic mathematical methods with applications: integral transforms, ordinary differential equations and partial differential equations.

Prerequisites: PHYS 601

PHYS 603 Classical Mechanics (3 Credit Hours)

Particle in a central-force field. Dynamics in a rotating reference frame. Lagrangian and Hamiltonian formulations. Small oscillations. Kinematics and dynamics of a rigid body. Canonical transformation, Hamilton-Jacobi theory.

PHYS 604 Classical Electrodynamics I (3 Credit Hours)

Electrostatics: Gauss' Law and Poisson and Laplace equations. Methods for the solution of boundary-value problems with rectangular, cylindrical, and spherical symmetry. Expansion in multipoles. Dielectrics. Magnetostatics and Faraday's law.

PHYS 621 Quantum Mechanics I (3 Credit Hours)

Mathematical foundations of Hilbert spaces. Background on Hamiltonian mechanics and electro-magnetism. Postulates of Quantum Mechanics, measurements and Schrödinger equation. Simple systems. Schrödinger Equation in 1-3 dimensions and solutions for specific systems. Symmetries and angular momentum. Time-independent perturbation theory.

PHYS 695 Selected Topics in Pure and Applied Physics (1-3 Credit Hours)

These courses afford the student an opportunity to pursue individual study.

Prerequisites: permission of the instructor

PHYS 696 Special Topics in Accelerator Physics (3 Credit Hours)

Special topics related to particle accelerators and their applications. Departmental approval required.

PHYS 698 Research (1-9 Credit Hours)

M.S. level research supervised by the student's thesis advisor.

PHYS 699 Thesis (1-9 Credit Hours)

M.S. level research supervised by the student's thesis advisor.

PHYS 704 Classical Electrodynamics II (3 Credit Hours)

Electrodynamics: Maxwell equations, plane electromagnetic waves and wave propagation, waveguides, radiating systems, special theory of relativity, including the dynamics of relativistic particles and electromagnetic fields.

Prerequisites: PHYS 604

PHYS 707 Statistical Mechanics (3 Credit Hours)

Review of thermodynamics. Classical statistical mechanics and applications. The virial expansion. Quantum statistical mechanics and the micro-canonical, canonical, and grand-canonical ensembles. The Fermi and Bose gases, and applications. Special topics in statistical mechanics.

Prerequisites: PHYS 603

PHYS 711 Computational Physics (3 Credit Hours)

Studies of high level computer languages. Computational techniques used in physics. Numerical techniques for differential and integral problems. Algebraic processing languages. Introduction to scientific visualization techniques.

PHYS 721 Quantum Mechanics II (3 Credit Hours)

Further development of quantum mechanics. Multi-particle states, bosons and fermions. Classical Limit. Variational principle, time-dependent perturbation theory and scattering. Path integral formulation. Symmetry and groups, addition of angular moments. Examples from solid state, atomic, nuclear, and particle physics.

Prerequisites: PHYS 621

PHYS 722 Nuclear and Particle Physics I (3 Credit Hours)

Nuclear forces, models of nuclear structure and reactions, hadron and lepton scattering, introduction to constituent quark model and hadron spectroscopy.

Prerequisites: PHYS 621

PHYS 723 Nuclear and Particle Physics II (3 Credit Hours)

Discrete and continuous symmetries and application to particle physics, SU(2) and SU(3) symmetries and static properties of hadrons. Klein-Gordon and Dirac equations, quantum electrodynamics and Feynman rules, strong and weak interactions, Standard Model and physics beyond the Standard Model.

Prerequisites: PHYS 722 or PHYS 822

PHYS 724 Condensed Matter Physics I (3 Credit Hours)

Electronic and lattice properties of solids, band structures of metals, semiconductors and insulators, dynamics of electron and phonons, electromagnetic and optical properties of metals and doped semiconductors, phenomenology of superconductivity and magnetism, and selected experimental methods of solid state physics.

Prerequisites: PHYS 621, and PHYS 721 or PHYS 821

PHYS 727 Atomic Physics (3 Credit Hours)

Irreducible tensor methods. Radiative excitation and ionization processes. Atom-atom scattering. Time-evolution of atomic observables in external fields. Multiple channel quantum defect theory and complex atomic and molecular spectra.

Prerequisites: permission of the instructor

PHYS 754 Accelerator Physics (3 Credit Hours)

Overview of the underlying physics of modern particle accelerators. Beam acceleration, coupled and uncoupled beam transport, nonlinear dynamics, collective effects, phase space cooling, and free-electron lasers will be covered. Depending on the instructor, additional topics of current interest such as coherent synchrotron radiation, wakefields and impedances, and novel methods of acceleration will be discussed.

PHYS 755 Experimental and Computational Techniques in Accelerator Physics (3 Credit Hours)

Overview of the tools and techniques used in the design of particle accelerators and the measurement of their components. The course is targeted for both physicists and engineers, and its intent is to provide them with a common language and understanding. The course consists of 6 modules of 2 weeks each. Each module will be a combination of assigned readings, lectures, computer-based design, and hand-on measurements. Typical topics to be addressed in the 6 modules are: beamline design, electromagnetic cavity design, magnets, beam instrumentation, engineering principles for superconducting rf accelerators, machine learning.

PHYS 759 Classical Mechanics and Electromagnetism in Accelerator Physics (3 Credit Hours)

Further developments in classical mechanics and electromagnetism and their application to accelerator physics: Lagrangian and Hamiltonian formulation of equations of motion, canonical transformations, adiabatic invariants, linear and nonlinear resonances. Louisville's theorem, solutions of Maxwell's equation in cavities and waveguides, wakefields, radiation and retarded potentials, and synchrotron radiation.

Prerequisites: PHYS 601, PHYS 603, and PHYS 704 or PHYS 804

PHYS 760 Low Temperature Physics (3 Credit Hours)

Properties and behavior of materials and systems at low temperature with emphasis on particle accelerator and microwave applications. Macroscopic quantum phenomena in condensates. Superfluidity, electrodynamic properties of superconductors.

Prerequisites: PHYS 825

PHYS 765 Design and Operating Principles of Particle Accelerators (3 Credit Hours)

This course will introduce design and general operating principles for particle accelerators, including acceleration methods for particles and beams. Topics will include the evolution and descriptions of particle beams under acceleration, physics of accelerated particle beams, as well as the effects of space charge, high-order modes (HOMs), and other collective effects. Aspects of both normal conducting (RF) and superconducting (SRF) particle beam acceleration will be covered.

Prerequisites: PHYS 603, PHYS 604, and PHYS 754 or PHYS 854

PHYS 790 Introduction to the Processes of Quantum Chromodynamics (3 Credit Hours)

An introduction to basic Quantum Chromodynamics (QCD) methods in hadron-scattering experiments. Focus will be placed on perturbative methods and partonic interpretations of specific processes. The course will begin with a general overview of QCD, and specific processes will be studied in detail to illustrate the general features of partonic physics and their QCD interpretations. The course will close with a summary of questions of current research interest.

Prerequisites: PHYS 871

PHYS 791 Seminar I (1 Credit Hour)

This seminar is designed to enhance both written and oral communication skills as applied to physics. Topics include effective display of data, preparation of scientific reports and preparation and delivery of scientific talks.

PHYS 795 Special Topics in Physics (1-3 Credit Hours)

Thorough coverage of areas selected to meet special needs and interests.

Prerequisites: Permission of the instructor

PHYS 796 Special Topics in Accelerator Physics (3 Credit Hours)

Special topics related to particle accelerators and their applications.

Prerequisites: Department approval required

PHYS 797 Research (1-6 Credit Hours)**PHYS 804 Classical Electrodynamics II (3 Credit Hours)**

Electrodynamics: Maxwell equations, plane electromagnetic waves and wave propagation, waveguides, radiating systems, special theory of relativity, including the dynamics of relativistic particles and electromagnetic fields.

Prerequisites: PHYS 604

PHYS 807 Statistical Mechanics (3 Credit Hours)

Review of thermodynamics. Classical statistical mechanics and applications. The virial expansion. Quantum statistical mechanics and the micro-canonical, canonical, and grand-canonical ensembles. The Fermi and Bose gases, and applications. Special topics in statistical mechanics.

Prerequisites: PHYS 603

PHYS 811 Computational Physics (3 Credit Hours)

Studies of high level computer languages. Computational techniques used in physics. Numerical techniques for differential and integral problems. Algebraic processing languages. Introduction to scientific visualization techniques.

PHYS 821 Quantum Mechanics II (3 Credit Hours)

Further development of quantum mechanics. Multi-particle states, bosons and fermions. Classical Limit. Variational principle, time-dependent perturbation theory and scattering. Path integral formulation. Symmetry and groups, addition of angular moments. Examples from solid state, atomic, nuclear and particle physics.

Prerequisites: PHYS 621

PHYS 822 Nuclear and Particle Physics I (3 Credit Hours)

Nuclear forces, models of nuclear structure and reactions, hadron and lepton scattering, introduction to constituent quark model and hadron spectroscopy.

Prerequisites: PHYS 621

PHYS 823 Nuclear and Particle Physics II (3 Credit Hours)

Discrete and continuous symmetries and application to particle physics, SU(2) and SU(3) symmetries and static properties of hadrons. Klein-Gordon and Dirac equations, quantum electrodynamics and Feynman rules, strong and weak interactions. Standard Model and physics beyond the Standard Model.

Prerequisites: PHYS 722 or PHYS 822

PHYS 824 Condensed Matter Physics I (3 Credit Hours)

Electronic and lattice properties of solids, band structures of metals, semiconductors and insulators, dynamics of electron and phonons, electromagnetic and optical properties of metals and doped semiconductors, phenomenology of superconductivity and magnetism, and selected experimental methods of solid state physics.

Prerequisites: PHYS 621, and PHYS 721 or PHYS 821

PHYS 825 Condensed Matter Physics II (3 Credit Hours)

Many body and collective effects in condensed matter, including phase transitions, Bose and Fermi quantum liquids, superfluidity, superconductivity and magnetism, and properties of mesoscopic and low-dimensional systems.

Prerequisites: PHYS 707 or PHYS 807, and PHYS 724 or PHYS 824

PHYS 827 Atomic Physics (3 Credit Hours)

Irreducible tensor methods. Radiative excitation and ionization processes. Atom-atom scattering. Time-evolution of atomic observables in external fields. Multiple channel quantum defect theory and complex atomic and molecular spectra.

Prerequisites: permission of the instructor

PHYS 842 Advanced Quantum Mechanics (3 Credit Hours)

Introduction to relativistic quantum mechanics; symmetries in relativistic wave equations; solutions to relativistic wave equations for bound states and scattering processes; classical field theory and role of symmetries in construction of conserved currents; introduction to second quantization of fields.

Prerequisites: PHYS 704 or PHYS 804, PHYS 721 or PHYS 821

PHYS 854 Accelerator Physics (3 Credit Hours)

Overview of the underlying physics of modern particle accelerators. Beam acceleration, coupled and uncoupled beam transport, nonlinear dynamics, collective effects, phase space cooling, and free-electron lasers will be covered. Depending on the instructor, additional topics of current interest such as coherent synchrotron radiation, wakefields and impedances, and novel methods of acceleration will be discussed.

PHYS 855 Experimental and Computational Techniques in Accelerator Physics (3 Credit Hours)

Overview of the tools and techniques used in the design of particle accelerators and the measurement of their components. The course is targeted for both physicists and engineers, and its intent is to provide them with a common language and understanding. The course consists of 6 modules of 2 weeks each. Each module will be a combination of assigned readings, lectures, computer-based design, and hand-on measurements. Typical topics to be addressed in the 6 modules are: beamline design, electromagnetic cavity design, magnets, beam instrumentation, engineering principles for superconducting rf accelerators, machine learning.

PHYS 857 Plasma Physics (3 Credit Hours)

Motion of charged particles in electromagnetic fields. Coulomb collisions and transport processes. Collisional Boltzmann equation. Generation of various forms of plasma in the laboratory. Basic plasma diagnostic methods including plasma and laser spectroscopy, measurements of electron and ion density and energy distribution.

Prerequisites: PHYS 603, PHYS 604, PHYS 704/PHYS 804, PHYS 727/PHYS 827 or permission of the instructor

PHYS 859 Classical Mechanics and Electromagnetism in Accelerator Physics (3 Credit Hours)

Further development in classical mechanics and electromagnetism and their application to accelerator physics: Lagrangian and Hamiltonian formulation of equations of motion, canonical transformations, adiabatic invariants, linear and nonlinear resonances. Louisville's theorem, solutions of Maxwell's equation in cavities and waveguides, wakefields, radiation and retarded potentials, and synchrotron radiation.

Prerequisites: PHYS 601, PHYS 603, and PHYS 704 or PHYS 804

PHYS 860 Low Temperature Physics (3 Credit Hours)

Properties and behavior of materials and systems at low temperature with emphasis on particle accelerator and microwave applications. Macroscopic quantum phenomena in condensates. Superfluidity, electrodynamic properties of superconductors.

Prerequisites: PHYS 825

PHYS 861 Nuclear Physics (3 Credit Hours)

The Yukawa potential in classical and quantum mechanics. One- and two-meson exchange amplitudes. Pion-exchange interactions: one- and two-pion exchange two-nucleon potentials, and two-pion exchange three-nucleon potentials. Electromagnetic interactions. Nucleon-nucleon scattering. Realistic models of two- and three-nucleon potentials. Relativistic corrections to the nuclear Hamiltonian. Electro-weak currents of nucleons and nuclei.

Prerequisites: PHYS 621 and either PHYS 721 or PHYS 821

PHYS 865 Design and Operating Principles of Particle Accelerators (3 Credit Hours)

This course will introduce design and general operating principles for particle accelerators, including acceleration methods for particles and beams. Topics will include the evolution and descriptions of particle beams under acceleration, physics of accelerated particle beams, as well as the effects of space charge, high-order modes (HOMs), and other collective effects. Aspects of both normal conducting (RF) and superconducting (SRF) particle beam acceleration will be covered.

Prerequisites: PHYS 603, PHYS 604, and PHYS 754 or PHYS 854

PHYS 871 Introduction to Quantum Field Theory I (3 Credit Hours)

Quantization of the Klein-Gordon field, interactions in quantum field theory and Feynman diagrams, quantization of the Dirac field, quantization of the electromagnetic field, quantum electrodynamics, renormalization, quantum chromodynamics and asymptotic freedom.

Prerequisites: PHYS 842

PHYS 872 Introduction to Quantum Field Theory II (3 Credit Hours)

Further development of topics in quantum field theory. The course addresses renormalization, non-abelian gauge theories, and advanced calculation techniques.

Prerequisites: PHYS 871

PHYS 890 Introduction to the Processes of Quantum Chromodynamics (3 Credit Hours)

An introduction to basic Quantum Chromodynamics (QCD) methods in hadron-scattering experiments. Focus will be placed on perturbative methods and partonic interpretations of specific processes. The course will begin with a general overview of QCD, and specific processes will be studied in detail to illustrate the general features of partonic physics and their QCD interpretations. The course will close with a summary of questions of current research interest.

Pre- or corequisite: PHYS 871

PHYS 891 Seminar I (1 Credit Hour)

This seminar is designed to enhance both written and oral communication skills as applied to physics. Topics include effective display of data, preparation of scientific reports and preparation and delivery of scientific talks.

PHYS 892 Seminar II (1 Credit Hour)

A continuation of PHYS 891 at an advanced level. This seminar is designed to enhance both written and oral communication skills as applied to physics. Topics include effective display of data, preparation of scientific reports and preparation and delivery of scientific talks.

PHYS 895 Special Topics in Physics (1-3 Credit Hours)

Thorough coverage of areas selected to meet special needs and interests.

Prerequisites: Permission of the instructor

PHYS 896 Special Topics in Accelerator Physics (3 Credit Hours)

Special topics related to particle accelerators and their applications.

Prerequisites: Departmental approval required

PHYS 898 Doctoral Research (1-12 Credit Hours)**PHYS 899 Dissertation (1-9 Credit Hours)**

POLS - Political Science

POLS 501 Global Environmental Policy (3 Credit Hours)

This course analyzes the causes, severity, potential consequences, and proposed solutions regarding global ecological issues with special attention to the scientific debate and the political and policy process. It examines environmental policies of national governments, regional/international organizations, and global conferences.

Prerequisites: GEOG 100S or GEOG 101S or GEOG 102T or POLS 100S or POLS 102S

POLS 503 American Constitutional Law: First Amendment (3 Credit Hours)

The course explores the development of conflicting judicial and legal theories arising from Supreme Court enforcement of the First Amendment's protection of speech and religious freedoms. Supreme Court opinions, along with the underlying theories that inform its decisions and rationales, are the focus of the assignments and class discussion.

POLS 510 African American Politics (3 Credit Hours)

This course examines the political development of Black people in the United States by focusing on the relationship and processes of the American political system. The political dynamics of Black political thought, the Civil Rights Movement, and Black protest politics are also analyzed.

POLS 512 Politics of the Civil Rights Movement (3 Credit Hours)

Examines the political activities which resulted in the passage of the nation's second Civil Rights policy, the 1960 and 1964 Civil Rights Acts, the 1965 Voting Rights Act and the 1968 Fair Housing Act. The course analyzes the underpinnings, leadership, and political strategies of the Civil Rights Movement.

POLS 514 Politics of Education (3 Credit Hours)

The question of power, often ignored by education policy analysts and researchers, is a principal focus of this seminar. Issues ranging from the role of education in political socialization and the politics of affirmative action and equal opportunity are examined.

POLS 515 Women and Politics in America (3 Credit Hours)

Examines women's place in political theory and the practice of politics in the United States. A major focus is to trace the development of women's political rights, the impact of public policy on the lives of American women and to see how women influence and participate in the political process.

POLS 520 Southern Politics (3 Credit Hours)

This seminar focuses on the politics of the American South from the 1940s to the present. Emphasis is on introducing students to contrasting explanations and analysis about the politics of the American South.

POLS 521 International Law (3 Credit Hours)

Surveys major areas of public international law (e.g., laws of warfare, law of the sea, conflict resolution, etc.). Emphasizes the relationship between international law and international politics.

POLS 524 International Organization (3 Credit Hours)

Course provides a basis for understanding the role and importance of international organizations in contemporary international relations. Focuses on development and history of global organizations, with particular emphasis on the United Nations, and regional and functional organizations.

POLS 534 Political Participation in the United States (3 Credit Hours)

An examination of current theories and research on political behavior, conventional and unconventional modes of political participation, and the impact of participation on the political system.

POLS 535 Chinese Politics (3 Credit Hours)

A study of origins of the Chinese revolution; development and functions of the Chinese Communist Party; government institutions; the defense establishment; evolution of foreign policy; and post-Mao political and economic reforms.

POLS 537 International Relations in East Asia (3 Credit Hours)

A study of contemporary issues (political, economic, and strategic) in the East Asia area; the interactions of China, Japan, the United States, and the former Soviet republics in East Asia.

POLS 538 Law in Literature and Film (3 Credit Hours)

Students will study law as seen through the lens of fiction. Assignments draw heavily from classic and contemporary novels, short stories, plays, films, and perhaps television. As these artistic representations of law in action are explored, short theoretical readings help focus on questions of philosophy, politics, and justice. The course also explores the relationship between fiction and reality through appellate opinions and contemporary literature on the American legal system. The goal is to come to a better understanding of the potential blessings, dangers, and limitations of law.

POLS 539 International Relations of African States (3 Credit Hours)

This course aims to expose students to an examination of the workings of international politics from the viewpoint of Africans and African states. International relations have tended to look at the world from the viewpoint of its most powerful states. Yet, most the world's states - notably in Africa - are weak but have great potential global impact.

POLS 542 Twentieth Century Dictatorships (3 Credit Hours)

A study of the Fascist, Nazi, Stalin and Mao regimes and the forces that brought them to power and sustained them, including a study of the impact of their policies on their people and neighboring states.

POLS 555 The Politics of Climate Change (3 Credit Hours)

An examination of the science of climate change and how United States political actors have responded to this global environmental challenge.

POLS 566 Politics of the Middle East (3 Credit Hours)

An analysis of the political processes throughout the region and in selected nations of the Middle East. Topics to be discussed include inter-Arab relations, the Arab-Israeli conflict, the Iran-Iraq rivalry and foreign power involvement in the Middle East.

POLS 595 Topics in Political Science (1-3 Credit Hours)

The advanced study of selected topics which, due to their specialized nature, may not be offered regularly.

POLS 596 Topics in Political Science (1-3 Credit Hours)

The advanced study of selected topics which, due to their specialized nature, may not be offered regularly.

POLS 597 Independent Research in Political Science (1-3 Credit Hours)

Independent research in political science under the supervision of a faculty member.

POLS 602 Seminar in American Foreign Policy (3 Credit Hours)

The formulation and conduct of U.S. foreign policy under changing domestic and external circumstances. Models of decision making; interrelationships of economic, political, and military factors; major trends in contemporary American foreign policy making.

POLS 623 Foreign Policy Analysis (3 Credit Hours)

Comparative study of foreign policy behavior. Internal and external factors in formation and implementation of foreign policy. Examination and application of foreign policy models.

POLS 624 National Security Policy (3 Credit Hours)

Examines U.S. national security policy, strategy and the use of force, the formulation and execution of policy, the international dimension of national security, and contemporary issues in national security.

POLS 626 Seminar in Politics of Russia and the Soviet Successor States (3 Credit Hours)

Power and authority in Russia and the other successor states of the former Soviet Union. Although focusing on Russia, the course embraces the contemporary internal politics of the states in the space between Germany and Japan/China including Central Asia and the Caucasus. Emphasizes research methodology and strategies.

POLS 631 Seminar in Chinese Politics (3 Credit Hours)

An advanced survey and research on contemporary Chinese politics, political and economic reforms; intellectuals and politics; China's experience of socialist revolution and economic construction; and foreign policy.

POLS 650 Interdependence, Power and Transnationalism (3 Credit Hours)

This course covers the fundamental concepts, ideas, and approaches to the study of interdependence and transnationalism. It seeks to expose students to the nature, role, and impact of economic, technological, strategic, and cultural interdependence. Cases of interdependence and transnationalism are explored in the post-Cold War era. Some focus is placed on how interdependence and transnationalism are impacting the power of the state.

Prerequisites: Permission of director or instructor

POLS 665 International Political Economy (3 Credit Hours)

Analysis of the forces shaping national and transnational economic institutions and their policies on a range of contemporary issues, including North-South relations.

POLS 695 Selected Topics in Political Science (1-3 Credit Hours)

The advanced study of selected topics which, due to their specialized nature, may not be offered regularly.

POLS 696 Selected Topics in Political Science (1-3 Credit Hours)

The advanced study of selected topics which, due to their specialized nature, may not be offered regularly.

POLS 697 Independent Research in Political Science (1-3 Credit Hours)

Independent research in political science under the supervision of a faculty member.

PORT - Maritime, Ports and Logistics Management

PORT 610 International Shipping and Supply Chain Management (3 Credit Hours)

Examines international freight transportation and terms for movement of international trade; focuses on improving supply chain relationships in the movement of international trade/directing the flow of information, materials and products. (cross-listed with MSCM 610)

PORT 611 International Maritime Transport (3 Credit Hours)

Examines the international business of shipping, commercial processes, maritime-related organizations, shipbuilding and repair, ship types and fleets, and commodity movement.

Prerequisites: an undergraduate course in the international field such as MGMT 361, MGMT 462, or a similar graduate course

PORT 612 Port Operations and Management (3 Credit Hours)

Covers role, functions, and types of international terminals and ports, including design and operation of general and specialized cargo handling facilities and offshore systems, port authorities, operational structures, and labor.

Prerequisites: a graduate course in management such as MGMT 602 and a course in operations management

PORT 613 International Maritime and Admiralty Law (3 Credit Hours)

International law of the sea, maritime jurisdiction, regulation of shipping, carriage of goods, marine insurance, salvage, marine environmental law, safety at sea, and the Oil Pollution Act of 1990 are covered, along with other maritime laws.

Prerequisites: a basic law course

PORT 614 Port Planning and Economics (3 Credit Hours)

Port planning and competition, ports and ocean container shipping, port impacts, port users in theory, port operator costing and pricing, port carriers and shippers, government and maritime institutions, dockworkers, port environment and port performance evaluation.

Prerequisites: a course in microeconomics such as ECON 604

PORT 615 Maritime Security and Risk Analysis (3 Credit Hours)

An overview of international and U.S. initiatives to ensure the security of vessels, cargo, people, and infrastructure within the maritime domain. In addition to the impacts of regulatory requirements on maritime commerce, the course also addresses maritime threats to the international economy (including maritime piracy and maritime terrorism), maritime coalitions, and state-of-the-art techniques and tools for safeguarding oceanborne commerce. (cross-listed with MSCM 615)

PORT 616 Reverse Logistics and Sustainable Operations (3 Credit Hours)

This course explores the theoretical foundations of global supply chain partnerships and reverse logistics systems, and examines the practices, risks, and opportunities found in today's systems. Fundamental tools and techniques are used to provide insights and solutions on how to best organize, manage, and optimize such systems to achieve sustainable performance. (cross-listed with MSCM 616)

Pre- or corequisite: MSCM 641 or PORT 611 or PORT 612 or instructor's permission

PORT 617 Transportation Management (3 Credit Hours)

The course includes a review of the key elements of transportation such as: modes of transportation, transportation economics, and transportation technology and regulations. The relationships between intermediaries, carriers and shippers are discussed, as well as company roles and operations within the transportation field, transportation sourcing and management, and transportation risk management.

PORT 618 Shipbuilding and Ship Repair Business Management (3 Credit Hours)

Examines the shipbuilding and ship repair industry from the perspective of industry economics, industry financial management and repair operations and acquisition processes. Provides industry professionals with business management practices that shape the industry.

PORT 619 Marine Insurance (3 Credit Hours)

Examines the rise of Lloyd's and the London Insurance Market, the current maritime insurance market, principles of insurance and law, Hull Insurance Law, cargo insurance, general average and salvage insurance.

PORT 641 Supply Chain Management and Logistics (3 Credit Hours)

This course examines supply chain management, the integration of all activities associated with the flow of materials and information from product start to customers' receipt. Examples include order processing, warehousing, inventory management, transportation and logistics, and the costs and information systems supporting these activities. Particular attention will be paid to global logistics systems supporting port and maritime activities. Supply chain relationships can be improved through effective integration of management and via such technologies as the World Wide Web, electronic data exchange, and enterprise resource planning (ERP). (cross-listed with MSCM 641)

PORT 668 Directed Research/Port Internship (1-3 Credit Hours)

Practical field experience in international maritime, ports and logistics related challenges through supervised investigation and analysis of a problem or a working internship within the port-related arena.

Prerequisites: PORT 611, PORT 612, PORT 613, and PORT 614

PORT 695 Selected Topics in Maritime and Port Management (3 Credit Hours)

The advanced study of selected topics not offered on a regular basis.

Prerequisites: PORT 611 or PORT 612

PORT 697 Independent Study (3 Credit Hours)

Designed to provide the opportunity for independent study under the guidance of a member of the faculty.

PPCM - Public Procurement and Contract Management

PPCM 704 Methods of Public Program Evaluation (3 Credit Hours)

Examination of various methodologies for designing and conducting program evaluation and research. Experimental, quasi-experimental and nonexperimental procedures will be covered. (Cross listed with PADM 704).

PPCM 714 Public-Private Partnerships (3 Credit Hours)

An in-depth analysis of the forces behind the privatization movement. Examines the context of privatization, the theoretical and empirical arguments on both sides of the debate, and the different forms of privatization practiced in the U.S. The course draws on a wide range of disciplines in a quest for an understanding of the privatization phenomenon-political science, public administration, public policy, sociology, economics, management, and others. (Cross listed with PADM 714).

PPCM 718 Public Sector Contract Administration (3 Credit Hours)

Examines the actions that must be taken following the award of a contract, including assurance of required outcomes, assurance of compliance, proper contract launch, proper contract close-out, and documentation and carrying forward lessons learned. Connections to steps that must be taken in the other two phases of the procurement process are noted. (Course is cross listed with PADM 718.)

PPCM 719 Leadership (3 Credit Hours)

Examines leadership through theoretical and practice-based frameworks. Offers analytical and intellectual examination and reflection on core issues in the practice of leadership. These objectives will be achieved through open discussion, honest self-assessment, experiential exercises, and observation of real-life leadership practice. (Cross listed with PADM 719)

PPCM 726 Introduction to Public Procurement (3 Credit Hours)

This course provides an overview of procurement and contract management as a core function in public sector organizations. The course introduces the student to how properly-aligned, best practice acquisitions can support public entities' strategic goals. Challenges and opportunities for all stakeholders are addressed. Special attention is given to ongoing changes in public procurement. (Cross listed with PADM 726)

PPCM 727 Public Procurement and Project Management (3 Credit Hours)

Course covers each phase of the public procurement project cycle, with an emphasis on tools and techniques to manage a public procurement project. (Cross listed with PADM 727)

PPCM 728 Public Sector Contract Planning and Formation (3 Credit Hours)

This course provides insight into why and how public sector contracts should be planned and formed properly. A strong emphasis is placed on the strategic role that procurement can play in public sector organizations and how procurement planning and source selection, in particular, fit into that role. (Cross listed with PADM 728)

PPCM 731 Public Sector Procurement Law and Ethics (3 Credit Hours)

This course surveys the laws and ethics applicable to public sector procurement and contract management. A theoretical and problem-based, interdisciplinary approach is used to address the major legal and ethical issues that arise when public sector organizations plan, form, and administer contracts. Attention is given to the role of professionalization in socializing appropriate ethics. (Cross listed with PADM 731)

PPCM 734 Negotiation and Dispute Resolution (3 Credit Hours)

The course provides conceptual and practical skills in negotiations. It examines the underlying cultural, legal, and organizational issues and problems that affect managing human resources in the workplace. (Cross listed with PADM 734)

PPCM 772 Public Financial Management (3 Credit Hours)

Examination of public sector financial principles, practices, and processes. A public manager's perspective of the decision making and practices of managing public funds. Introduction to governmental accounting practices. Emphasis on analyzing financial statements for decision making. Extensive use of Excel spreadsheet. Exploration of public financial management research and the link between public financial management practices and public fiscal and monetary policies.

PPCM 781 Intergovernmental Management (3 Credit Hours)

Analysis of relationships among federal, state, and local governmental units in the delivery of governmental programs. Focus on intergovernmental issues in urban metropolitan regions. (Cross listed with PADM 781)

PRTS – Parks, Recreation and Tourism Studies

PRTS 636 Research Problems in Park, Recreation and Tourism Studies (3 Credit Hours)

Practice in the use of statistical and analytical techniques in solving problems in Park, Recreation and Tourism Studies; supervised student research.

PRTS 650 Contemporary Issues in Park, Recreation and Tourism Studies (3 Credit Hours)

This course is designed to increase the student's ability to critically analyze and discuss the contemporary issues and trends in parks, recreation and tourism. This course will require students to describe, evaluate, and critique the current research in the field; evaluate the future trajectory of park, recreation and tourism studies; and assess both personal and professional philosophies to elucidate his/her role as an advanced-level practitioner in parks, recreation or tourism industry.

PRTS 668 Internship in Park, Recreation and Tourism Studies (1-6 Credit Hours)

Designed to provide detailed practical experience (400 clock hours) in a park, recreation or tourism field setting.

Prerequisites: completion of 75% of graduate work

PRTS 695 Topics in Park, Recreation and Tourism Studies (1-3 Credit Hours)

Selected topic courses in Park, Recreation and Tourism Studies

PRTS 697 Independent Study in Park, Recreation and Tourism Studies (1-3 Credit Hours)

Investigations in park, recreation, and tourism studies. Problems approved in advance are investigated under the supervision of the faculty advisor.

PRTS 698 Thesis Research in Park, Recreation and Tourism Studies (3-6 Credit Hours)

Students work independently with a faculty member to conduct research for their thesis on a topic related to Park, Recreation, and Tourism Studies.

Prerequisites: Permission of the advisor and committee

PRTS 699 Thesis in Park, Recreation and Tourism Studies (3-6 Credit Hours)

Students work independently with a faculty member to complete their thesis on a topic related to Park, Recreation and Tourism Studies.

Prerequisites: permission of the advisor and committee

PRTS 710 Tourist Behavior and Consumption (3 Credit Hours)

This course explores the complexities and evolution of tourism consumer behavior from a multidisciplinary perspective. Choosing, buying and consuming tourism/travel products and services includes a range of psycho-social processes, individual and environmental influences, motivations, and meanings that researchers and managers of national parks and tourism destinations should take into account when evaluating the tourism experience. This course provides an overview of such processes and influences and explains the basic and advanced concepts and theories that underlie tourist decision-making and behavior.

PRTS 720 Advanced Leisure Theories and their Applications (3 Credit Hours)

The course examines the concepts, theories and philosophies related to outdoor recreation, travel and tourism, and community recreation. Discussion will focus on the application of social science theories to the study of leisure, parks, recreation and tourism.

PRTS 730 Park Management for Professionals (3 Credit Hours)

This course targets research related to outdoor recreation in parks and open spaces. Empirical studies investigating sense of place, motivations for outdoor recreation, carrying capacity, crowding, recreation opportunity spectrum, and other sensitive issues will be covered. The course will also provide a historical overview of social sciences in outdoor recreation, and the principles guiding park management.

PRTS 740 Recreation Management for Administrators (3 Credit Hours)

This course provides preparation for upper-level recreation administration. National standards for managerial, administrative and executive decision-making for parks and recreation professionals will be discussed, in addition to practical knowledge and current real-world skills necessary in today's changing park and recreation environment. The course is designed to prepare professionals to sit for the Certified Park and Recreation Professionals (CPRP) or Certified Park and Recreation Executive (CPRE) exam.

PRTS 760 Advanced Sustainable Tourism Management (3 Credit Hours)

This course examines the planning, development and management of the tourism industry with regard to economic, social, cultural and environmental sustainability. Current theory and research in the field of sustainable tourism will also be explored in order for students to develop a critical perspective on sustainable tourism development.

PRTS 770 Grant Writing for Parks and Recreation (3 Credit Hours)

Grant writing is an essential skill for the park and recreation professional. This course examines the grant writing process. This includes, but is not limited to, The Office of Research, the ODU Research Foundation, budgeting, human subjects, and partnerships. Students will be expected to submit a grant application by the end of the course.

PRTS 780 Youth Development in Recreation (3 Credit Hours)

The Positive Youth Development (PYD) movement has been greatly influenced by sport and recreation. With the recent increase of diabetes, obesity, sedentary lifestyles, and risky behaviors among youth, sport and recreation professionals are charged to help alleviate these societal issues. More specifically, practitioners need to target the socio-emotional needs of our youth through the sport and recreation experience. By using class lectures, technology, video, and self-directed research, students will explore research, theory, practice, and techniques of structuring positive experiences for youth. This course includes the examination of theories on youth development, behavior management, motivation, resiliency, and social skills as they relate to the sport and recreation experience.

PRTS 810 Tourist Behavior and Consumption (3 Credit Hours)

This course explores the complexities and evolution of tourism consumer behavior from a multidisciplinary perspective. Choosing, buying and consuming tourism/travel products and services includes a range of psycho-social processes, individual and environmental influences, motivations, and meanings that researchers and managers of national parks and tourism destinations should take into account when evaluating the tourism experience. This course provides an overview of such processes and influences and explains the basic and advanced concepts and theories that underlie tourist decision-making and behavior.

PRTS 820 Advanced Leisure Theories and their Applications (3 Credit Hours)

The course examines the concepts, theories and philosophies related to outdoor recreation, travel and tourism, and community recreation. Discussion will focus on the application of social science theories to the study of leisure, parks, recreation and tourism.

PRTS 830 Park Management for Professionals (3 Credit Hours)

This course targets the pursued and needed research of outdoor recreation in parks and open space. Empirical studies investigating areas such as: sense of place, motivations for outdoor recreation, carrying capacity, crowding, recreation opportunity spectrum, and other sensitive issues will be covered. The course will also include an historical overview of social sciences in outdoor recreation. The course will also cover principles to guide park management.

PRTS 840 Recreation Management for Administrators (3 Credit Hours)

This course provides preparation for upper-level recreation administration. National standards for managerial, administrative and executive decision-making for parks and recreation professionals will be discussed, in addition to practical knowledge and current real-world skills necessary in today's changing park and recreation environment. The course is designed to prepare professionals to sit for the Certified Park and Recreation Professionals (CPRP) or Certified Park and Recreation Executive (CPRE) exam.

PRTS 860 Advanced Sustainable Tourism Management (3 Credit Hours)

This course examines the planning, development and management of the tourism industry with regard to economic, social, cultural and environmental sustainability. Current theory and research in the field of sustainable tourism will also be explored in order for students to develop a critical perspective on sustainable tourism development.

PRTS 880 Youth Development in Recreation (3 Credit Hours)

The Positive Youth Development (PYD) movement has been greatly influenced by sport and recreation. With the recent increase of diabetes, obesity, sedentary lifestyles, and risky behaviors among youth, sport and recreation professionals are charged to help alleviate these societal issues. More specifically, practitioners need to target the socio-emotional needs of our youth through the sport and recreation experience. By using class lectures, technology, video, and self-directed research, students will explore research, theory, practice, and techniques of structuring positive experiences for youth. This course includes the examination of theories on youth development, behavior management, motivation, resiliency, and social skills as they relate to the sport and recreation experience.

PSYC - Psychology

PSYC 651 Developmental Psychology (3 Credit Hours)

This course covers topics related to the physical, cognitive, social and emotional aspects of growth, from conception to death. It focuses on human growth and development, but other organisms are also considered.

PSYC 661 Psychopathology (3 Credit Hours)

The course provides a conceptual basis for the study of abnormal behavior. Students conduct an in-depth review of the literature related to the classification, etiology, and treatment of mental disorders.

PSYC 662 Human-Computer Interface Design (3 Credit Hours)

Course introduces students to the fundamental principles of human-computer interaction. Exposes students to basic psychological concepts and shows how they are used to create effective interface designs. Covers both theoretical and practical aspects of interface design.

Prerequisites: graduate standing and permission of the instructor

PSYC 664 Personality Assessment (3 Credit Hours)

This course covers history of personality theory and assessment and psychometrics, and introduces tools and techniques aimed at understanding individual differences in personality and assessment of major psychopathology.

Prerequisites: Student must be a clinical Ph.D. degree student or receive permission of the instructor

PSYC 667 Practicum in Psychology (2-5 Credit Hours)

Students will receive supervised training in an applied setting in the area of clinical or industrial psychology.

Prerequisites: 15 graduate course hours (including PSYC 663) and permission of the instructor

PSYC 696 Topics in Psychology (3 Credit Hours)**PSYC 697 Selected Topics in Psychology (1-4 Credit Hours)**

This course provides opportunities for advanced investigations of selected topics in psychology. May be taken by students beyond the first year of graduate study who wish to pursue topics not covered by regularly scheduled courses.

Prerequisites: permission of the instructor and graduate program director

PSYC 698 Research in Psychology (3 Credit Hours)

Individual project under guidance of a research advisor. Required for students choosing thesis option. Limited to a total of 3 hours of credit.

PSYC 699 Thesis (1-3 Credit Hours)

Individual project under guidance of a research advisor. Required for students choosing thesis option.

Prerequisites: PSYC 698

PSYC 705 Health Disparities and Inequities (3 Credit Hours)

This course will cover differences in health among marginalized populations. This course will take an interdisciplinary approach to understand what factors may contribute to health disparities and inequities among these populations. This course will also discuss ways to address health inequities at the policy level as well as through clinical interventions and health promotion.

PSYC 713 Research Methods in Psychology (3 Credit Hours)

This course will cover research design and methodology. Topics may include experimental, quasi-experimental, single subject and survey research; validity; reliability; confounds; measurement; sampling; inductive inference. Additionally, this course will cover Responsible Conduct of Research, including completion of CITI course, protection of human subjects, University Human Subjects Committee and IRB, APA Style, paper structure, references, tables, figures, etc., research proposal writing, including searching for sources, writing, oral presentation, data collection and management issues (e.g., Qualtrics, SONA, data cleaning). Students are required to complete a Research Proposal with Introduction and Methods and Data Analysis Plan and give an oral presentation of research proposal.

PSYC 722 Occupational Health Psychology (3 Credit Hours)

This course examines multidisciplinary research and theories on issues related to individual and organizational well-being and health. Occupational health psychology (OHP) emphasizes the promotion of wellness and the prevention of injuries and illnesses in the workplace. Through lectures/presentations, discussions, and research activities, students will learn about OHP theory and practice.

Prerequisites: PSYC 763/863 and PSYC 850

PSYC 727 Analysis of Variance and Experimental Design (4 Credit Hours)

Review of the basic descriptive and inferential statistical procedures with a heavy emphasis on fundamental and advanced analysis of variance techniques. Topics include contrasts, factorial designs, within-subject and mixed designs, and analysis of covariance. Course materials are covered in the context of classical experimental and quasi-experimental design.

Prerequisites: admission into the psychology M.S. or Ph.D. program or permission of the instructor

PSYC 728 Regression and Correlational Design (4 Credit Hours)

Course covers correlation with heavy emphasis on regression analysis in the context of the general linear model. Topics include partial correlations, categorical and continuous interactions, non-linear regression, and multivariate statistics. Course materials are covered in the context of correlational designs and survey research.

Prerequisites: Admission into the psychology M.S. or Ph.D. program or permission of the instructor and PSYC 727/PSYC 827 or equivalent

PSYC 731 Human Cognition (3 Credit Hours)

An investigation of the ways in which people process and retain information, make decisions, and solve problems. Current models of structures and processes of human memory and cognition are discussed with particular emphasis on neurocognitive evidence of the brain mechanisms involved in cognition.

Prerequisites: admission into the psychology M.S. or Ph.D. program or permission of the instructor

PSYC 735 Health Psychology (3 Credit Hours)

This course focuses on contemporary theory and research topics in health psychology. The course examines psychological and behavioral issues affecting health maintenance, coping with life-threatening illnesses and chronic diseases, and health promotion. The course uses the biopsychosocial (mind-body) model as an organizing framework, emphasizing the dynamic interactions among biological, social, personality, and behavioral factors jointly in influencing people's health. The course is conducted as a seminar.

PSYC 736 Multilevel Models: HLM (3 Credit Hours)

Social science data frequently have a hierarchical or multilevel structure as a consequence of sampling designs or repeated measures. The purpose of the course is to introduce students to the basic principles and applications of hierarchical linear modeling in social science research. Topics covered include an introduction to multilevel analyses, random intercept models, random slope models, hypotheses testing, hierarchical models for limited dependent variables, model fitting, three-level models, and repeated-measures applications.

Prerequisites: PSYC 728 or PSYC 828 or equivalent

PSYC 740 Quasi-Experimental Methods (3 Credit Hours)

Quasi-experimental methods is a course to teach techniques for research designs not conducive to randomized-control trials. The philosophy of these techniques, issues of validity, and analyses are discussed. Comparisons with randomized-control trials as well as means to strengthen quasi-methodologies for better general causal inferences are presented.

PSYC 741 Sensation and Perception (3 Credit Hours)

A survey of human sensation and perception emphasizing historical contributions, recent theoretical and methodological developments, and empirical findings.

PSYC 744 Program Evaluation (3 Credit Hours)

This course is designed to introduce students to the field of program evaluation as well as to give students practical experience conducting a program evaluation. Students will get experience creating and conducting qualitative and quantitative assessments. A course goal is to work in small groups to conduct a program evaluation.

Prerequisites: PSYC 727/PSYC 827 and PSYC 728/PSYC 828 (or current enrollment)

PSYC 745 Applied Psychometrics (3 Credit Hours)

This course introduces classical test theory, including definitions and equations for test reliability, standard error of measurement, and related statistics. Additional topics include scaling, item statistics useful in test constructions, norms commonly used in educational and psychological testing, test validity and exploratory factor analysis. If time permits, Item Response (IRT) and Generalizability Theory are introduced.

Prerequisites: PSYC 728 or PSYC 828 or equivalent

PSYC 746 Structural Equation Modeling (3 Credit Hours)

This course covers the topics of linear structural equation modeling and focuses on estimation, measurement models, confirmatory and hierarchical factor analysis, structural equations, longitudinal models, multisample analyses, and mean structures.

Prerequisites: PSYC 745 or PSYC 845 or equivalent

PSYC 747 Multivariate Methods for the Social/Behavioral Sciences (3 Credit Hours)

The course is focused on methods and techniques for analyzing multivariate data. Emphasis includes both conceptual and computational aspects of the most commonly used analytical tools when experimental units have multiple measures. A goal of the course is to avoid the extremes of "plug n chug" analyses on the one hand and theorems and proofs on the other to provide generalizable working knowledge of multivariate statistics. Featured techniques are MANOVA, MANCOVA, profile analysis, discriminant analysis, canonical correlation, principal components analysis, and exploratory factor analysis.

Prerequisites: PSYC 728 or PSYC 828 or equivalent

PSYC 748 Categorical Methods for the Social/Behavioral Sciences (3 Credit Hours)

The purpose of this course is to review the linear regression model and move into categorical methods. Featured methods are inference using proportions and odds ratios, multi-way contingency tables, logistic regression, and loglinear models. The generalized linear model is also introduced.

Prerequisites: PSYC 727/PSYC 827 or PSYC 728/PSYC 828

PSYC 749 Social and Affective Bases of Behavior (3 Credit Hours)

This course discusses the behavior of the human as a member of a group and the experience and expression of emotion. Topics include attitude theory and change, interpersonal attraction, stereotypes, discrimination, social cognition, social affect, aggression, theories of emotion and emotion regulation.

PSYC 750 Organizational Psychology (3 Credit Hours)

This course provides an overview of organizational behavior and theory. Topics include leadership, motivation, teams, social processes at work, workplace relationships, organization structure and environments, and organizational development and change.

PSYC 763 Personnel Psychology (3 Credit Hours)

This course provides an overview of personnel psychology. Topics include reliability and validity, job analysis, performance criteria, performance appraisal, employee recruitment, employee selection, and training and development.

PSYC 770 Human Factors Psychology (3 Credit Hours)

The application and evaluation of psychological principles and research relating human behavior to the design of tools, technology, and the work environment. Theory, methods, and application are emphasized.

Prerequisites: PSYC 731/PSYC 831 and PSYC 741/PSYC 841 or equivalents or permission of the instructor

PSYC 771 Ergonomics (3 Credit Hours)

Basic overview and application of anthropometry, biomechanics, functional anatomy, mechanics, and human physiology for the design of industrial tools, equipment, and workstations.

PSYC 776 Human-Computer Interaction (3 Credit Hours)

Review of the physical, cognitive, and performance capabilities and limitations of humans as they interact with modern computer systems. Emphasis is placed on the tools, techniques and procedures for the assessment and effective design of computer hardware, software and displays of information.

PSYC 780 Ethics, Professional Standards, and Responsible Conduct (3 Credit Hours)

Ethical principles, APA codes, laws, policies and approaches to ethical decision making will be applied to case studies involving dilemmas and issues in several areas of the professional activities of psychologists. Students will prepare an ethical and/or professional issue paper and a self-reflection on acculturation into professional ethics and standards.

PSYC 781 Advanced Ergonomics (3 Credit Hours)

Basic overview of the application of anthropometry, biomechanics, ergonomics, cognition and perception within workplace environments. Particular focus on the analysis and prevention of accidents at work. Course requires considerable practice in technical writing.

PSYC 792 Advanced Seminar in Physiological Psychology (3 Credit Hours)

Students will investigate the biological underpinnings of behavior and explore what is currently known about their role in movement, emotions, mental illness, sexual behavior, memory, states of consciousness, sensory perception, thought and language, and several neuro-psychiatric disorders. Through active learning exercises, i.e., class discussion, reports, critiques, oral presentations, and a final research paper or proposal, students will apply and demonstrate their acquired knowledge and critical thinking skills to the biological basis of human behavior.

PSYC 795 Topics in Psychology I (1-4 Credit Hours)**PSYC 796 Topics in Psychology II (1-4 Credit Hours)****PSYC 801 Empirically-Supported Therapies (3 Credit Hours)**

Empirically-Supported Therapies is designed to foster the integration of clinical science and the practice of psychotherapy. Course objectives include learning how to identify, evaluate, and implement empirically supported interventions for various psychological disorders.

PSYC 805 Health Disparities and Inequities (3 Credit Hours)

This course will cover differences in health among marginalized populations. This course will take an interdisciplinary approach to understand what factors may contribute to health disparities and inequities among these populations. This course will also discuss ways to address health inequities at the policy level as well as through clinical interventions and health promotion.

PSYC 810 Seminar in Professional Aspects of Industrial/Organizational Psychology (3 Credit Hours)

Topics covered include standards of professional behavior of I/O psychologists, the governance of psychology, I/O psychology professional associations, and professional opportunities for I/O psychologists.

Prerequisites: admission into the I/O Ph.D. program

PSYC 813 Research Methods in Psychology (3 Credit Hours)

This course will cover research design and methodology. Topics may include experimental, quasi-experimental, single subject and survey research; validity; reliability; confounds; measurement; sampling; inductive inference. Additionally, this course will cover Responsible Conduct of Research, including completion of CITI course, protection of human subjects, University Human Subjects Committee and IRB, APA Style, paper structure, references, tables, figures, etc., research proposal writing, including searching for sources, writing, oral presentation, data collection and management issues (e.g., Qualtrics, SONA, data cleaning). Students are required to complete a Research Proposal with Introduction and Methods and Data Analysis Plan and give an oral presentation of research proposal.

PSYC 815 Teaching Psychology (1 Credit Hour)

Seminar on the pedagogy of teaching as applied to the discipline of psychology. Topics include syllabus preparation, lecture and discussion methods, assessment and grading, and teaching portfolio development.

PSYC 822 Occupational Health Psychology (3 Credit Hours)

This course examines multidisciplinary research and theories on issues related to individual and organizational well-being and health. Occupational health psychology (OHP) emphasizes the promotion of wellness and the prevention of injuries and illnesses in the workplace. Through lectures/presentations, discussions, and research activities, students will learn about OHP theory and practice.

Prerequisites: PSYC 763/PSYC 863 and PSYC 850

PSYC 827 Analysis of Variance and Experimental Design (4 Credit Hours)

Review of the basic descriptive and inferential statistical procedures with a heavy emphasis on fundamental and advanced analysis of variance techniques. Topics include contrasts, factorial designs, within-subject and mixed designs, and analysis of covariance. Course materials are covered in the context of classical experimental and quasi-experimental design.

Prerequisites: admission into the psychology M.S. or Ph.D. program or permission of the instructor

PSYC 828 Regression and Correlational Design (4 Credit Hours)

Course covers correlation with heavy emphasis on regression analysis in the context of the general linear model. Topics include partial correlations, categorical and continuous interactions, non-linear regression, and multivariate statistics. Course materials are covered in the context of correlational designs and survey research.

Prerequisites: Admission into the psychology M.S. or Ph.D. program or permission of the instructor and PSYC 727/PSYC 827 or equivalent

PSYC 831 Human Cognition (3 Credit Hours)

An investigation of the ways in which people process and retain information, make decisions, and solve problems. Current models of structures and processes of human memory and cognition are discussed with particular emphasis on neurocognitive evidence of the brain mechanisms involved in cognition.

Prerequisites: admission into the psychology M.S. or Ph.D. program or permission of the instructor

PSYC 833 Grant and Manuscript Writing (3 Credit Hours)

The course is designed: (1) to teach students to write article-length scholarly manuscripts in APA format of publishable quality, and (2) to teach students the critical components of grant applications. By the end of this course, each student will have prepared a manuscript that is ready for submission to a peer-reviewed journal and have completed sections of a federal grant application.

Prerequisites: admission to the doctoral program in psychology and completion of master's thesis, or permission of instructor

PSYC 835 Health Psychology (3 Credit Hours)

This course focuses on contemporary theory and research topics in health psychology. The course examines psychological and behavioral issues affecting health maintenance, coping with life-threatening illnesses and chronic diseases, and health promotion. The course uses the biopsychosocial (mind-body) model as an organizing framework, emphasizing the dynamic interactions among biological, social, personality, and behavioral factors jointly in influencing people's health. The course is conducted as a seminar.

PSYC 836 Multilevel Models: HLM (3 Credit Hours)

Social science data frequently have a hierarchical or multilevel structure as a consequence of sampling designs or repeated measures. The purpose of the course is to introduce students to the basic principles and applications of hierarchical linear modeling in social science research. Topics covered include an introduction to multilevel analyses, random intercept models, random slope models, hypotheses testing, hierarchical models for limited dependent variables, model fitting, three-level models, and repeated-measures applications.

Prerequisites: PSYC 728 or PSYC 828 or equivalent

PSYC 837 Longitudinal Data Analysis (3 Credit Hours)

This course will introduce students to the theory and practice of longitudinal data analysis. It will examine a number of approaches for modeling change (in continuous outcomes) and event occurrence (broadly defined, in categorical or ordinal outcomes), including a careful treatment of the metric of time as well as missing data. Students will learn to develop, implement, interpret, and report research involving longitudinal data analyses. The use of statistical software is also illustrated.

Prerequisites: PSYC 728 or PSYC 828 and PSYC 736 or PSYC 836

PSYC 840 Quasi-Experimental Methods (3 Credit Hours)

Quasi-experimental methods is a course to teach techniques for research designs not conducive to randomized-control trials. The philosophy of these techniques, issues of validity, and analyses are discussed. Comparisons with randomized-control trials as well as means to strengthen quasi-methodologies for better general causal inferences are presented.

PSYC 841 Sensation and Perception (3 Credit Hours)

A survey of human sensation and perception emphasizing historical contributions, recent theoretical and methodological developments, and empirical findings.

PSYC 844 Program Evaluation (3 Credit Hours)

This course is designed to introduce students to the field of program evaluation as well as to give students practical experience conducting a program evaluation. Students will get experience creating and conducting qualitative and quantitative assessments. A course goal is to work in small groups to conduct a program evaluation.

Prerequisites: PSYC 727/PSYC 827 and PSYC 728/PSYC 828 (or current enrollment)

PSYC 845 Applied Psychometrics (3 Credit Hours)

This course introduces classical test theory, including definitions and equations for test reliability, standard error of measurement, and related statistics. Additional topics include scaling, item statistics useful in test construction, norms commonly used in educational and psychological testing, test validity, and exploratory factor analysis. If time permits, Item Response Theory (IRT) and Generalizability Theory are introduced.

Prerequisites: PSYC 728 or PSYC 828 or equivalent

PSYC 846 Structural Equation Modeling (3 Credit Hours)

This course covers the topics of linear structural equation modeling and focuses on estimation, measurement models, confirmatory and hierarchical factor analysis, structural equations, longitudinal models, multisample analyses, and mean structures.

Prerequisites: PSYC 745 or PSYC 845 or equivalent

PSYC 847 Multivariate Methods for the Social/Behavioral Sciences (3 Credit Hours)

The course is focused on methods and techniques for analyzing multivariate data. Emphasis includes both conceptual and computational aspects of the most commonly used analytical tools when experimental units have multiple measures. A goal of the course is to avoid the extremes of "plug n chug" analyses on the one hand and theorems and proofs on the other to provide generalizable working knowledge of multivariate statistics. Featured techniques are MANOVA, MANCOVA, profile analysis, discriminant analysis, canonical correlation, principal components analysis, and exploratory factor analysis.

Prerequisites: PSYC 728 or PSYC 828 or equivalent

PSYC 848 Categorical Methods for the Social/Behavioral Sciences (3 Credit Hours)

The purpose of this course is to review the linear regression model and move into categorical methods. Featured methods are inference using proportions and odds ratios, multi-way contingency tables, logistic regression, and loglinear models. The generalized linear model is also introduced.

Prerequisites: PSYC 727/PSYC 827 or PSYC 728/PSYC 828

PSYC 849 Social and Affective Bases of Behavior (3 Credit Hours)

This course discusses the behavior of the human as a member of a group and the experience and expression of emotion. Topics include attitude theory and change, interpersonal attraction, stereotypes, discrimination, social cognition, social affect, aggression, theories of emotion and emotion regulation.

PSYC 850 Organizational Psychology (3 Credit Hours)

This course provides an overview of organizational behavior and theory. Topics include leadership, motivation, teams, social processes at work, workplace relationships, organization structure and environments, and organizational development and change.

PSYC 851 Organizational Leadership (3 Credit Hours)

This course concerns the study of leadership and its effects on organizational behavior and effectiveness as well as employee well-being and health. Emphasis will be placed on classic and contemporary leadership theory and research.

Prerequisites: PSYC 750/PSYC 850 or permission of the instructor

PSYC 853 Job Attitudes and Motivation (3 Credit Hours)

The course focuses on the major concepts, issues, principles, and findings of job attitudes and motivation at the workplace. The student who successfully completes this course should be able to apply knowledge and skills to workplace issues regarding job attitudes and motivation, as well as stimulate ideas for future research projects.

PSYC 854 Organizational Development and Change (3 Credit Hours)

This seminar discusses models and theories of organizational change and interventions that are commonly used to foster organizational development and effectiveness. Students participate in an organizational consulting project to apply lessons learned in the classroom.

Prerequisites: PSYC 851 and PSYC 853 or permission of the instructor

PSYC 858 ODU Clinical and Ethical Issues (1 Credit Hour)

Weekly seminars address professional and ethical issues in the practice of clinical psychology.

PSYC 863 Personnel Psychology (3 Credit Hours)

This course provides an overview of personnel psychology. Topics include reliability and validity, job analysis, performance criteria, performance appraisal, employee recruitment, employee selection, and training and development.

PSYC 864 Human Resource Development (3 Credit Hours)

This course covers research findings, methodologies, and evaluation designs for the training and development of personnel in organizations. Specific topics include needs assessment, learning principles and system design.

Prerequisites: PSYC 763/PSYC 863 or permission of the instructor

PSYC 865 Psychology of Personnel Selection (3 Credit Hours)

This course covers the topics of recruitment, job performance, interviews, internet-based testing, and psychological constructs for use in employee selection (e.g., intelligence, personality).

Prerequisites: PSYC 763/PSYC 863 or permission of the instructor

PSYC 867 Human Performance Assessment (3 Credit Hours)

This course covers the job analysis and performance appraisal/management (PA/MA). Specific topics include job analysis methods; use of job analysis results for various HR functions; performance assessment/appraisal methods; multi-source feedback; employee reactions to and use of PA/MA information; rater cognitive processes and affect; rater goals, bias, and accuracy; and organizational practical and legal issues surrounding job analysis and PA/PM.

Prerequisites: PSYC 763/PSYC 863 or permission of the instructor

PSYC 868 Internship (1 Credit Hour)

The course is designed to provide individual students with advanced on-the-job professional experience. Internship assignments must be approved by the student's program of study. Direct supervision is given by an experienced professional at the internship setting.

PSYC 870 Human Factors Psychology (3 Credit Hours)

The application and evaluation of psychological principles and research relating human behavior to the design of tools, technology, and the work environment. Theory, methods, and application are emphasized.

Prerequisites: PSYC 731/PSYC 831 and PSYC 741/PSYC 841 or equivalents or permission of the instructor

PSYC 871 Ergonomics (3 Credit Hours)

Basic overview and application of anthropometry, biomechanics, functional anatomy, mechanics, and human physiology for the design of industrial tools, equipment, and workstations.

PSYC 872 Methods, Measures, Techniques, and Tools in Human Factors (3 Credit Hours)

Experiential survey of methods, measures, techniques, and prototyping tools available for human factors investigations in laboratory and field settings. The design and execution of experimental investigations utilizing the measures and tools are emphasized.

PSYC 873 ODU Biological Bases of Behavior (3 Credit Hours)**PSYC 876 Human-Computer Interaction (3 Credit Hours)**

Review of the physical, cognitive, and performance capabilities and limitations of humans as they interact with modern computer systems. Emphasis is placed on the tools, techniques and procedures for the assessment and effective design of computer hardware, software and displays of information.

PSYC 877 Theories, Models and Simulations in Human Factors (3 Credit Hours)

Survey of the historical and philosophical bases for the use of theories, models, and simulations in human factors applications with a critical evaluation of existing theories, mathematical and cognitive models, and simulations in terms of actual and potential contributions to the field.

PSYC 878 Advanced Cognition and Information Processing (3 Credit Hours)

Historical survey of human information processing literature, detailed review of recent developments in cognitive psychology, and examination of the purposes, role and scope of cognitive engineering.

PSYC 879 Careers (3 Credit Hours)

This course covers the developmental processes, facilitators, and barriers individuals encounter in their work lives. It provides a theoretical foundation in the careers literature and introduces contemporary research in the area. Work-family conflict, mentoring, organizational socialization, and career success are among the topics covered.

Prerequisites: PSYC 750/PSYC 850 and PSYC 851 or permission of instructor

PSYC 880 Ethics, Professional Standards, and Responsible Conduct (3 Credit Hours)

Ethical principles, APA codes, laws, policies and approaches to ethical decision making will be applied to case studies involving dilemmas and issues in several areas of the professional activities of psychologists. Students will prepare an ethical and/or professional issue paper and a self-reflection on acculturation into professional ethics and standards.

PSYC 881 Advanced Ergonomics (3 Credit Hours)

Basic overview of the application of anthropometry, biomechanics, ergonomics, cognition and perception within workplace environments. Particular focus on the analysis and prevention of accidents at work. Course requires considerable practice in technical writing.

PSYC 882 Attention and Human Performance (3 Credit Hours)

Survey of theories of attention, factors that influence human performance, and human performance assessment in human-machine systems. Topics include dual-task performance, vigilance, workload, arousal, fatigue, stress, human error, psychophysiology, and neuroergonomics.

Prerequisites: PSYC 870

PSYC 883 Research in Clinical Psychology (1-4 Credit Hours)

Individual project under guidance of a research advisor.

PSYC 890 ODU Internship in Clinical/Community Psychology (4 Credit Hours)

Must be enrolled in psychology doctorate program.

Prerequisites: Permission of the clinical director

PSYC 891 Industrial/Organizational Internship (1 Credit Hour)

Internship in Industrial/Organizational Psychology.

PSYC 892 Advanced Seminar in Physiological Psychology (3 Credit Hours)

Students will investigate the biological underpinnings of behavior and explore what is currently known about their role in movement, emotions, mental illness, sexual behavior, memory, states of consciousness, sensory perception, thought and language, and several neuro-psychiatric disorders. Through active learning exercises, i.e., class discussion, reports, critiques, oral presentations, and a final research paper or proposal, students will apply and demonstrate their acquired knowledge and critical thinking skills to the biological basis of human behavior.

PSYC 894 ODU Clinical Dissertation (1-6 Credit Hours)

1-6 credits each semester for variable credit.

PSYC 895 Topics in Psychology I (1-4 Credit Hours)

PSYC 896 Topics in Psychology II (1-4 Credit Hours)

PSYC 897 Individual Study (Readings) (1-4 Credit Hours)

PSYC 898 Research (3 Credit Hours)

PSYC 899 Dissertation (1-9 Credit Hours)

Directed research in preparation for the dissertation.

PSYC 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

PSYC 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

PT - Physical Therapy

PT 621 Introduction to Physical Therapy (2 Credit Hours)

An introductory course where students will develop physical therapy clinical skills. Content focuses on patient handling techniques including positioning and draping, bed mobility and transfer training, wheelchair management and gait training with the use of assistive devices. Basic medical terminology, communication, proper body mechanics and safety are also introduced.

PT 627 Theory and Practice I (4 Credit Hours)

This is the first course in a series that covers physical therapy interventions. The focus is on therapeutic exercise to address an individual's impairments, functional deficits, and well-being. Students will learn where different types of exercises fit into the healing and recovery timeline.

PT 628 Theory and Practice II (4 Credit Hours)

This course covers the theory, clinical techniques, and the evidence behind using common physical agents in physical therapy, including massage, electrotherapy, thermal and non-thermal modalities. The course also addresses theories of pain management and management of wounds and burns. The format of the class will combine lecture with an extensive laboratory component.

PT 630 Mechanical Properties of Human Tissues in Rehabilitation (1 Credit Hour)

This one-credit course surrounds the basic structure and function of loose and dense connective tissues, bone, articular cartilage, muscle and nerve. It will address how these tissues function under normal and pathological conditions and the implications for physical therapy. The course will also prepare the student to read and interpret the medical and scientific literature relative to histology and clinical practice.

PT 634 Clinical Sciences I (3 Credit Hours)

The first class in a series of lectures designed to acquaint the student with the clinical areas related to pathological conditions frequently encountered in physical therapy practice. The course develops an understanding of health models, disease processes and highlights common pathologies by body system central to the care of the patient.

PT 635 Clinical Sciences II (3 Credit Hours)

This course is designed to acquaint the student with medical aspects and pathological conditions associated with musculoskeletal disorders and surgical procedures involving the musculoskeletal system with a subunit related to cancer.

PT 638 Exercise Physiology (2 Credit Hours)

This course provides an overview of human physiology as it relates to exercise and the clinical practice of physical therapy. Energy systems and cardiopulmonary physiology will be covered, including electrocardiogram interpretation, as well as resistance training and weight loss.

PT 640 Patient Evaluation I (3 Credit Hours)

A beginning course in patient examination skills which focuses on history/interviewing skills, vital signs, range of motion, surface anatomy palpation, reflex testing, sensation testing, edema testing, and manual muscle testing.

PT 641 Patient Evaluation II (3 Credit Hours)

This course builds upon PT 640 with the focus on gait, posture, and musculoskeletal examination/evaluation. Emphasis will be on examination tests and measures, orthopedic special tests, beginning differential diagnosis, and linking evaluation to intervention choices.

PT 655 Clinical Problem Solving I (3 Credit Hours)

This course integrates material from first-year courses using case scenario role playing, short case vignettes, and standardized patients to facilitate clinical skill competencies and clinical decision making. Also covered are professional topics such as interprofessional collaboration competencies (IPEC), direct access, the ICF model, documentation, and emergency procedures.

Prerequisites: PT 621; must be enrolled in the DPT Program

PT 656 Clinical Problem Solving II (3 Credit Hours)

This course is one in the series of clinical problem-solving courses. It focuses on simulated patient experiences and discussion in orthopedic physical therapy. The course will emphasize critical thinking, problem solving and differential diagnosis as well as development and progression of plans of care for orthopedic patients.

PT 665 Biomechanics/Kinesiology I (3 Credit Hours)

This course will review the musculoskeletal system with emphasis on normal movement of the spine and extremities and the coordinated muscle activity necessary to produce that movement. Students will learn manual muscle testing techniques. The course will also introduce basic concepts such as types of muscle contractions, torque production, and joint reaction forces.

PT 666 Biomechanics/Kinesiology II (2 Credit Hours)

Students will learn to assess the measurement of motion and forces in normal human movement. Trigonometry will be employed in the problem-solving section of the course as the student assesses forces, vectors and loads.

PT 669 Clinical Experience I (4 Credit Hours)

This first full-time clinical education experience begins at the end of the first academic year of the program and is designed to permit progressive responsibility in patient evaluation and treatment based upon material learned in classes during the first year. Each student is required to provide one in-service presentation during the clinical learning experience.

PT 695 Topics in Physical Therapy (1-3 Credit Hours)

Advanced study of selected topics.

PT 792 Neuroscience I (3 Credit Hours)

Neuroscience I is the first in a series of courses that provide the student with an understanding of integrated neuroanatomy and neurophysiology. Emphasis will be placed upon basic neurophysiologic principles at the cellular level.

Prerequisites: BIOL 889

PT 793 Neuroscience II (3 Credit Hours)

Neuroscience II is the second course in the sequence. From the foundation of Neuroscience I, the course will build to the progressively higher order of structural functional relationships that control behavior.

Prerequisites: PT 792 and BIOL 889

PT 810 Scientific Inquiry I (3 Credit Hours)

This is the first in a series of courses that prepare the graduate to critically analyze and use scientific literature to improve clinical decision-making and practice. This course introduces the terminology and strategies of evidence-based practice applied to physical therapy. It emphasizes the basic concepts such as research design, measurement principles and basic statistics.

PT 822 Scientific Inquiry II (2 Credit Hours)

This course is a continuation of the graduate's preparation to practice critical analysis skills related to scientific literature. Its emphasis is placed on creating the components of research reports and concepts associated with judging the quality and value of research. Students will complete a systematic review of the literature.

PT 826 Theory and Practice III (4 Credit Hours)

This is third in a series of four courses in which the student will develop entry-level professional analytical skills in the area of evaluation and treatment with emphasis in the area of orthopedics. This course will expand on the knowledge from spring semester and summer clinical experiences. Teaching methods will include lecture, lab experiences, patient case studies, and demonstrations.

PT 827 Theory and Practice IV (4 Credit Hours)

This is the fourth in a series of Theory and Practice courses designed to prepare the student to achieve entry-level skills in analysis and management in acute care, the adult client with neurologic dysfunction, and rehabilitation following limb amputation. The course integrates the theoretical aspects of neurologic physical therapy with the development of cognitive and psychomotor clinical skills. Practice laboratories, demonstrations, use of audiovisual aids, lectures, laboratory assignments and projects are used to facilitate learning.

PT 836 Clinical Sciences III (3 Credit Hours)

This course is designed to emphasize modules in pharmacology, management of chronic pain, functional capacity evaluations, work conditioning, clinical electrophysiology and imaging.

PT 837 Clinical Sciences IV (3 Credit Hours)

The fourth clinical science course is designed to provide the learner with the foundation to apply clinical science knowledge about an underlying injury or disease to design and implement the appropriate physical therapy care plan for pathologies seen in physical therapy practice. This course focuses on pathologies seen in the acute care environment, pathologies of the nervous system and limb amputations.

PT 842 Patient Evaluation III (3 Credit Hours)

This course allows students to learn and develop the clinical tools and decision-making skills necessary in the evaluation of patients across the continuum of care with special attention paid to patients with various neurological dysfunctions, medically complex patients in the acute care setting and patients with amputations.

PT 857 Clinical Problem Solving III (3 Credit Hours)

The course uses simulated patient experiences, case studies and discussion around topics in orthopedic physical therapy. The course will emphasize critical thinking, problem solving and differential diagnosis, as well as the development and progression of plans of care for the orthopedic patient.

PT 858 Clinical Problem Solving IV (3 Credit Hours)

This is the fourth clinical problem-solving course. It focuses on simulated patient experiences, case studies and discussion of interventions for people with neurologic dysfunction (pediatric and adult), spinal cord injury, and care of patients with medically complex conditions in acute care and intensive care units (ICU).

PT 870 Pediatric Rehabilitation (3 Credit Hours)

This course is designed to prepare the student to achieve entry-level skills in pathology, analysis and management of the pediatric client with neurologic dysfunction. The course integrates the theoretical aspects of neurologic physical therapy with the development of cognitive and psychomotor clinical skills. Practice laboratories, demonstrations, use of audiovisual aids, lectures, laboratory assignments and projects are used to facilitate learning.

PT 875 Clinical Experience II (6 Credit Hours)

This second full-time clinical education experience occurs between the second and third academic years of the program and is designed to permit progressive responsibility in patient evaluation and treatment based upon material learned in classes during the first and second years.

PT 876 Clinical Experience III (7 Credit Hours)

This third full-time clinical education experience occurs following the final academic semester of the program and is designed to promote the development of an autonomous professional through the synthesis and application of clinical problem solving and clinical reasoning skills. Students will achieve entry-level clinical and administrative practice skills.

PT 880 Psychosocial Aspects of Patient Care (2 Credit Hours)

This course focuses upon the emotional and psychological elements associated with illness and disease. Students will learn the various societal and personal views of sickness and chronic illness as well as the coping mechanism employed by individuals and families when facing disease and terminal illness.

PT 881 Inter-Professional Case Management for Special Populations (3 Credit Hours)

This hybrid course facilitates interprofessional health promotion development between graduate-level health professions students in addition to PT management of special populations. Health promotion topics include abuse/mandated reporting, adolescent and LGBTQ health promotion, social and environmental issues, spirituality, death and dying, and supportive environments.

PT 882 Practice Management (3 Credit Hours)

This course is designed to provide the physical therapy student with a review of the principles and practices of managing and administering physical therapy in various clinical settings. The course stresses the principles of management administration in patient care in clinical environments.

PT 883 Professional Issues in Physical Therapy (2 Credit Hours)

This course is for the identification, analysis, and discussion of issues currently facing the physical therapy profession. The issues focus on the ethical questions as well as the role relationships of physical therapists in the greater health care delivery system of the United States.

PT 884 Clinical Teaching and Professional Communication (3 Credit Hours)

This course is designed to meet the needs for patient instruction, education within the classroom and clinic, and peer continuing education. The focus of the course is on clear communication in the teaching/learning process.

PT 890 Differential Diagnosis Seminar (3 Credit Hours)

The focus of this seminar will be on the integration of the foundational and clinical sciences to analyze and solve patient-based clinical problems to arrive at a diagnosis. Students will be expected to explain their reasoning and defend their decisions.

PT 891 Seminar in Scientific Inquiry (3 Credit Hours)

This course is designed to facilitate critical inquiry, clinical reasoning, cultural respect, and reflective thinking through formulation of a systematic review or case report on a patient from one of the student's full-time clinical experiences. Emphasis in this course is placed upon integrating the best research evidence with clinical experience and patient values to support decisions that affect patient outcomes and quality of life with application to management, education, and clinical practice.

PT 892 Seminar in Inter-Professional Practice (1 Credit Hour)

The purpose of this course is to challenge the student to interact with other health professionals in making patient care decisions.

PT 893 Research Topics (2 Credit Hours)

Research topics.

PT 895 Topics in Physical Therapy I (1 Credit Hour)

This course will expose interprofessional students to current trends in health promotion and illness prevention. Topics will include: Healthy People 2020 objectives, age specific clinical guidelines for health promotion and illness prevention, theories on behavior and motivation, sociocultural issues, and screening for a variety of health problems. Measures for promoting and maintaining health throughout the lifespan will be explored with attention to current research from the literature.

PT 896 Topics in Physical Therapy II (1 Credit Hour)

Students will pick from a variety of clinical specialty practice, service learning or research topics to explore in a small group setting.

PUBH - Public Health

PUBH 525 Health Aspects of Aging (3 Credit Hours)

Identifies major issues and problems in meeting health care needs of the aged. Emphasis on role of social assets and supports in determining effects of life changes on the aging process.

Prerequisites: Permission of the instructor or program director

PUBH 530 Community Health Resources and Health Promotion (3 Credit Hours)

Designed to provide information about community health resources. This course will focus on health administration and public health applications.

Prerequisites: Permission of the instructor or program director

PUBH 540 Finance and Budgeting in Healthcare (3 Credit Hours)

This course covers financial management functions in healthcare organizations including operating and capital budgeting processes along with budgeting and financial controls.

Prerequisites: Permission of the instructor or program director

PUBH 545 Health Services Research Methods (3 Credit Hours)

This course focuses on health services research and its assessment abilities and application in health care and public health. Topics include the use of EXCEL, SAS, and SPSS to analyze data. An exploration of the issues and challenges of health services research for health related organizations and other organizations. Statistical procedures and practices will also be conducted.

Prerequisites: Permission of the instructor or program director

PUBH 550 Public and Community Health Administration (3 Credit Hours)

A review of the principles and practice of administering public and community health organizations and programs at federal, state, and local levels. Constitutional, statutory and administrative bases for organizing and conducting public/community health programs will be discussed.

Prerequisites: Permission of the instructor or program director

PUBH 561 Managerial Epidemiology (3 Credit Hours)

This course will blend theory and application of epidemiology. This course will also provide a comprehensive introduction to epidemiology and explain how to use epidemiological concepts and tools to improve decisions about the management of health services.

Prerequisites: Permission of the instructor or program director

PUBH 565 Policy and Politics of Health (3 Credit Hours)

This course will explore both health policy and the politics of health. Students will develop an understanding of the systematic and analytical framework for developing health and health care policy issues.

Prerequisites: Permission of the instructor or program director

PUBH 575 Healthcare Marketing (3 Credit Hours)

This course provides a basic understanding of marketing in a health care setting. It will cover the following: the history of marketing in a health care setting, health care markets, marketing techniques, and leadership skills in managing and supporting the marketing efforts.

Prerequisites: Permission of the instructor or program director

PUBH 580 Health Ethics and the Law (3 Credit Hours)

This course provides the students with a basic knowledge of health law and examines legal issues confronting health services administrators in various health care environments.

Prerequisites: Permission of the instructor or program director

PUBH 595 Topics in Public Health (1-3 Credit Hours)

This course provides the opportunity for the study of selected topics in public/community health or health administration, including informatics, under the supervision of a faculty member.

Prerequisites: Permission of the instructor or program director

PUBH 600 Environment, Society and Health (3 Credit Hours)

Introduces students to 21st century environmental health issues and challenges, and examines how they affect health in the region, nation and world. Topics include: air/water quality, food safety and food-borne illness, antibiotic resistance, emergency preparedness and response, sea level rise, vulnerable populations, radiation safety and health, pediatric environmental health, tick-borne illness, hazardous substances, environmental health policy and practice, and environmental risk communication.

PUBH 602 Environmental Health Law, Justice and Governance (3 Credit Hours)

An overview of environmental health law and governance at the local, state, federal and international levels. Students examine the environmental health policy-making process and how laws, regulations and treaties are made and implemented. Students also will be familiarized with U.S. environmental public health statutes, key institutions and agencies, current controversies, issues of environmental justice, and major international treaties related to environmental health.

Prerequisites: PUBH 600 and PUBH 610

PUBH 610 Introduction to Public Health Practice (1 Credit Hour)

Provides an introduction to the multidisciplinary field of public health by examining the history, structure and functions of the public health system. Course is organized around the three core functions of public health: assessment, policy development and assurance while focusing on elements of the basic public health disciplines.

PUBH 611 Social and Behavioral Sciences for Public Health (3 Credit Hours)

Students will learn about different theoretical perspectives and how to apply appropriate social and behavioral models to public health programs. Topics discussed include social inequalities in health status related to culture, race, social class, gender, and the critical intersection between social risk factors, behavioral risk factors, and the development and implementation of public health interventions.

PUBH 622 Research Methods in Public Health (3 Credit Hours)

This is a course in research methods that will provide an overview of the basic principles of research design, methods, measurement, data collection and data management in the field of public health. Students will learn the differences between quantitative, qualitative and mixed-methods approaches to public health research, as well as how to formulate and evaluate research questions.

PUBH 624 Systems Thinking and Health Management (3 Credit Hours)

Students will learn the practice of systems thinking, which includes the ability to integrate multiple perspectives and synthesize them into a framework or model that encompasses the various ways in which a system might react to policy choices.

PUBH 632 Environmental and Occupational Health Risk Assessment (3 Credit Hours)

This course is an introduction to quantitative and qualitative risk analysis and examines the fundamental aspects of risk, focusing on environmental, occupational, and public health risk. Hazard identification, exposure assessment, dose-response evaluation, risk characterization, and risk communication are emphasized.

PUBH 640 Health Disparities and Social Justice (3 Credit Hours)

This course provides an introduction to the topic of global health disparities through an in-depth examination and discussion of the relationship between social injustice and inequitable health outcomes. Students will be introduced to the social and environmental determinants of health disparities and the pathways and mechanisms leading to inequitable health outcomes in vulnerable groups, as well as strategies for addressing these determinants to improve health.

PUBH 643 Principles of Toxicology (3 Credit Hours)

An introduction to the fundamentals of toxicology with emphasis on the interaction of environmental and industrial chemicals with humans are studied. Exposure, dose response, kinetics and distribution of toxicants, metabolism of toxic agents, factors that affect toxicity and introductory chemical carcinogenesis are discussed.

PUBH 690 Integrative Learning Experience (3 Credit Hours)

This course provides a culminating learning experience in the MPH curriculum, which gives students the opportunity to demonstrate integration of foundational and concentration competencies and to apply the knowledge and skills achieved in their study of public health. The learning outcome is the demonstrated mastery, via course assignments, of core public health and discipline- or concentration-specific competencies.

PUBH 746 Principles of Epidemiology (3 Credit Hours)

This course covers basic epidemiologic methods and research study design such as case-control and cohort studies, randomized trials, risk estimation, and causal inferences. Content also covers the use of epidemiology in public health practice, links to health policy, and the factors and associations determining the distribution of disease in the population.

PUBH 778 Global Environmental Health (3 Credit Hours)

The goal of this course is to guide students with a public health perspective to develop skills to identify and analyze environmental health problems globally. It is designed to provide knowledge on recognizing and evaluating major environmental health issues and risk factors in developed and developing countries by using group discussions and real-life case studies.

PUBH 784 Creating Sustainable Environmental Futures (3 Credit Hours)

This course examines the interrelationships between individual and societal decisions and the global environment, and analyzes the consequences these interrelationships have for public health and sustainability. The course will review food, environmental quality, climate variability, sea-level rise and public health, homes-workplaces-communities, environmental health and sustainability, in the region, the nation and around the world

RCS - Reproductive Clinical Science

RCS 700 Biochemistry and Molecular Cell Biology (2 Credit Hours)

This course presents the basic principles of cellular structure and function, which are the infrastructure for understanding clinical endocrinology and embryo metabolism. This 4-module course examines the structure of biological components and their roles in biochemical processes - metabolism, molecular feedback through hormones, signal transduction, cellular physiology and molecular biology. Case study discussion boards and current journal article discussions connect the basic science content to IVF.

RCS 701 Introduction IVF, Laboratory Tech and Skills Development (3 Credit Hours)

Laboratory science and technology are at the foundation of the Clinical Embryology Laboratory, and ART success rates are largely dependent on the quality of the laboratory environment and the knowledge and skill of laboratory personnel. This course covers the basic laboratory skills and techniques used in the IVF and andrology laboratories. A required, on-campus component includes hands-on training and skills evaluation.

RCS 702 Molecular Biology & Genetics (3 Credit Hours)

This course includes an introduction to molecular biology with an emphasis on the structure and function of both DNA and RNA and their roles in protein synthesis. Aspects of gene structure-function and regulation will also be discussed in this course, including a section on mitochondrial DNA. Research in this area includes the use of molecular techniques, which will be illustrated. This course also provides instruction in the fundamentals of human cytogenetics with discussions of chromosomal structure and cell division, as well as both genetic and epigenetic mechanisms of inheritance and different types of mutations and aneuploidies. This course will also introduce basic molecular biological techniques that are used in current molecular biological research including DNA, RNA isolation and analysis, protein isolation and analysis, genetic engineering, cloning and sequencing, gene expression analysis, PCR and quantitative real-time RCR.

RCS 703 Female Reproductive Endocrinology & Infertility (3 Credit Hours)

This course provides an introduction to endocrinology, female reproductive anatomy and the latest information in basic reproductive physiology of the female at all life stages, including puberty, mid-reproductive life and menopause. Chronic reproductive abnormalities will be discussed in detail using the current literature, including hypothalamic amenorrhea, polycystic ovarian syndrome and premature menopause. The role of gonadotropin hormone therapy in ovulation induction and controlled ovarian stimulation along with complications, such as ovarian hyperstimulation and multiple births, will also be discussed. The use of agonists and antagonists in ART and stimulation protocols for difficult cases, such as the poor responder and hyper-responder, will be covered, along with donor egg and surrogacy and ethics.

RCS 704 Current Topics in IVF - Journal Club (1 Credit Hour)

This course is a journal club format designed to give basic instruction for reading the literature as students prepare to take courses in the following semesters that depend on journal articles as a supplement to or the sole source of reading. Another purpose for this course is to introduce current topics in IVF prior to thesis topic selection in the second semester. The students will work in groups to present papers selected by the program faculty. The online meeting format will be used to present and record the sessions; these sessions can be attended synchronously or asynchronously. Discussion boards will also be used to review and critique the presentations.

RCS 705 IVF Technology (3 Credit Hours)

In vitro fertilization has given its name to the field of reproductive medicine. This course presents a historic overview of the field of IVF and all current techniques and regulatory issues including: how to collect, recover, assess, prepare, fertilize and maintain gametes and embryos; the basic protocols for IVF, ICSI, GIFT, ZIFT, TET and ET; the types of culture media and culture systems used in IVF; how to design and maintain a quality IVF laboratory; the principles and application of Quality Assurance (QC, proficiency testing) and laboratory safety (security, fire, electrical, patient issues, staff issues); the operation and maintenance of common lab equipment, recordkeeping, personnel issues and standards of good practice; how to troubleshoot problems that may arise in the IVF lab; and topical subjects, such as derivation of embryo stem cells from blastocysts and cloning. Assigned asynchronous discussions with faculty and students connect students with current topics allowing them to present their own experiences and to review the current literature for changes in the field.

RCS 706 Gametes and Embryos (3 Credit Hours)

The objective of this course is to present the recent understanding of the development of gametes and embryos to connect the participants with the molecular principles behind IVF laboratory practice. Using the historic and current literature, this course covers the molecular aspects of the origin of germ cells, oogenesis, spermatogenesis, meiosis, fertilization and preimplantation, development, implantation of embryos, gamete pathology and aging. The students are taught how to evaluate a current journal article and write a research paper to discuss their findings.

RCS 707 Research Methods and Capstone/Thesis: Project and Statistics (2 Credit Hours)

Statistics and research study design are essential tools in any scientific endeavor. Developing a thesis research study design and understanding the background literature needed to create a capstone review or practice improvement project requires a rudimentary knowledge of basic statistics. In this course, students will receive training in biostatistics, which is the study of statistics used in medical and basic biological research. Students will: learn the fundamental principles of biostatistics, study applications of biostatistics in clinical medicine, participate in statistical problem-solving and learn the fundamental components of a research study design.

RCS 708 Advanced IVF, Laboratory Tech and Skills Development (2 Credit Hours)

Laboratory science and technology are at the foundation of the Clinical Embryology Laboratory, and ART success rates are largely dependent on the quality of the laboratory environment and the knowledge and skill of laboratory personnel. This course covers advanced laboratory skills and techniques used in the IVF and andrology laboratories. A required, on-campus component includes hands-on training and skills evaluation.

RCS 709 Research Methods Capstone/Thesis: Project Proposal (1 Credit Hour)

The master's project must be an original project of scholarship or research on a relevant topic in reproductive biology or medicine resulting in a paper. Students select either the review, QC/QI or research track. In all cases, an EVMS and possibly local advisers are selected to help determine the proper approach to the project. Depending on the track selected, a detailed capstone research or QC/QI study design is developed. To aid in capstone writing, a section of the courses have been developed to give the students an outline of the steps for writing their project. Basic elements of the capstone project for the three different tracks are covered: development of a thesis statement, data commentary, introduction, background, discussion and conclusion; specific to the research thesis, materials/methods and results. A major concern in publication today is plagiarism; this topic is also covered in detail. All students in this program are required to take IRB, bloodborne pathogens and HIPAA for research training during this course.

RCS 710 Genetics of Reproduction and Infertility (3 Credit Hours)

Many aspects of medicine, including reproductive medicine, are beginning to revolve around underlying genetic causes or predispositions. This course covers many important areas of genetics including: the basis of sex determination with functional anomalies of the reproductive system, the origin of aneuploidy and other chromosomal abnormalities in oocytes, sperm and embryos, the epidemiology and genetic basis of pregnancy wastage, the current status of preimplantation/prenatal genetic diagnosis and its applications and the molecular techniques that are available for PGD and prenatal diagnosis. Current journal article critiques and PGD design projects are used to connect with recent developments in the field.

RCS 711 Research Methods Capstone/Thesis: Master's Project (1 Credit Hour)

The master's project must be an original project of scholarship or research on a relevant topic in reproductive biology or medicine resulting in a paper. Students select either the review, QC/QI or research track. In all cases, an EVMS and possibly local advisers are selected to help determine the proper approach to the project. Depending on the track selected, a detailed capstone research or QC/QI study design is developed. To aid in capstone writing, a section of the courses have been developed to give the students an outline of the steps for writing their project. Basic elements of the capstone project for the three different tracks are covered: development of a thesis statement, data commentary, introduction, background, discussion and conclusion; specific to the research thesis, materials/methods and results. A major concern in publication today is plagiarism; this topic is also covered in detail. All students in this program are required to take IRB, bloodborne pathogens and HIPAA for research training during this course.

RCS 712 Male Reproductive Function and Dysfunction (3 Credit Hours)

The emphasis of this course will be on the physiology and pathology of the male reproductive system in the context of evaluations for male infertility. Knowledge of reproductive function by reviewing recent discoveries about the physiology and dysfunction of the male reproductive system will be presented using current articles and techniques. Relevant areas include: normal and abnormal spermatogenesis, reviewing slides prepared from testicular biopsies, basic semen analysis, standard tests of sperm function using microscopy and specialized functional and "non-functional" sperm evaluating assays. Also covered are disorders like testicular cancer, benign and malignant prostate and genetic causes of male infertility, male contraception and gender pre-selection using sperm. Additionally, students will be challenged with the evaluation of case studies in andrology.

RCS 713 Research Methods Capstone/Thesis: Scientific Writing (3 Credit Hours)

The master's project must be an original project of scholarship or research on a relevant topic in reproductive biology or medicine resulting in a paper. Students select either the review, QC/QI or research track. In all cases, an EVMS and possibly local advisers are selected to help determine the proper approach to the project. Depending on the track selected, a detailed capstone research or QC/QI study design is developed. To aid in capstone writing, a section of the courses have been developed to give the students an outline of the steps for writing their project. Basic elements of the capstone project for the three different tracks are covered: development of a thesis statement, data commentary, introduction, background, discussion and conclusion; specific to the research thesis, materials/methods and results. A major concern in publication today is plagiarism; this topic is also covered in detail. All students in this program are required to take IRB, bloodborne pathogens and HIPAA for research training during this course.

RCS 714 Cryopreservation (2 Credit Hours)

The goals of cryopreservation are to preserve viable gametes, embryos, tissues and even whole organs for future fertility options and to enable augmented pregnancy rates for IVF. In this course, the biological effects of cooling and freezing will be covered in detail. Additionally, the discussion will include the following: principles of cryopreservation using conventional, equilibrium cooling methods, vitrification as an alternative to conventional freeze-thawing, applications and adaptations of low temperature banking for different cell and tissue type as well as safeguards for quality assurance. Assigned asynchronous discussion groups between faculty and students are used to have students present their own experience in the lab or to review current literature to discuss recent changes in techniques.

RCS 715 Ethics, Society, & ART (1 Credit Hour)

The objective of this course is to provide the student with a historical background of various traditional beliefs about reproduction, as well as the comments of moral theologians, ethicists, philosophers, sociologists and others about these same beliefs. The student will gain considerable understanding to be prepared to discuss these sensitive subjects with patients. Specifically, the course will provide a limited amount of background material but will refer the student to original sources, as well as to selected commentaries. At the practical level, the student will be presented with clinical case histories and will be expected to discuss the pros and cons of each case and offer a realistic resolution to the ethical or moral dilemma. Grades in this course will be determined by the students' evaluation of these case studies and a take-home exam.

RCS 716 Scientific Writing (1 Credit Hour)

Students who do not successfully complete the thesis requirement will be required to enroll in this extended writing course until it is completed. This course can only be repeated a select number of times.

RCS 768 IVF Clinical Internship (3 Credit Hours)

During the second year of the program, those entering with no or limited experience will be placed in internships at various clinics and at the EVMS training facility. These experiences will give students additional hands-on skills in andrology and embryology that will broaden their knowledge in best practices in the field of IVF.

RCS 801 Advanced Statistics (3 Credit Hours)

Advanced Statistics explores the use of statistics in basic and clinical science research. Learn what types, when and how to use different analysis tools for qualitative and quantitative statistics and quality assurance calculations. Particular attention will be focused on clinical and laboratory applications as well as basic science research.

RCS 802 Assisted Reproduction Evidence-Based Practice Journal Club (1 Credit Hour)

Using the best evidence from literature, learn how to interpret and formulate best practices in IVF. This course will utilize the principles of evidence-based medical practice and adapt them to the clinical IVF environment.

RCS 803 Comparative Anatomy and Physiology of Reproduction (3 Credit Hours)

Knowing which type of animal models and how they may be used in research is an essential component of interpreting and applying study outcomes to humans. This course will illustrate the uses and limitations of these animal models in the study of human reproduction.

RCS 804 Experimental Design (3 Credit Hours)

Essential skills for a researcher are how to design a study and how to apply advanced experimental modeling techniques. These are both combined here, leading to best practices development in experimental design.

RCS 805 Advanced Topics IVF (1 Credit Hour)

Using the literature, students will present current topic areas in IVF, laboratory and clinical research. How to conduct research in this area will also be covered in this course.

RCS 806 Developmental Biology (3 Credit Hours)

Study the origin and development of form and patterns in organisms. Recent investigations and recent research methodology on the processes of growth and differentiation are stressed.

RCS 809 Toxicology and Infertility (3 Credit Hours)

Environmental factors influence fertility during development, gametogenesis, fertilization and embryogenesis. This course explores the current technology, theories and research surrounding toxins and fertility.

RCS 810 Research Literature Review (3 Credit Hours)

During this course, students learn the best techniques for reviewing the literature, summarizing previous data and writing a review of a topic area. Students will produce their own topic literature review by the end of this course.

RCS 811 Male Infertility Research Literature (1 Credit Hour)

Using the literature, students will present current topic areas in male infertility, treatment and research. How to conduct research in this area will also be covered in this course.

RCS 812 Clinical Laboratory Management (3 Credit Hours)

All aspects of the management of a clinical lab will be presented in this course. Students will develop new protocols, write risk management reports, develop QC guidelines and design and justify the design of an IVF facility as a portfolio project.

RCS 814 Genetics and Art (1 Credit Hour)

Using literature, students will present current topics in ART and genetics. How to conduct research in this area will also be covered in this course.

RCS 815 Dissertation Research Proposal Development (4 Credit Hours)

This course gives students an opportunity to structure their research projects and write a proposal for their dissertation.

RCS 816 Dissertation Research (1-7 Credit Hours)

The objective of this course is to follow the dissertation research plan and track progress of dissertation research.

RCS 819 The Business of IVF (1 Credit Hour)

Management of the IVF facility from the business perspective is the main goal of this course. Students will construct an analysis of a laboratory business plan and propose phased changes to make improvements.

RCS 898 Dissertation Research (1-7 Credit Hours)

The objective of this course is to follow the dissertation research plan and track progress of dissertation research.

READ - Reading

READ 612 Action Research in Reading (3 Credit Hours)

This course will introduce students to action research, a form of self-reflective, systematic inquiry by educators of their own practice. Students will learn about research methods, design, and implementation, and they will develop action research proposals based on a line of structured inquiry emanating from events occurring within their own classrooms. Teachers will study student learning related to their own teaching, a process which allows them to learn about their own instructional practices and to continue monitoring improved student learning. Conducting action research provides educators with an avenue to reflect on their own teaching practices with the aid of empirical data and engage in self-directed learning with the ultimate goal of improving student learning. Must have completed 15 Graduate credit hours in reading coursework.

READ 614 Foundations of Literacy Learning (3 Credit Hours)

Surveys theories and historical trends leading up to present day literacy instruction. Participants will learn how to incorporate application of current research to the methods and philosophies of teaching reading and writing. An integrated language model suggests that reading, writing, and thinking be viewed as interrelated, critical processes for exploring and responding to the world. Offers students an opportunity to acquire foundational knowledge of materials, instructional strategies, and assessment tools that support literacy and engaging learners

READ 618 Approaches to Teaching Literature and Writing K-12 (3 Credit Hours)

Explores the theory and practice of teaching literature, including young adult and children's literature, and writing. Considers some of the characteristics of writing processes, the role of the teacher in structuring and responding to student writing, the role of the teacher in literary text selection, the relationships between writing and literacy understanding, and the authentic assessment of K-12 students' reading, writing and learning.

READ 619 Word Study, Phonics, and Linguistics (3 Credit Hours)

Provides an overview of the field of linguistics, the scientific study of language and word study, an approach to spelling instruction that relies on an understanding of English orthography that incorporates instruction in phonics, spelling and vocabulary. Students will learn to recognize characteristics of readers and writers at different levels of development. The course provides multiple opportunities for hands-on practice and application.

READ 620 Multicultural Children's Literature and Literacy (3 Credit Hours)

Provides for the examination, evaluation, and use of multicultural library materials and resources for elementary and middle school children.

READ 622 Culturally Responsive Literacy for All Learners (3 Credit Hours)

Explores curriculum, instructions, materials and issues related to teaching literacy and language to diverse learners regardless of their ethnic, cultural, linguistic, cognitive, religious, gender, backgrounds, etc.

READ 625 Issues and Trends in Literacy Education (3 Credit Hours)

This course provides an opportunity for students to explore the critical trends and issues being debated within the field of Literacy Education. This course will provide students with an in-depth understanding of significant issues, trends, and practices in reading instruction at the K-12 level. The course is designed to deal with questions and problems of the type facing teachers, supervisors, and administrators. In addition to providing students with a deeper understanding of current trends and the latest literacy research, this course will also help students to critique ideas and issues surrounding informed instruction within literacy education.

READ 627 School-Wide Assessment and Professional Development (3 Credit Hours)

This course focuses on the literacy coach's roles and responsibilities in conducting school-wide, needs-based assessments and planning professional development to align with assessments. Multiple perspectives and approaches to considering, piloting, and administering needs-based surveys and analyzing data for schools and school divisions are explored and practiced. Using results, data-based professional development planning is studied and practiced. Through interactive online instruction, lecture, projects, and reflective participation based upon the International Reading Association's Standards and The Virginia Standards of Learning, a professional knowledge base will be developed. This course provides experiences on a variety of levels to further the development of the literacy coach within ODU's Educator as Professional Framework.

READ 628 New Literacies, Digital Technologies, and Learning (3 Credit Hours)

This course is designed to provide a context in which in-service teachers can explore a range of "new" literacies and consider their relationships to school-based literacy education. Participants will explore these new literacies, specifically the socially immersive experiences of youth and their new media practices. These participating educators will examine the role of multimodality in literacy learning across the curriculum with an emphasis on how to bridge the digital literacies of students' private lives with the traditional print practices valued in school. Teachers will gain insight into and understanding of how young people's participation in a shifting media landscape can help shape and form learning and literacy in the 21st Century classroom.

READ 637 Problems in Reading Education (3 Credit Hours)

Presents an overview of current reading research and its application to instruction. Provides study and practice in the use of quantitative or qualitative techniques, including analytical processes, in solving problems in reading education.

Prerequisites: FOUN 612 and 15 hours in Reading Education

READ 680 Literacy Across the Curriculum (3 Credit Hours)

This class has an emphasis on advanced techniques in literacy for classroom teachers who are not reading specialists. Students will develop an understanding of literacy across the curriculum, including a wide variety of instructional strategies and an understanding of the complex nature of literacy within the disciplines. Lecture, demonstrations, development of materials/planning approaches, and practice in the techniques of literacy instruction for K-12 classroom teachers and library media specialists are provided.

Prerequisites: Graduate standing

READ 683 Diagnostic Teaching of Reading in the Classroom (3 Credit Hours)

Provides classroom teachers with strategies/techniques to employ to ongoing diagnosis and remediation through the use of informal and standardized tests to select appropriate instructional strategies for pupils' existing reading capabilities.

READ 685 Organizing and Supervising Reading Program Development (3 Credit Hours)

Presents an overview of the total school reading program (K-12), and not only prepares the prospective reading supervisor to make decisions pertaining to the procurement of materials for the program but also explores modes for integrating reading into the general curriculum.

Prerequisites: 9 graduate hours in reading

READ 686 Advanced Language Development and Reading (3 Credit Hours)

Explores current theories of cognitive development and their relationship to language development and reading as bases for evaluating methods and materials of teaching reading and the related communicative arts: spelling, writing, and speaking.

Prerequisites: Graduate standing

READ 689 Survey of Reading Instruction (3 Credit Hours)

Surveys the linguistic, psychological, sociological, philosophical, and historical foundations of current reading pedagogy.

Prerequisites: graduate standing

READ 693 Practicum in Reading (3 Credit Hours)

Hours to be arranged. This course provides graduate teachers with opportunities to practice and further refine their understandings of the reading process in clinical and classroom settings. Teachers provide both individual and group reading lessons with students from the local community. Advanced diagnostic tests of learning processes and intellectual capacity are covered. These advanced diagnostic techniques are in addition to those covered in the initial diagnostic reading course.

Prerequisites: 15 hours in graduate reading to include READ 683 and permission of the instructor

READ 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

REL - Religious Studies

REL 503 Gender and Sexuality in Islam (3 Credit Hours)

This course explores the shifting constructions of gender and sexuality in Muslim communities from the early period until the present, considering feminism, patriarchy, gender identity, masculinity, femininity, homosexuality, heteronormativity, and transgender people.

REL 551 Native American Philosophies (3 Credit Hours)

This course will provide students with an introduction to Native American philosophies with a focus on issues of identity, genocide, personhood, gender, sovereignty, and decolonization. Topics will be approached through a consideration of Native American philosophical methodologies and Native views regarding metaphysics, epistemology, and ethics. (Cross-listed with PHIL 551)

Prerequisites: ENGL 110C and 3 credit hours in PHIL or REL, or permission of instructor

REL 583 Tibet, Happiness, and this Precious Life (3 Credit Hours)

Throughout this course, students will examine Tibetan texts and artifacts that address the meaning of happiness and the human condition. The course covers the indigenous religion Bön; the four main Tibetan Buddhist traditions (Nyingma, Sakya, Kagyu, and Geluk), Islam in Tibet, and contemporary social issues, such as gender, identity politics, and the use of social media.

Prerequisites: ENGL 110C and 3 credit hours in PHIL or REL, or permission of the instructor

REL 595 Topics in Religious Studies (3 Credit Hours)

The advanced study of selected topics designed to permit qualified students to work on subjects that, because of their specialized nature, may not be taught regularly. These courses will appear in the course schedule and will be more fully described in information distributed to all academic advisors.

Prerequisites: 3 hours in PHIL or permission of the instructor

REL 596 Topics in Religious Studies (3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule, and will be more fully described in information distributed to all academic advisors.

REL 597 Tutorial Work in Religious Studies (1-3 Credit Hours)

Independent reading and study of a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

REL 598 Tutorial Work in Religious Studies (1-3 Credit Hours)

Independent reading and study of a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

REL 697 Tutorial Work in Religious Studies (1-3 Credit Hours)

Independent reading and study of a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

REL 698 Tutorial Work in Religious Studies (1-3 Credit Hours)

Independent reading and study of a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

SCLM - Supply Chain, Logistics, and Maritime Operations

SCLM 515 Maritime and Supply Chain Safety and Security (3 Credit Hours)

This course examines methods to anticipate threats and mitigation strategies for securing the supply chain and increasing its resilience. It provides an overview of international and U.S. initiatives to ensure the security of logistics assets, cargo, people, and infrastructure within the maritime and supply chain domain. The course also addresses threats to the international trade (including maritime piracy, terrorism, cyber threats), and state-of-the-art techniques and tools for protecting the industry against cyberattacks, as well as roles and responsibilities of the supply chain actors.

SCLM 519 Maritime and Supply Chain Risk and Insurance (3 Credit Hours)

This course examines the risks associated with supply chain operations, including aspects of identification, analysis, assessment, response, and control of the risks associated with the transportation and storage of goods. It covers risk assessment as a function of threats, vulnerabilities, and consequences for operational performance for all modes of transportation. Topics include Lloyd's and the London Insurance Market, principles of insurance and law, international liability conventions, institute clauses, exclusions, cargo policies, particular and general average, and salvage insurance.

SCLM 542 Supply Chain and Maritime Intelligence (3 Credit Hours)

This course examines the performance metrics of the supply chain, including item tracking and visibility of the whole chain, including control tower approaches. It covers the importance of supply chain information collection, real-time data sharing and basic analytics tools to evaluate and improve the degree of execution of the supply chain and generating insights. Topics include monitoring supply chain processes, end-to-end visibility, collaborative supply chain networks, data integration, and data visualization.

SCLM 550 Supply Chain 4.0 Technologies and Innovations (3 Credit Hours)

This course examines the role of technology within the supply chain and how these technologies can be used to improve supply chain performance. Topics include AI, blockchain and smart contracts, IoT and digital twins, Large Language models (LLM), automation and robotics, digital supply chain transformation, machine learning in supply chain, anti-hacking technologies, autonomous vehicles, and additive manufacturing, among others.

SCLM 561 Warehousing, Distribution and Material Management (3 Credit Hours)

This course is designed to investigate the strategic role of warehouses, distribution centers and material management in domestic and global supply chains. Course content includes the analysis of distribution center operations through the study of warehouse design and layout, material handling systems and equipment, distribution network design, warehouse processes, order-picking strategies, inventory control, and safety.

SCLM 572 Vessel Fleet Operations (3 Credit Hours)

Examines the operations of freight shipping organizations involved in the transport of cargo by ship. Key topics are vessel fleets and ship space; shipping markets, operations, costs, investment, insurance, claims, and regulation; and ship types, cargoes, safety, flagging, pollution, and chartering, purchase and scrapping.

Prerequisites: SCLM 370

SCLM 573 Inland Waterways and Dredging Operations (3 Credit Hours)

This course is designed to explore and analyze the current condition of inland waterways and the maintenance of the navigational channels. It will include topics such as: the importance of marine highways, current waterways infrastructure (dams, locks and canals), barge types, the environmental benefits as well as its current legislation and policy. Also, it will cover dredging processes, types of equipment and stages of dredging projects with emphasis on the maintenance of navigation channels, disposal sites, and beneficial use of dredge materials.

SCLM 574 Shipbuilding and Ship Repair Logistics (3 Credit Hours)

Examines the shipbuilding and ship repair industry from the perspective of industry economics, technology, project management and supply and procurement processes. It covers principal ship dimensions, typical types of ship repairs, the preparation for a routine docking period with emphasis on the materials logistics, and the shipbuilding logistics process.

SCLM 581 Freight Brokerage and 3PL Services (3 Credit Hours)

This course covers the basics of Freight Brokering including types of freight and the types of niche markets available, import/export compliance and regulations, Broker-Carrier and Broker-Shipper Agreements, determination of freight shipment rates, load tracking, and carrier relations. Also, it covers the role of the 3PLs in freight brokerage plus inventory management, consolidation, order fulfillment and warehousing.

SCLM 586 Cruise Ship Operations (3 Credit Hours)

Overview cruise ship markets and tourism, and cruise ship types and cruise ship lines. Basic cruise operations including sales, supplies, safety and security, itineraries and ports of call, terminal operations and personnel management. Detailed understanding of the relevant issues surrounding the cruise ship terminal operations and sustainability of cruise line services.

SCLM 630 Strategic Sourcing and Procurement (3 Credit Hours)

An overview of the strategic sourcing of materials and services in the organization and its role in the supply chain. Topics include supply management, sourcing analytics, price/cost analysis, quality issues, supplier evaluation and selection, global supply risk and ethical and sustainable dimensions of global sourcing. This course also covers supply and procurement negotiations. It examines conceptual and practical skills in negotiations.

SCLM 641 Supply Chain Management and Logistics (3 Credit Hours)

This course explores strategic, tactical, and operational aspects of global supply chain and logistics management. Topics include end-to-end planning, international logistics, SCOR model application, and multimodal transportation processes. Emphasis is on analytics-driven, data-informed decision-making across global supply chains. The course also covers international trade entry strategies, payment, documentation, insurance, and customs processes.

SCLM 690 Supply Chain, Logistics, and Maritime Capstone (3 Credit Hours)

This capstone course covers best practices in global supply chain management, focusing on models, methods, and tools for effective planning, organization, and governance. Students examine end-to-end fulfillment strategies in a global environment with attention to environmental, ethical, and cultural factors. Topics include a semester-long project incorporating aspects of logistics, maritime operations, and the impact of Industry 4.0 on supply chains.

SEPS - STEM Education and Professional Studies

SEPS 500 Instructional Systems Development (3 Credit Hours)

Students learn how to design and develop classroom instructional materials including career and technical education and training curricula and programs for youths and adults. Skills in this area include the selection and use of materials, including media and computers and evaluation of pupil performance. Training specialist students learn to develop instructional materials using the instructional systems design process. Career and technical education students learn to plan instruction, to implement competency-based and standards-based education, and to modify and use the Virginia career and technical education curriculum guides.

SEPS 501 Foundations of Career and Technical Education (3 Credit Hours)

This course is designed to teach career and technical education majors to plan, develop, and administer a comprehensive program of career and technical education for high school students and adults. Students also develop an understanding of the historical and sociological foundations underlying the role, development and organization of public education in the United States.

SEPS 502 Instructional Methods in Occupational Studies (3 Credit Hours)

Designed to develop a student's ability to use basic instructional techniques and methods applicable to career and technical education, and adults in business, government, and industrial organizations. It involves videotaped micro-teaching demonstrations.

SEPS 503 Methods in Career and Technical Education (3 Credit Hours)

A practical study and application of recommended methods of teaching career and technical education to high school students. Video-taped micro-teaching demonstrations are included. The course should be taken the semester prior to student teaching.

SEPS 508 Advanced Classroom Issues and Practices in Career and Technical Education (3 Credit Hours)

An overview of classroom issues and practices for prospective career and technical teachers. The course covers classroom management and safety, communication processes, reading in the content area and child abuse and neglect recognition and intervention. Students learn the legal requirements and alternative teaching strategies for serving students with special needs. Students visit schools for a 30-hour student observation. PRAXIS II completion is a course requirement.

Prerequisites: junior standing and passing scores on PRAXIS I or State Board of Education-approved SAT or ACT scores

SEPS 509 Fashion Forecasting Market Trip (3 Credit Hours)

This is the study of planning and conducting a fashion buying trip to one of the major fashion markets in the United States like the Las Vegas Magic Trade Show. The students envision themselves as buyers in action and learn how trend forecasting and creative presentations help market fashion products and services to trade customers and consumers.

SEPS 510 The Foreign Fashion Market Trip (3 Credit Hours)

Students plan and conduct a fashion buying trip to a foreign market in Europe or Asia, and learn how to buy merchandise in the global marketplace. The course requires students to go on the trip as well as attend the pre- and post-trip classes.

Prerequisites: SEPS 208

SEPS 511 Fashion Show Production (3 Credit Hours)

Students plan and produce a fashion show. They examine each behind-the-scenes step from concept to execution as they organize and stage a show that is profitable, entertaining, and aesthetically pleasing.

SEPS 523 Visual Merchandising and Display (3 Credit Hours)

This course is designed to introduce students to the best practices and effective strategies in visual merchandising. It will provide the basic framework with which prospective merchandisers plan and construct visual displays that enhance the selling of merchandise and ideas.

Prerequisites: permission of the instructor

SEPS 524 Fashion, Textiles, and Construction Analysis (3 Credit Hours)

This course explores information related to new technological advances in the textile/apparel industry and determines consumer preferences and concepts of fashion product quality. It includes the development of standards for judging qualities of merchandise. Fabrics are examined to determine the value they provide to the apparel and accessories customer.

Prerequisites: permission of the instructor

SEPS 531 Web-Based Organization for Fashion (3 Credit Hours)

This course provides the basic communications foundations needed to conceive, plan, develop, implement, and maintain a Web-based organization for fashion. Upon completion, students will understand what is required to plan, launch and maintain a successful online venture, limited only by the willingness of the student to explore these technological advances.

SEPS 535 International Retailing (3 Credit Hours)

This course examines globalization and the development of an integrated global economy. Primary emphasis is placed on the strategies for successful global business expansion for retailers in international markets.

SEPS 540 Fashion Global Sourcing/Supply Chain Management (3 Credit Hours)

This course examines the role of global sourcing in the strategic positioning of retailers in the global economy. Emphasis is placed on economic, political, logistical, and ethical factors affecting world trade and global sourcing decisions.

SEPS 550 Assessment, Evaluation and Improvement (3 Credit Hours)

This course prepares training and educational professionals to plan for and conduct assessments to use in planning instructional programs, evaluate individual learning, monitor student progress, measure program effectiveness and efficiency, and evaluate the return on investments of training courses and programs.

SEPS 584 Student Teaching Mentored (6-12 Credit Hours)

Classroom placement in school systems for students to apply content and methodologies. The student is mentored by a school mentor and university faculty. This course is for newly hired teachers on provisional contracts.

Prerequisites: completion of the approved teacher education program in the major area, departmental approval, and permission of the director of teacher education services; passing scores on PRAXIS I or State Board of Education-approved SAT or ACT scores and passing scores on the appropriate PRAXIS II content examination required

SEPS 586 Middle School Student Teaching for Technical Education (6 Credit Hours)

Classroom placement for student teaching in a middle school technology laboratory. Students apply content and methodology under the supervision of a cooperating teacher and university faculty member. Available for pass/fail grading only.

Prerequisites: SEPS 408, SPED 313, TLED 408 and SEPS 450; or SEPS 508, 596, STEM 730, SEPS 788, TLED 608, READ 680 for graduate students; passing scores on PRAXIS I or State Board of Education-approved SAT or ACT scores and passing scores on the appropriate PRAXIS II content examination are required

SEPS 595 Topics in Occupational Education (1-3 Credit Hours)

The department offers selected topics designed to permit small groups of qualified students to work in subjects of mutual interest which, due to their specialized nature, may not be offered regularly.

Prerequisites: permission of the instructor

SEPS 596 Topics in Career and Technical Education (1-3 Credit Hours)

The department offers selected topics designed to permit small groups of qualified students to work in subjects of mutual interest which, due to their specialized nature, may not be offered regularly.

Prerequisites: permission of the instructor

SEPS 597 Independent Study in Occupational Education (1-6 Credit Hours)

Independent study.

Prerequisites: permission of the instructor

SEPS 636 Problems in Occupational and Technical Studies (3 Credit Hours)

Taken the last semester of graduate work. Practice in the use of statistical and analytical techniques in solving problems in occupational and technical studies related to secondary, community college, and training environments.

Prerequisites: FOUN 612

SEPS 695 Topics in Occupational Education (1-3 Credit Hours)

The department offers selected topics designed to permit groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly.

SEPS 696 Topics in Occupational Education (1-3 Credit Hours)

The department offers selected topics designed to permit groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly.

SEPS 697 Independent Study in Occupational Education (1-3 Credit Hours)

Individual study under the supervision of a graduate faculty member.

Prerequisites: permission of the instructor

SEPS 698 Thesis in Occupational Education (3-6 Credit Hours)

Research and writing of the master's thesis and scheduled conferences with the candidate's advisor.

Prerequisites: permission of the advisor

SEPS 740 Readings in Occupational and Technical Studies (3 Credit Hours)

A guided review of the literature to determine the history, development, and issues of occupational and technical education, including specialization in technology education, career and technical education specialties, and human resources training.

SEPS 750 Trends and Issues in Training: Modeling and Simulation (3 Credit Hours)

This course is designed to explore the issues and trends in developing and implementing technology-based training with emphasis on modeling and simulation.

SEPS 760 Trends and Issues in Occupational Education (3 Credit Hours)

This course prepares training and educational professionals to plan for and conduct assessments to use in planning research findings and issues related to tech prep and other articulated programs being established in secondary schools, community colleges, and four-year institutions.

Prerequisites: junior standing

SEPS 761 Foundations of Adult Education and Training (3 Credit Hours)

This course is a study of adult education and training in many settings including the community college, business, industry, labor, government, the military, and social service agencies of many types. An attempt will be made to assess the important trends or directions such activities are taking, including the needs of non-traditional learners and education and labor.

SEPS 762 Administration and Management of Education and Training Programs (3 Credit Hours)

This course deals with organizational policy, human and financial resources, facilities, and the planning process as applied to occupational education and adult training programs.

SEPS 765 Trends and Issues of Economic and Workforce Development (3 Credit Hours)

An analysis of economic trends and issues that lead to workforce development decisions. Focus is on planning for educational and training programs to meet workforce needs dictated by local and regional economic issues. This course is designed for community college and school system personnel.

Prerequisites: student must be accepted into doctoral program or have permission of the instructor

SEPS 785 Curriculum Development in Occupational Education and Training (3 Credit Hours)

A course designed to prepare students to design and develop curriculum for occupational education and training courses and programs. Included is a focus on articulation between secondary and post-secondary curriculum.

SEPS 787 Career and Technical Education Curriculum (3 Credit Hours)

Learn the various curriculum options taught in secondary schools under the auspices of career and technical education. Work from an administrative standpoint to learn the mission and goals of the various subject areas and plan to direct such efforts.

SEPS 788 Instructional Strategies for Innovation in Training and Occupational Education (3 Credit Hours)

Learning and teaching styles are considered as a basis for developing instructional strategies to maximize occupational and technical education at all levels, including secondary, the community college, and senior institutions. Relevant learning theories and knowledge of self, learner, and the environment are blended to enhance the participants' instructional strategies.

SEPS 789 Instructional Technology in Education and Training (3 Credit Hours)

A course that provides insights about trends, issues, and the applications of instructional technologies as they may be applied to education and training environments. Topics include selected technical processes and electronic media to solve practical problems in educations and training.

SEPS 790 Practicum in Occupational Education (3 Credit Hours)

Individually prescribed instruction under the supervision of a graduate faculty member. Study intended to professionally fulfill development of graduate candidates.

Prerequisites: permission of the graduate program director

SEPS 795 Topics in Occupational Education (1-3 Credit Hours)

The department offers selected topics designed to permit groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly.

SEPS 797 Independent Study in Occupational Education (1-6 Credit Hours)

Individual study under the supervision of a graduate faculty member.

Prerequisites: Permission of the instructor

SEPS 809 Pro Seminar for Workforce and Organizational Development (1 Credit Hour)

This course is designed for students in the PhD in Education, Workforce and Organizational Development program that have completed both summer institutes. Focus will be on preparing for the comprehensive exam and finalizing the dissertation proposal. Course will be held during the second week of our Summer Institute on campus. It runs three hours per day for five days.

Pre- or corequisite: SEPS 835 and SEPS 840

SEPS 835 Research Design for Occupational and Technical Studies (3 Credit Hours)

Analyses of current research and needs in occupational and technical studies. Students analyze the literature and develop a research focus for future graduate studies.

SEPS 840 Readings in Occupational and Technical Studies (3 Credit Hours)

A guided review of the literature to determine the history, development, and issues of occupational and technical education, including specialization in technology education, career and technical education specialties, and human resources training.

SEPS 850 Trends and Issues in Training: Modeling and Simulation (3 Credit Hours)

This course is designed to explore the issues and trends in developing and implementing technology-based training with emphasis on modeling and simulation.

SEPS 860 Trends and Issues in Occupational Education (3 Credit Hours)

Trends in philosophy, workforce needs, curriculum and teaching procedures in occupational and technical education. Analysis of research findings and issues related to tech prep and other articulated programs being established in secondary schools, community colleges, and four-year institutions.

SEPS 861 Foundations of Adult Education and Training (3 Credit Hours)

This course is a study of adult education and training in many settings including the community college, business, industry, labor, government, the military, and social service agencies of many types. An attempt will be made to assess the important trends or directions such activities are taking, including the needs of non-traditional learners and education and labor.

SEPS 862 Administration and Management of Education and Training Programs (3 Credit Hours)

This course deals with organizational policy, human and financial resources, facilities, and the planning process as applied to occupational education and adult training programs.

SEPS 865 Trends and Issues of Economic and Workforce Development (3 Credit Hours)

An analysis of economic trends and issues that lead to workforce development decisions. Focus is on planning for educational and training programs to meet workforce needs dictated by local and regional economic issues. This course is designed for community college and school system personnel.

Prerequisites: student must be accepted into doctoral program or have permission of the instructor

SEPS 868 Internship (3 Credit Hours)

Supervised assignment to an agency operating an occupational education or training program.

Prerequisites: permission of the instructor

SEPS 885 Curriculum Development in Occupational Education and Training (3 Credit Hours)

A course designed to prepare students to design and develop curriculum for occupational education and training courses and programs. Included is a focus on articulation between secondary and post-secondary curriculum.

SEPS 887 Career and Technical Education Curriculum (3 Credit Hours)

Learn the various curriculum options taught in secondary schools under the auspices of career and technical education. Work from an administrative standpoint to learn the mission and goals of the various subject areas and plan to direct such efforts.

SEPS 888 Instructional Strategies for Innovation in Training and Occupational Education (3 Credit Hours)

Learning and teaching styles are considered as a basis for developing instructional strategies to maximize occupational and technical education at all levels, including secondary, the community college, and senior institutions. Relevant learning theories and knowledge of self, learner, and the environment are blended to enhance the participants' instructional strategies.

SEPS 889 Instructional Technology in Education and Training (3 Credit Hours)

A course that provides insights about trends, issues, and the applications of instructional technologies as they may be applied to education and training environments. Topics include selected technical processes and electronic media to solve practical problems in educations and training.

SEPS 890 Practicum in Occupational Education (3 Credit Hours)

Individually prescribed instruction under the supervision of a graduate faculty member. Study intended to professionally fulfill development of graduate candidates.

Prerequisites: permission of the graduate program director

SEPS 895 Topics in Occupational Education (1-3 Credit Hours)

The department offers selected topics designed to permit groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly.

SEPS 897 Independent Study in Occupational Education (1-6 Credit Hours)

Individual study under the supervision of a graduate faculty member.

Prerequisites: Permission of the instructor

SEPS 899 Dissertation in Occupational Education (1-12 Credit Hours)

Work on pre-selected dissertation topics under the direction of dissertation committee chair.

Prerequisites: permission of dissertation committee chair

SEPS 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

SEPS 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

SMGT - Sport Management

SMGT 515 Principles of Coaching Management (3 Credit Hours)

This course is designed to provide students with a basic knowledge of the coaching profession. Special emphasis will be placed on establishing a sound coaching philosophy, selecting a coaching style, desirable qualities of a coach, ethics and the coach, roles of the head coach, planning and organizing for games and practices, coaching pedagogy, off-season planning, final preparations for the season, and issues and problems related to coaching and recruiting athletes.

SMGT 556 Sport Psychology (3 Credit Hours)

Study of the psychological bases of coaching strategies and methodologies. Emphasis is placed on applying knowledge in field settings.

SMGT 560 Sport and Social Justice (3 Credit Hours)

The class is a comprehensive survey of the historical interrelationship between sports and civil rights movements in the United States, emphasizing the African American experience. Through popular and academic text and documentary films, we will examine the role that sport has played in raising consciousness about racial issues, and how participation and spectatorship influence attitudes about race.

SMGT 580 Introduction to Sport Analytics (3 Credit Hours)

This course will examine the theory, development, and application of analytics in sport. Students will learn about the application of analytics in sport for purposes of evaluating player performance, team management, market segmentation, pricing, and other areas in sport industry operations. Analytics includes the inclusive use of data, statistical and quantitative analysis, explanatory and predictive models, and fact-based decision making. Sport Management program.

Prerequisites: Must be a degree-seeking student admitted into the M.S

SMGT 595 Topics in Sport Management (3 Credit Hours)

This course provides an opportunity for in-depth study of selected topics in sport management.

Pre- or corequisite: Permission from the instructor

SMGT 636 Research Problems in Sport Management (3 Credit Hours)

Practice in the use of statistical and analytical techniques in solving problems in sport management; supervised student research.

Prerequisites: HMS 635 or FOUN 612; taken in the last semester of graduate work

SMGT 652 Facility Management for Sport, Recreation and Entertainment (3 Credit Hours)

This course examines the principles of facility operation for sport, recreation, and entertainment events. It will provide students with an understanding of the unique challenges and opportunities commonly faced by facility managers and how to effectively manage a sport facility. Students will analyze current research related to planning, funding, and operating facilities for sport, recreation, and entertainment. Sport Management program.

Prerequisites: Must be a degree seeking student admitted into the M.S

SMGT 653 Sponsorship and Event Planning (3 Credit Hours)

This course examines the theory and practice of securing sponsorships and planning events. Students will analyze partnerships created between sport events and corporate sponsors. In addition, students will gain experience in planning and implementing a sport or leisure event. Sport Management program.

Prerequisites: Must be a degree seeking student admitted into the M.S

SMGT 668 Internship in Sport Management (6 Credit Hours)

Designed to provide detailed practical experience (400 clock hours) in a sport management field setting. Sport Management program.

Prerequisites: Must be a degree seeking student admitted into the M.S

SMGT 695 Topics in Sport Management (1-3 Credit Hours)

Selected topic courses in Sport Management. Sport Management program.

Prerequisites: Must be a degree seeking student admitted into the M.S

SMGT 697 Independent Study in Sports Management (1-3 Credit Hours)

Individualized instruction to include research, specialized studies, or other scholarly writing. Sport Management program.

Prerequisites: Must be a degree seeking student admitted into the M.S

SMGT 698 Thesis Research in Sport Management (3-6 Credit Hours)

Students work independently with a faculty member to conduct research for their thesis on a topic related to sport management.

Prerequisites: Permission of the advisor and committee

SMGT 699 Thesis in Sport Management (3-6 Credit Hours)

Students work independently with a faculty member to complete their thesis on a topic related to sport management.

Prerequisites: Permission of the advisor and committee

SMGT 738 Sport Finance (3 Credit Hours)

This course is designed to examine the principles and practices of financial management in diverse sport service settings. This course will explore the basic concepts of financial planning and analysis required to effectively manage a successful sport operation. The concepts covered in this course include finance, economics, accounting, and general business practices. The course is intended to offer a broad perspective of sport finance along with the basic skills associated with fiscal planning and management. Students will gain an understanding of the core principles associated with the financial management of sport enterprises. Sport Management program.

Prerequisites: Must be a degree seeking student admitted into the M.S

SMGT 746 Strategic Marketing in Sport (3 Credit Hours)

This course will familiarize the student with theoretical and practical aspects of sport marketing including the dynamic nature of sport and the importance of branding. Through lecture and case-study analysis, the course will provide students with an understanding of the importance of marketing and consumer behavior theory and fundamentals specific to strategic marketing in the sport industry. Sport Management program.

Prerequisites: Must be a degree seeking student admitted into the M.S

SMGT 750 Ethics in Sport Management (3 Credit Hours)

This course is designed to provide students with an understanding of ethics and morals and how they apply in sport management settings. Teleological and deontological theories of ethics are examined with special application made to sport environments. Models of moral development, ethical decision making, and codes of ethics are emphasized. Sport Management program.

Prerequisites: Must be a degree seeking student admitted into the M.S

SMGT 755 Social Issues in Sport (3 Credit Hours)

The course will examine the nature and scope of sport from sociological, historical, economic, and philosophical perspectives. Special emphasis will be placed on studying selected issues and topics that impact sport managers and their understanding of the role that sport plays in society. Sport Management program.

Prerequisites: Must be a degree seeking student admitted into the M.S

SMGT 760 Sport Law (3 Credit Hours)

This course will examine the theory and practice of sport law as it relates to the management and supervision of sport and recreation facilities, programs, participants, spectators and events. Sport Management program.

Prerequisites: Must be a degree seeking student admitted into the M.S

SMGT 775 Management and Leadership in Sport (3 Credit Hours)

This course will examine various management principles as they apply to sport settings. Special emphasis will be placed on studying leadership theories, human resource management, strategic planning, decision making, problem-solving, and employee motivation. Sport Management program.

Prerequisites: Must be a degree seeking student admitted into the M.S

SMGT 785 Sport Entrepreneurship (3 Credit Hours)

This course will introduce students to various aspects of sport entrepreneurship ranging from development of an idea for a sport business to the formulation of a comprehensive sport business plan. Sport Management program.

Prerequisites: Must be a degree-seeking student admitted into the M.S

SMGT 790 Applied Sport Analytics (3 Credit Hours)

In this capstone course, students in the Sport Analytics concentration gain an opportunity to demonstrate their analytical expertise by creating a professional portfolio. Drawing on insights from previous coursework, they will carry out independent data analyses on significant topics in the sport industry and share their findings with peers and the wider sport analytics community.

Prerequisites: Must be a degree-seeking student admitted into the MS Sport Management program

SMGT 795 Topics in Sport Management (1-3 Credit Hours)

Selected topic courses in sport management. Sport Management program.

Prerequisites: Must be a degree seeking student admitted into the M.S

SMGT 838 Sport Finance (3 Credit Hours)

This course is designed to examine the principles and practices of financial management in diverse sport service settings. This course will explore the basic concepts of financial planning and analysis required to effectively manage a successful sport operation. The concepts covered in this course include finance, economics, accounting, and general business practices. The course is intended to offer a broad perspective of sport finance along with the basic skills associated with fiscal planning and management. Students will gain an understanding of the core principles associated with the financial management of sport enterprises.

Prerequisites: Must be a degree seeking student admitted into the Human Movement Sciences doctoral program

SMGT 846 Strategic Marketing in Sport (3 Credit Hours)

This course will familiarize the student with theoretical and practical aspects of sport marketing, including the dynamic nature of sport and the importance of branding. Through lecture and case-study analysis, the course will provide students with an understanding of the importance of marketing and consumer behavior theory and fundamentals specific to strategic marketing in the sport industry.

Prerequisites: Must be a degree seeking student admitted into the Human Movement Sciences doctoral program

SMGT 850 Ethics in Sport Management (3 Credit Hours)

This course is designed to provide students with an understanding of ethics and morals and how they apply in sport management settings. Teleological and deontological theories of ethics are examined with special application made to sport environments. Models of moral development, ethical decision making, and codes of ethics are emphasized.

Prerequisites: Must be a degree seeking student admitted into the Human Movement Sciences doctoral program

SMGT 855 Social Issues in Sport (3 Credit Hours)

The course will examine the nature and scope of sport from sociological, historical, economic, and philosophical perspectives. Special emphasis will be placed on studying selected issues and topics that impact sport managers and their understanding of the role that sport plays in society.

Prerequisites: Must be a degree seeking student admitted into the Human Movement Sciences doctoral program

SMGT 860 Sport Law (3 Credit Hours)

This course will examine the theory and practice of sport law as it relates to the management and supervision of sport and recreation facilities, programs, participants, spectators and events.

Prerequisites: Must be a degree seeking student admitted into the Human Movement Sciences doctoral program

SMGT 875 Management and Leadership in Sport (3 Credit Hours)

This course will examine various management principles as they apply to sport settings. Special emphasis will be placed on studying leadership theories, human resource management, strategic planning, decision making, problem-solving, and employee motivation.

Prerequisites: Must be a degree seeking student admitted into the Human Movement Sciences doctoral program

SMGT 885 Sport Entrepreneurship (3 Credit Hours)

This course will introduce students to various aspects of sport entrepreneurship ranging from development of an idea for a sport business to the formulation of a comprehensive sport business plan.

Prerequisites: Must be a degree seeking student admitted into the Human Movement Sciences doctoral program

SMGT 890 Applied Sport Analytics (3 Credit Hours)

In this capstone course, students in the Sport Analytics concentration gain an opportunity to demonstrate their analytical expertise by creating a professional portfolio. Drawing on insights from previous coursework, they will carry out independent data analyses on significant topics in the sport industry and share their findings with peers and the wider sport analytics community.

Prerequisites: Must be a degree seeking student admitted into the Human Movement Sciences doctoral program

SMGT 895 Topics in Sport Management (1-3 Credit Hours)

Selected topic courses in sport management.

Prerequisites: Must be a degree seeking student admitted into the Human Movement Sciences doctoral program

SOC - Sociology

SOC 500 War and Gender (3 Credit Hours)

In this course students grapple with issues concerning war, gender roles, and gender inequality. The course addresses gender roles in war throughout history, globally and across cultures. However, the United States military and military involvement in the 20th and 21st century will remain the primary focus areas. Discussions include how social norms and ideals of masculinity and femininity shape, and in turn are shaped by, images and realities of war, including gendered aspects of nationalism and just war theories. The military involvement of men, women (and children) in war and in peacetime, as participants and observers, perpetrators and victims, supporters and opponents of war is also discussed.

SOC 502 Sociology of Child Welfare (3 Credit Hours)

A sociological analysis of the field of child welfare. Topics include social inequality as it applies to children as a group in the U.S. and globally; understanding violence against children within the global context of children's rights; examining data on the degree to which policies, programs and research in the field fail to protect children and why; prevalence, causes and consequences of child sexual, physical and emotional abuse and neglect; evaluation of programs like 'family preservation' and placement in 'substitute' care, i.e. foster care, adoption, institutionalization; changes that would protect and advance the interests and rights of children at the parent-child, agency and societal level.

SOC 505 Social Change and Social Movements (3 Credit Hours)

Analysis of the nature and causes of social change, major social movements, and their impact upon contemporary society.

SOC 521 Deviant Behavior (3 Credit Hours)

A study of various definitions and forms of deviant behavior, theoretical explanations of causes of deviant behavior and the impact of deviant behavior on society and the individual.

SOC 523 Women, Health and Healing (3 Credit Hours)

An examination of women's experiences with health and illness and women's roles in the health-care system as patients and care providers from a feminist sociological perspective.

SOC 526 Minority Group Relations (3 Credit Hours)

The study of the process of and responses to the oppression of racial, religious, ethnic, and national minorities in a variety of countries within a historical and comparative perspective. Special emphasis given to American minorities and especially African Americans.

SOC 527 Gender-Based Violence (3 Credit Hours)

This course takes an expansive and intersectional approach to studying various forms of gender-based violence, from the interpersonal to the systemic, institutional, and cultural. Prevalence, risk factors, theoretical explanations, and legal remedies related to topics such as intimate partner violence, sexual assault on college campuses, gender-based violence in the military, sexual violence against undocumented immigrants, commercial sexual exploitation, and racism and reproductive health will be examined.

SOC 540 Health, Illness, and Society (3 Credit Hours)

The study of health, illness and society. After exploring how health is conceptualized by the prevailing allopathic medical model, an emergent alternative or "integrative" health perspective is examined with a focus on how wellbeing may be understood.

SOC 541 Drugs and Society (3 Credit Hours)

Topics include changes in the legal status of drugs, cross-cultural and historical variations in the control and use of drugs, and social epidemiology of drug use in contemporary society.

SOC 595 Topics in Sociology (3 Credit Hours)

The advanced study of selected topics designed to permit qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule, and will be more fully described in information distributed to academic advisors.

SOC 596 Topics in Sociology (3 Credit Hours)

The advanced study of selected topics designed to permit students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule, and will be more fully described in information distributed to academic advisors.

SOC 597 Tutorial Work in Special Topics in Sociology (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

SOC 598 Tutorial Work in Special Topics in Sociology (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

SOC 610 Applied Social Research Methods (3 Credit Hours)

The application of social science methods to practical problems. The topics of research design, measurement, scaling, sampling, data collection, and research organization are taught with reference to issues of reliability, validity and ethical concerns.

SOC 615 Perspectives on Racial Inequality (3 Credit Hours)

This course explores racial inequality in the United States. The course is organized by the question: "Why, in 21st Century United States, are there still different social outcomes for the descendants of American slaves and descendants of European immigrants?" Students are given a selection of materials from a variety of perspectives attempting to answer the question.

SOC 620 Proseminar in Sociological Theory (3 Credit Hours)

An examination of classical and contemporary sociological theories about the relations between the individual and society; the ways theory shapes and informs the study of social issues; and the relationship among theory, research and practice.

SOC 627 Violence Against Women (3 Credit Hours)

This course examines the many ways in which violence against women functions as an agent of social control. Violence is viewed on a continuum in order to determine how a variety of acts contribute to the subordination of women. Specific types of violence are explored including: wife assault, rape, incest, sexual harassment and pornography.

SOC 630 Applied Social Statistics (3 Credit Hours)

This course is a graduate-level introduction to social statistics as they may be applied to various practical problems. Students will learn the appropriate use of various statistical procedures through discussion and application.

Prerequisites: SOC 610

SOC 640 Sociological Application of Computer and Data Analysis (3 Credit Hours)

This course is a graduate-level introduction to the use of the computer in problems of data management and analysis. Students will use existing software packages (e.g. SPSS, SAS) to build specified data files and carry out various statistical procedures.

Prerequisites: SOC 610

SOC 650 Research Seminar (3 Credit Hours)

This seminar integrates the skills needed to complete a master's thesis. Exercises include formulating research questions, developing a research design, and writing a publishable paper. Students practice these skills assignments in class and by completing their thesis proposal.

Prerequisites: SOC 610, SOC 620 or CRJS 620, SOC 630, and SOC 640

SOC 668 Internship (3 Credit Hours)

Students gain first-hand experience in professional settings which are deemed appropriate given their academic background and career objectives. Students will be required to complete a research project which corresponds to their specific internship placement.

Prerequisites: Permission of the instructor

SOC 695 Topics of Sociology (3 Credit Hours)

Topics vary each semester.

SOC 696 Topics of Sociology (3 Credit Hours)

Topics vary each semester.

SOC 697 Independent Study in Special Topics in Sociology (3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: Approval of the department chair

SOC 698 Independent Study in Special Topics in Sociology (3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: Approval of the department chair

SOC 699 Thesis (3-9 Credit Hours)

Credit hours to continue thesis work.

SOC 795 Topics in Sociology (3 Credit Hours)

Topics vary by semester.

Prerequisites: Six hours of graduate credit

SOC 797 Independent Study in Sociology (3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor.

Prerequisites: Approval of department chair and 6 hours of graduate credit

SOC 895 Topics in Sociology (3 Credit Hours)

Topics vary by semester.

Prerequisites: Six hours of graduate credit

SOC 897 Independent Study in Sociology (3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor.

Prerequisites: Approval of department chair and 6 hours of graduate credit

SOC 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

SOC 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

SPAN - Spanish

SPAN 507 Advanced Grammar and Syntax (3 Credit Hours)

This class is designed to solidify and refine students' working knowledge of written skills in the language, with an emphasis on increasing their written sophistication. Focus is on analysis of vocabulary, grammar, and cultural nuances in the syntax to examine how language reflects the ways of life and beliefs of its speakers, contrasted with the extent of language's influence on culture. Students will refine their skills in written inter-cultural communication, paying attention to idioms and the fine points of 'cultural grammar,' communicative competence and specialized discourse to develop excellent communication skills. This course is intended to prepare students for using their knowledge of language and culture in professional settings.

Prerequisites: 9 hours of 300-level Spanish courses

SPAN 510 Spanish Applied Linguistics (3 Credit Hours)

This course provides an introduction to Spanish linguistics and establishes the basis for the application of linguistic principles, including an introduction to the description and organization of data dealing with phonology (how sound patterns form words), discussion on topics in morphology (word formation and verbal inflection) and the description and organization of data dealing with syntax (how words combine to form phrases and sentences). In addition, the course analyzes the regional variations of Spanish (dialectology), and applying linguistics concepts, students contrast and compare the regional categories of Spanish use world-wide. It will provide students with a level of knowledge to make connections between the structure of Spanish and relevant issues in contemporary Hispanic linguistics, such as second language learning, language variation, bilingualism, and Spanish in the United States.

SPAN 515 Spanish Phonetics (3 Credit Hours)

This class is an introduction to the descriptive analysis of Spanish sounds and provides a comprehensive presentation of phonetics concepts as well as the comparisons drawn between the sounds of Spanish and those of English from a theoretical perspective. Students will gain a solid understanding of the sound system and strengthening of their pronunciation of Spanish from engaging, culturally driven activities taken from real-life modern Spanish sources, as well as enhancing awareness through aural comprehension of the nuances of the different dialects from speakers across the Spanish-speaking world.

SPAN 547 Drama of the Spanish Golden Age (3 Credit Hours)

A study of selected works of the major playwrights of the Golden Age: Lope de Vega, Calderon de la Barca, Tirso de Molina, Ruiz de Alarcon.

SPAN 548 Contemporary Spanish Drama (3 Credit Hours)

Through reading and analysis of the most representative texts of Spanish drama of the last decades, this course intends to introduce students to contemporary theater production in relation to the social, political and cultural trends that dominate in Spain today. Readings will allow students to gain a deeper understanding of the debates predominating within Spanish society and of possible correlations linking Spanish and European culture today.

SPAN 549 Contemporary Spanish-American Drama (3 Credit Hours)

A study of contemporary Spanish-American drama through the reading of representative authors.

SPAN 553 Border Culture and Literature (3 Credit Hours)

Students study a variety of current cultural texts from the U.S. and Mexico to explore the multiplicity of images that surround and define the highly contested and increasingly important area of the U.S.-Mexico border. Discussions are grounded in an ideological analysis with the goal of developing a description of the historical and social parameters and strategies that are utilized in the critical revision of the Borderlands. Specifically, this course focuses on questions dealing with subaltern identities, for example women, indigenous groups, immigrants, and the poor.

Prerequisites: SPAN 311, SPAN 312W, SPAN 323, and SPAN 330

SPAN 569 Hispanic Film (3 Credit Hours)

A topical study of the major works of Spanish and Latin American film from Bunuel to the present. The course will explore many issues, including those related to gender, race, symbolism, and class struggle. (cross listed with COMM 443/COMM 543)

Prerequisites: SPAN 311, SPAN 312W, SPAN 323, and SPAN 330

SPAN 571 Hispanic Women Authors (3 Credit Hours)

A study of fictional and non-fictional works by Spanish, Spanish-American, and U.S. Latina writers from the 16th to the 20th century. The course analyzes gender identity and roles and the interaction of gender, race, and class in literary representations of courtship and marriage, spirituality, nationalism, colonialism, and multiculturalism. (cross-listed with WCS 471/WCS 571)

SPAN 573 Contemporary Latina Literature: From Borders to Crossroads (3 Credit Hours)

The course focuses on poetry, prose fiction and theater written by Chicana, Puerto Rican, Cuban-American, and Dominican-American women authors in the last twenty years. Attention will also be paid to the very influential theoretical work written by Chicanas.

SPAN 595 Topics in Spanish (1-3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule.

SPAN 596 Topics in Spanish (1-3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule.

SPAN 602 Intensive Spanish for Teachers: Language and Culture (3 Credit Hours)

This course is designed for Spanish teachers interested in keeping up with cultural developments in the Spanish-speaking world and in maintaining/improving linguistic performance. Emphasis will be placed on authentic materials from newspapers, magazines, film and video, and the Internet.

SPAN 668 Internship in Spanish (3 Credit Hours)

Individualized practical experience. Students gain first-hand experience in settings that are appropriate given their academic background and career objectives.

Prerequisites: Departmental approval required

SPAN 695 Topics in Spanish (1-9 Credit Hours)

Advanced study of selected topics which may not be offered regularly. These courses appear in the course schedule.

SPAN 696 Topics in Spanish (1-9 Credit Hours)

Advanced study of selected topics which may not be offered regularly. These courses appear in the course schedule.

SPAN 697 Tutorial Work in Special Topics in Spanish (1-3 Credit Hours)

The independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: approval of the department chair

SPAN 698 Tutorial Work in Special Topics in Spanish (3 Credit Hours)

The independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: approval of the department chair

SPED - Special Education

SPED 500 Foundations of Special Education: Legal Aspects and Characteristics (3 Credit Hours)

The course provides an introduction and overview of the field of special education from the perspective that it is a subsection of general education and that the field is in transition by virtue of philosophical, legislative, and programmatic changes. Legal aspects, regulatory requirements, and critical analyses of research are addressed. The course includes a broad overview of the characteristics, identification, instructional needs, and accommodation necessary for creating appropriate educational and vocational environments for students with disabilities.

Prerequisites: junior standing

SPED 502 Instructional Design I: Learner Characteristics and Assessment (3 Credit Hours)

The intent of this course is to provide pre-service and in-service teachers with: (a) knowledge of the characteristics of K-12 students with learning differences who are accessing either the general curriculum or the adapted curriculum, and (b) the ability to develop knowledge and skill in the selection, administration, scoring and interpretation of standardized/norm-referenced and criterion-referenced assessments for exceptional learners. Administering formal and informal assessment tools for the development of an IEP are emphasized. The use of assessment data to improve evidence-based instruction and student performance is discussed.

Prerequisites: a grade of C- or higher in SPED 400 or a grade of B- or higher in SPED 500

SPED 504 Characteristics and Medical Aspects of Disabling Conditions (3 Credit Hours)

This course reviews medical conditions present among individuals with disabilities and implications for classroom instruction.

SPED 506 Students with Diverse Learning Needs in the General Education Classroom (3 Credit Hours)

This course introduces general education teachers to the legal aspects and educational needs of at-risk students and those with disabilities. Emphasis is on characteristics of children with special needs and procedures for effective academic, behavioral, and social integration of these children in the general education classroom.

Prerequisites: junior standing

SPED 511 Classroom and Behavioral Management Techniques for Students with Diverse Needs (3 Credit Hours)

This course addresses classroom management techniques and individual interventions based upon behavioral, cognitive, affective, social, and ecological theory and practice. The course focuses on the field of applied behavior analysis, including best practices in the areas of data collection, program selection, program implementation, and data analysis. Positive behavior management, supports, and functional behavioral assessment for students with diverse learning needs will be emphasized.

Pre- or corequisite: a grade of C- or higher in SPED 400 or a grade of B- or higher in SPED 500

SPED 515 Instructional Design II: Curricular Procedures and Individualized Education Planning (3 Credit Hours)

The intent of this course is to provide preservice and in-service teachers with: (a) knowledge of research-based instruction for PreK-12 students with disabilities and those who are gifted; (b) knowledge and skill in using data collection to make decisions about student progress, instruction, program, accommodations and teaching methodology for exceptional learners, and (c) knowledge and skill in planning, developing and implementing individual educational plans and group instruction for diverse exceptional learners who are accessing the general education curriculum and the standards of learning or the adapted education curriculum and the aligned or essentialized standards of learning.

Prerequisites: a grade of C- or higher in SPED 400 and SPED 402 or a grade of B- or higher in SPED 500 and SPED 502, and passing scores on Praxis Core Academic Skills for Educator Tests or equivalent as prescribed by the Virginia Board of Education

SPED 517 Collaboration and Transitions (3 Credit Hours)

This course addresses the complex issues surrounding families and children with disabilities and transitions across the lifespan, as well as effective collaboration with families and professionals to support inclusion and/or effective early intervention services, educational services, and transition services for students at-risk and students with disabilities. Emphasis is on successful professional collaboration and effective relationships in educational, transition, and family settings.

Pre- or corequisite: SPED 400/SPED 500

SPED 518 Instructional Strategies to Meet Diverse Learning Needs in Math (3 Credit Hours)

This course covers instructional strategies necessary to teach mathematics to students with diverse learning needs in elementary and secondary settings. Students will study and apply pedagogy-based research on how learning takes place and strategies for differentiating instruction for the unique needs of diverse learners. Students will address and apply effective research-based methodology and evaluation standards.

SPED 528 Instructional Strategies for Students Accessing the Adapted Curriculum (3 Credit Hours)

This course addresses the characteristics and instructional strategies of students accessing the adapted curriculum. Emphasis is on assessment, program development, academic, and functional skills instruction. This course addresses the needs of individuals with severe and/or profound multiple disabilities. 45 Hour Practicum.

SPED 532 Characteristics of Students with Visual Impairments (3 Credit Hours)

This course provides an overview of the characteristics of and services to persons with visual impairments, including the impact of visual impairment on infants' and children's growth and development, child and adolescent emotional and social development, and family interaction patterns. Considers the educational, conceptual, psycho-social, and physical implications of a visual impairment.

Prerequisites: SPED 400/SPED 500

SPED 533 Braille Code (3 Credit Hours)

This course provides instruction in the development, use, and application of the Braille literary code and its implications for educational/literacy programs for students with visual disabilities. Students will develop the skills to read and write contracted and uncontracted Braille, while acquiring instructional methodologies for teaching children who are blind to read and write. Sources of Braille materials for educational purposes are identified.

Pre- or corequisite: SPED 400/SPED 500 and SPED 432/SPED 532

SPED 534 Medical and Educational Implications of Visual Impairments (3 Credit Hours)

Provides an introduction to anatomy and physiology of the visual system and the educational implications of visual pathology. Topics include anatomy of the human eye, normal visual development, pathology of the eye, examination procedures for the identification of visual pathology, and the effects of pathology on visual learning and development. Practicum of 25 hours required.

Pre- or corequisite: SPED 400/SPED 500 and SPED 432/SPED 532

SPED 535 Orientation and Mobility (2 Credit Hours)

Provides the foundation for understanding the components and essence of orientation and mobility. Establishes how the need for independent travel in the blind population created the field of O&M. Explores the philosophy and history of orientation and mobility including cane instruction, dog guides and methods of travel. Addresses techniques in developing orientation skills and basic mobility instruction. Motor and concept skill development are emphasized. Practicum of 45 hours required.

Pre- or corequisite: SPED 400/SPED 500 and SPED 432/SPED 532

SPED 536 Curriculum and Assessment of Students with Visual Impairments (3 Credit Hours)

Provides students with knowledge and understanding of the educational assessment of students with visual impairments and additional disabilities including deaf-blindness. Students will practice assessing and planning educational programs for students with visual impairments. Addresses assessment of technology for students with visual impairments. Examines determination of learning needs and appropriate learning media, relationship of assessment, IEP development, and placement. Practicum requires a minimum of 25 hours.

Pre- or corequisite: SPED 400/SPED 500 and SPED 432/SPED 532

SPED 537 Assistive Technology for People with Sensory Impairments (3 Credit Hours)

This course is designed for professionals and/or students interested in serving the visually impaired/blind population or hearing impaired/deaf population. It is designed to heighten the awareness of participants to specific technology and resources available to enhance and improve the ability of individuals with visual and hearing impairments to succeed in school, daily living activities and employment. Knowledge and awareness components of this course will be delivered via distance education.

Pre- or corequisite: SPED 400 or SPED 500 and SPED 432 or SPED 532

SPED 540 Assistive Technology for Diverse Students (3 Credit Hours)

This course provides lectures for pre-service and in-service teachers, and related service providers of special populations in use of assistive technology (AT) devices and services, and augmentative and alternative communication (AAC) systems for instructional programs and computer applications. Study will involve compliance with federal and state laws, and national and state educational standards related to providing assistive technology to students with diverse learning needs.

SPED 541 Teaching Students with Severe Physical and Sensorimotor Disabilities (3 Credit Hours)

This course reviews techniques for working with students who have severe physical and sensorimotor disabilities. Course emphasis is on proper positioning and handling for students with atypical motor/muscle development who function at developmental levels between birth and five years. Practicum of 45 hours required.

SPED 560 Teaching Preschoolers With Diverse Abilities (3 Credit Hours)

This course prepares students to create high quality learning environments for preschool children (ages 2-5 years) who have diverse strengths and needs. Students will learn how to access curricula and materials, plan for and provide evidence-based instruction, collect data for progress monitoring, and provide adaptations to the environment to support the development of children with and without disabilities. Programming that addresses multiple areas of development, such as social-emotional, communication, motor, and cognition, will be discussed, and students will complete a 10-hour preschool observation.

SPED 561 Developmental Assessment of Young Children with Diverse Abilities (3 Credit Hours)

This course prepares students to use recommended practices for assessing the development of young children with diverse abilities, ages birth to 5 years, in home and inclusive/classroom-based settings. Course content and discussions address the knowledge and skills needed by early intervention, early childhood, and early childhood special educators when gathering developmental information to determine a child's eligibility, plan intervention and educational activities, and monitor progress across time. Practicum of 45 hours required.

SPED 567 Family-Centered Practices in Early Childhood Intervention (3 Credit Hours)

This course prepares professionals to partner with families of infants and toddlers (ages birth-three) with developmental delays and disabilities in early intervention programs. Emphasis is placed on the use of family-centered practices that support caregiver and child learning during visits in homes and other community settings. Strategies for collaborating with team members (including the family), writing Individualized Family Service Plans (IFSPs), and providing effective services that facilitate child development during natural family routines and activities will be discussed.

SPED 569 Communication/Language Development/Intervention for Students with Significant Disabilities (3 Credit Hours)

This course examines symbolic and non-symbolic communication/language development and acquisition. Emphasis is on routine-based communication training, communication/language facilitation strategies, augmentative communication systems, and informal/functional communication/language assessment procedures for students in early childhood special education, students with autism, and students with multiple disabilities.

SPED 583 Field Experience Seminar in Special Education (1 Credit Hour)

Explores issues, problems, concerns and processes related to teaching and entering the profession of teaching. Passing scores on the Virginia Communication and Literacy Assessment (VCLA), Praxis II: Elementary Education Content Test, and Virginia Reading Assessment (VRA)/ Reading for Virginia Educators (RVE) will be required by the end of the course.

Prerequisites: SPED 313, SPED 400/SPED 500 and SPED 402/SPED 502

SPED 586 Teacher Candidate Internship for Special Endorsement (3 Credit Hours)

Seven weeks will be completed at the elementary level and seven weeks will be completed at the middle/secondary level.

Prerequisites: admission to ODU Teacher Education Program; completion of the approved teacher education program in the specific endorsement area; departmental approval

SPED 595 Topics in Special Education (1-3 Credit Hours)

This course offers selected topics designed to permit small groups of qualified students to work on subjects of mutual interest in the special education field.

Prerequisites: SPED 400/SPED 500

SPED 601 English Learners and the Special Education Process (3 Credit Hours)

This course will provide students with information regarding the characteristics of English learners with disabilities, the special education law, and the legal requirements for assessment, evaluation, eligibility determination, and program planning. Progress monitoring, annual reviews, and reevaluation of English learners with disability or suspected of a disability also will be reviewed. The role of parents and community will be examined.

Prerequisites: Permission of the instructor

SPED 602 Principles of Language Learning and Assessment of English Learners with Disabilities (3 Credit Hours)

This course will provide students with knowledge and skills related to first and second language acquisition, language assessment, response to intervention, program planning, data collection and analysis, and the effective use of interpreters. Special attention is focused upon factors that affect second language acquisition, typical and atypical language development, differentiation for English learners with disabilities, and the bilingual brain.

Prerequisites: SPED 601

SPED 603 Language, Literature Content for English Learners With Disabilities in Inclusive Settings (3 Credit Hours)

This course examines language as the key to learning and the integration of speaking, listening, reading and writing to English learners' (EL) literacy development with a focus on ELs with disabilities. Students will learn phonological and orthographic features of words, factors that influence reading comprehension, how to differentiate instruction, how to teach sentence and paragraph writing, and how to develop academic vocabulary in ELs with disabilities.

Prerequisites: SPED 602

SPED 604 Instructional Strategies for English Learners with Disabilities (3 Credit Hours)

This course details current evidence-based practices to teach English learners with disabilities. Students will learn principles of effective evidence-based instructional strategies and guidelines for selecting them, including the use of technology to teach English learners with disabilities.

Prerequisites: SPED 603

SPED 610 Characteristics of Students Accessing the General Curriculum (3 Credit Hours)

The intent of this course is to provide pre-service and currently licensed teachers with (a) knowledge of the characteristics of students with disabilities who are accessing the general curriculum, K-12, including, but not limited to learning disabilities, emotional disabilities, and intellectual disabilities; (b) the ability to recognize etiologies, underlying factors, and contributing conditions that impact student learning, and (c) the cultural impact of disabling conditions.

SPED 611 Instructional Strategies for Students Accessing the General Education Curriculum (3 Credit Hours)

This course emphasizes effective research-based instructional strategies for teaching students with mild/moderate disabilities in grades K-12 who are accessing the general education curriculum. Practicum of 45 hours in middle/secondary-level setting is required.

SPED 613 Human Growth and Development (3 Credit Hours)

This course is designed to give a thorough overview of human development from birth through adolescence and to develop an understanding of what impact physical, social, emotional, and intellectual development may have on the student, the learning environment, and instructional decisions. This course provides an advanced overview of current research and theory in human growth and development and their applications to the classroom. Throughout the course, issues of diversity as it applies to economic, social, racial, ethnic, and religious characteristics will be explored; developmental issues related to giftedness or disability and the impact of family disruptions, child abuse, and substance abuse will be addressed within the context of each topic.

SPED 615 Advanced Classroom and Behavior Management Techniques for Students with Diverse Needs (3 Credit Hours)

This course addresses classroom management techniques and individual interventions based upon behavioral, cognitive, affective, social, and ecological theory and practice. The course focuses on the field of applied behavior analysis, including best practices in the areas of data collection, program selection, program implementation, and data analysis. Positive behavior management, supports, and functional behavioral assessment for students with diverse learning needs will be emphasized.

SPED 618 Advanced Instructional Design I: Learner Characteristics and Assessment (3 Credit Hours)

The intent of this course is to provide pre-service and in-service teachers with: (a) knowledge of the characteristics of K-12 students with learning differences who are accessing either the general curriculum or the adapted curriculum and (b) the ability to develop knowledge and skill in the selection, administration, scoring and interpretation of standardized/norm-referenced and criterion-referenced assessments for exceptional learners. Administering formal and informal assessment tools for the development of an IEP are emphasized. The use of assessment data to improve evidence-based instruction and student performance is discussed. Practicum of 45 hours required.

SPED 620 Advanced Foundations of Special Education: Legal Aspects and Characteristics (3 Credit Hours)

The course provides an introduction and overview of the field of special education from the perspective that it is a subsection of general education and that the field is in transition by virtue of philosophical, legislative, and programmatic changes. Legal aspects, regulatory requirements, and critical analyses of research are addressed. The course includes a broad overview of the characteristics, identification, instructional needs, and accommodation necessary for creating appropriate educational and vocational environments for students with disabilities.

SPED 621 Effective Interventions for Children and Youth with Challenging Behavior (3 Credit Hours)

Students with challenging behavior pose a tremendous challenge to school personnel. Along with the growing incidence of behavior problems, there has been a dramatic increase in the number of research-supported interventions. Emphasis is on assessment of the structural and functional properties of problem behavior to facilitate development of interventions that match the nature and severity of the problem behavior. The course focuses on gaining knowledge of the likely source(s) of challenging behavior, including various strategies to document the environmental determinants of the behavior, establishment of school-wide, classroom-level, and student-specific intervention programs and ways to document the outcome of those interventions. Attention is given to adult- as well as peer-mediated intervention options for problem behavior reduction/replacement among children and youth from diverse backgrounds and across categories of exceptionality. Practicum of 45 hours required.

SPED 622 Advanced Collaboration and Transitions (3 Credit Hours)

This course addresses the complex issues surrounding families and children with disabilities and transitions across the lifespan, as well as effective collaboration with families and professionals to support inclusion and/or effective early intervention services, educational services, and transition services for students at-risk and students with disabilities. Emphasis is on successful professional collaboration and effective relationships in educational, transition, and family settings.

SPED 623 Adv Instructional Design II: Curriculum Procedures and Individualized Education Planning (3 Credit Hours)

The intent of this course is to provide preservice and in-service teachers with: (a) knowledge of research-based instruction for PreK-12 students with disabilities and those who are gifted; (b) knowledge and skill in using data collection to make decisions about student progress, instruction, program, accommodations and teaching methodology for exceptional learners, and (c) knowledge and skill in planning, developing and implementing individual educational plans and group instruction for diverse exceptional learners who are accessing the general education curriculum and the standards of learning or the adapted education curriculum and the aligned or essentialized standards of learning. Practicum of 45 hours required.

SPED 625 Characteristics of Students with Autism Spectrum Disorders (3 Credit Hours)

This course includes a review of characteristics, etiology, prevalence, and perspectives of students with autism spectrum disorders.

SPED 626 Advanced Procedures in Reading and Writing for Students with Diverse Learning Needs (3 Credit Hours)

This course provides the professional educator with a variety of educational procedures for students with disabilities in reading and writing, including diagnostic assessment, causal nature of the disability, and evidence-based instructional strategies. Application of evidence-based practices for assessing and teaching students with disabilities who have severe deficits in reading and writing is emphasized.

SPED 627 Instructional Strategies for Students with Autism Spectrum Disorders (3 Credit Hours)

This course includes a review of intervention strategies for students with autism spectrum disorders. Practicum of 45 hours required.

SPED 628 Instructional Strategies for Students Accessing the Adapted Curriculum (3 Credit Hours)

This course addresses the characteristics and instructional strategies of students accessing the adapted curriculum. Emphasis is on assessment, program development, academic, and functional skills instruction. This course addresses the needs of individuals with severe and/or profound multiple disabilities. Practicum of 45 hours required.

Prerequisites: SPED 400/SPED 500, SPED 411/SPED 511, and passing scores on Praxis Core Academic Skills for Educator Tests or equivalent as prescribed by the Virginia Board of Education

SPED 630 Teaching Preschoolers with Disabilities (3 Credit Hours)

This course is designed to prepare students in curricula, materials and methods of instruction for preschool-aged (2 to 6 years) children with special needs. Programming for self-help, social, language, motor, and cognitive development are addressed. Data collection, program organization, and classroom planning are also covered. Practicum of 45 hours required.

Prerequisites: SPED 400/SPED 500 and passing scores on Praxis Core Academic Skills for Educator Tests or equivalent as prescribed by the Virginia Board of Education

SPED 631 Developmental Assessment of Young Children with Diverse Abilities (3 Credit Hours)

This course prepares students to use recommended practices for assessing the development of young children with diverse abilities, ages birth to 5 years, in home and inclusive/classroom-based settings. Course content and discussions address the knowledge and skills needed by early intervention, early childhood, and early childhood special educators when gathering developmental information to determine a child's eligibility, plan intervention and educational activities, and monitor progress across time. Practicum of 45 hours required.

SPED 633 Teaching Students with Severe Physical and Sensorimotor Disabilities (3 Credit Hours)

This course reviews techniques for working with students who have severe physical and sensorimotor disabilities. Emphasis is on proper positioning and handling for students with atypical motor/muscle development who function at developmental levels between birth and five years. Practicum of 45 hours required.

Prerequisites: SPED 400/SPED 500 and passing scores on Praxis Core Academic Skills for Educator Tests or equivalent as prescribed by the Virginia Board of Education

SPED 636 Cortical and Cerebral Visual Impairment (3 Credit Hours)

This class will provide an overview of cortical visual impairment (CVI) including causes, visual characteristics, assessments, and interventions for students with CVI.

Prerequisites: SPED 400 or SPED 500 and SPED 432 or SPED 532

SPED 637 Infant/Family Intervention and Teamwork (3 Credit Hours)

This course prepares professionals from cross-discipline backgrounds to serve families with children who are at-risk and disabled from birth through age three. Emphasis is placed on the development of the individualized family service plan (IFSP), procedures, materials and curriculum for this population. A family-centered approach is stressed. Practicum of 45 hours required.

Prerequisites: SPED 400/SPED 500, SPED 630, and passing scores on Praxis Core Academic Skills for Educator Tests or equivalent as prescribed by the Virginia Board of Education

SPED 638 Teaching Methods for Students with Visual Impairments (3 Credit Hours)

This course emphasizes methods of teaching compensatory skills, the core curriculum, and technology for use by students who are blind and visually impaired. It addresses curriculum development, adaptations, and teaching methodology for individuals with visual impairments. In addition, it provides information on adaptations within various educational programs and adaptation of general education classroom materials and procedures for use with blind and low vision children and youth.

Prerequisites: passing scores on Praxis Core Academic Skills for Educator Tests or equivalent as prescribed by the Virginia Board of Education

Pre- or corequisite: SPED 400/SPED 500 and SPED 432/SPED 532

SPED 639 Braille Reading and Writing (3 Credit Hours)

Provides instruction on transcription of advanced braille codes, including: mathematics (UEB and Nemeth) music, foreign language, and other specialized codes. Introduces techniques for teaching skills in each code. Explores technology tools used to create braille and tactile materials in addition to other assistive technologies used for instruction in STEM content. Practicum requires a minimum of 15 hours.

Prerequisites: SPED 433/SPED 533 and passing scores on Praxis Core Academic Skills for Educator Tests or equivalent as prescribed by the Virginia Board of Education

Pre- or corequisite: SPED 400/SPED 500 and SPED 432/SPED 532

SPED 640 Applied Behavior Analysis: Concepts and Principles (3 Credit Hours)

This course focuses on the concepts and principles of applied behavior analysis; identification of factors that increase or decrease the probability of behavior under specific circumstances.

Prerequisites: Permission of the instructor

SPED 641 Applied Behavior Analysis: Empirical Bases (3 Credit Hours)

Applications of single-case experimental research designs to the analysis of behavior with emphasis on measurement, visual display of data, and interpretation of results.

Pre- or corequisite: SPED 640 or permission of the instructor

SPED 642 Ethics and Professional Conduct for Behavior Analysts (3 Credit Hours)

This course provides a basis in Virginia Behavior Analyst Licensure law, the Behavior Analyst Certification Board's Ethics Code for Behavior Analysts, disciplinary systems, and professional conduct consistent with the practice of applied behavior analysis.

Prerequisites: SPED 640 or permission of the instructor

SPED 643 Applied Behavior Analysis: Assessments and Interventions (3 Credit Hours)

Identification and assessment of problem behavior and socially-appropriate behaviors, implementation of function-based intervention plans, and design of environments to prevent and address problem behavior.

Prerequisites: SPED 640 or permission of the instructor

SPED 644 Applied Behavior Analysis: Applications (3 Credit Hours)

Application of concepts and principles of behavior analysis to a wide range of populations, settings, and behaviors within the context of more sophisticated clinical and professional issues and environments.

Prerequisites: SPED 640, SPED 641, and SPED 643 or consent of the instructor

Pre- or corequisite: SPED 643

SPED 645 Applied Behavior Analysis: Verbal Behavior (3 Credit Hours)

B.F. Skinner's analysis of verbal behavior and the design, development, and implementation of curriculum, language and communication interventions for individuals with language delays.

Prerequisites: SPED 643 or permission of the instructor

SPED 646 Applied Behavior Analysis: Personnel Supervision and Management (3 Credit Hours)

Application of behavior analytic principles and procedures to personnel supervision and management as well as implementation of evidence-based practices to provide effective supervision to enhance personnel performance across a variety of organizational settings.

Prerequisites: Admission to the Applied Behavior Analysis Certificate Program; completion of SPED 640 and SPED 641

SPED 668 Advanced Teacher Candidate Internship for Special Endorsement (9 Credit Hours)

This course provides supervised classroom experiences in settings serving students with disabilities. Enrolled students work collaboratively with classroom teachers to create and implement instructional plans targeting diverse learning needs. Total internship requirement is comprised of 7.5 weeks at the elementary level and 7.5 weeks at the middle/secondary level.

Prerequisites: Admission to ODU Teacher Education Program; completion of the approved teacher education program in the specific endorsement area; departmental approval; passing scores on Praxis Core Academic Skills for Educator Tests (or equivalent as prescribed by the Virginia Board of Education); passing scores on Virginia Communication and Literacy Assessment (VCLA) and the Reading for Virginia Educators (RVE- General Curriculum only); and the endorsement program exit exam

SPED 669 Directed Field Internship Special Education, PreK-12 (3 Credit Hours)

The course provides supervised involvement in a practicum setting where the student and the instructor work together closely to develop curricula and gain expertise in teaching specific topics of importance to special educators. 50 hours per credit.

SPED 670 Transition and Community-Based Instruction (3 Credit Hours)

This course provides an overview of the role of special educators in preparing students with severe disabilities for post-secondary vocational, residential, educational, community, and recreational settings. Emphasis is placed on developing appropriate curricula, involving students and their families in planning, implementing and evaluating transition programs, and helping students to access the services needed to be successful in adult life.

Prerequisites: SPED 400/SPED 500

SPED 671 Positive Behavior Supports (3 Credit Hours)

This course is designed specifically for teachers and other professionals working with individuals who have moderate to severe disabilities, including autism, or with young children who have disabilities. It is required for endorsement in Adapted Curriculum and Early Childhood Special Education. The primary focus is upon the concepts and skills needed (a) to design, implement, and evaluate individualized behavior support programs which derive from functional behavioral assessment, (b) to use effective teaching strategies to build relevant replacement skills, (c) to facilitate generalization and maintenance of skills, (d) to incorporate prevention strategies, (e) to improve the aspects of the student's environment that relate to the problem behavior, and (d) to incorporate, as appropriate, individually designed crisis intervention procedures

Prerequisites: SPED 400/SPED 500 and passing scores on the Praxis Core Academic Skills for Education Tests

SPED 672 IEP, Assessment & Program Planning for Adapted Curriculum (3 Credit Hours)

This course is designed to develop knowledge and skills about best special education practice in assessment and evaluation for students with severe disabilities, and IEP and educational program planning for those preparing to teach K-12 students with disabilities in the adapted curriculum. Field experience required.

Prerequisites: SPED 400 or SPED 500 and passing scores on the Praxis Core Academic Skills for Education Tests

SPED 673 Communication and Severe Disabilities (3 Credit Hours)

This course introduces professionals to augmentative and alternative communication (AAC) for individuals with severe speech and language impairments. It addresses the knowledge and skills that are needed to assess the potential AAC user, to make team decisions, to develop and implement instruction, and to evaluate the effects of instruction. The course is also aimed at motivating, building, and expanding communication, choice-making, and social interaction.

Prerequisites: SPED 400/SPED 500

SPED 674 Characteristics of Students with Severe Disabilities (3 Credit Hours)

Examines the academic, social, medical and behavioral characteristics of individuals with severe disabilities such as intellectual disability, autism, traumatic brain injury, and severe/multiple cognitive, physical and/or sensory disabilities. Focuses on etiology, contributing factors, impact on life and family, the challenges of identifying students with disabilities, and the need for intensive instruction, accommodations, and support.

Prerequisites: SPED 400/SPED 500

SPED 675 Foundations of Language and Literacy for Diverse Learners (3 Credit Hours)

This course provides an understanding of the development of emergent and early literacy in developmentally-typical learners and learners with complex language and learning needs, as well as the inter-relationship of language and literacy development. Emphasis will be placed on identifying effective research-based strategies for promoting and enhancing emergent literacy and early reading and writing skills for children and youth with language and intellectual disabilities and English language learners with disabilities. Field experience is required: course participants must identify an appropriate target student and engage in observation and assessment activities with that student and his/her family during the first half of the course. Final product includes the development of a literacy development plan for the student.

Prerequisites: SPED 400/SPED 500 and passing scores on the Praxis Core Academic Skills for Education Tests

SPED 676 Curriculum and Methods-Severe Disabilities (3 Credit Hours)

This course focuses on current best practices in curriculum and methods for students with severe disabilities, including specific strategies for teaching students with severe disabilities, general strategies for working with heterogeneous groups of students in inclusive settings, and methods for adapting the general education curriculum to include students with severe disabilities.

Prerequisites: SPED 400/SPED 500 and passing scores on the Praxis Core Academic Skills for Education Tests

SPED 677 Consultation and Collaboration (3 Credit Hours)

This course provides professionals in special education, regular education, and related fields with knowledge and communications skills necessary for collaborative consultation and technical assistance to other educators and service providers.

Prerequisites: SPED 400/SPED 500

SPED 678 Individualized Supports and Specialized Care of Students with Significant Disabilities (3 Credit Hours)

Provides an understanding of the unique physical, sensory, communication, and health and medical needs of students with significant disabilities, how these needs impact the educational program, how special education and related services are delivered, and how to design academic, functional and behavioral instruction and adaptations to meet those needs.

Prerequisites: SPED 400/SPED 500

SPED 686 Teacher Candidate Internship for Special Endorsement (3 Credit Hours)

Seven weeks will be completed at the elementary level and seven weeks will be completed at the middle/secondary level.

Prerequisites: admission to ODU Teacher Education Program; completion of the approved teacher education program in the specific endorsement area; departmental approval

SPED 695 Topics in Special Education (3 Credit Hours)

This course offers selected topics designed to permit small groups of qualified students to work on subjects of mutual interest in the special education field.

Prerequisites: Permission of Instructor

SPED 697 Independent Study (3 Credit Hours)

Independent study of special topics in special education for graduate students.

Prerequisites: Permission of Instructor

SPED 698 Research Project (1 Credit Hour)

This capstone seminar is one of the culminating assessments for the master's degree in education with a major in advanced special education. Students will design, develop, and deliver an evidence-based professional development program that is aligned with their concentrations. As a culminating activity, this project will reflect the synthesis of coursework, research, and practical experience as these program aspects relate to the needs of school divisions and the education of students from diverse backgrounds.

SPED 701 Historical and Contemporary Research in Special Education (3 Credit Hours)

This course covers contemporary and historical topics related to problem issues in special education. This is a course of study that will enable participants to examine various topics in special education and research a position on an issue.

SPED 702 Cognitive Processes and Learning Strategies for Students with Special Needs (3 Credit Hours)

The intent of this course is to provide an overview of research and critical issues relative to the cognitive and affective development of individuals with disabilities. Research-based interventions that address deficits of cognitive processes will be discussed and specific learning strategies will be presented.

SPED 707 Advanced Instructional Procedures in Special Education (3 Credit Hours)

This course provides students with advanced skills in educational planning, development, and implementation for students with learning problems.

Techniques focus on inclusive and self-contained classroom arrangements.

Prerequisites: graduate standing

SPED 720 Curriculum and Instruction: Research Into Practice (3 Credit Hours)

This course provides an overview of research methods employed in the field of special education. Current trends related to curriculum and instruction in general and special education will be investigated. Strategies and procedures for identifying learner characteristics and application of that knowledge will be included. Implementation of quality curricular modifications and/or instructional accommodations for students with diverse needs in a variety of educational settings and evaluation of instruction will be addressed.

Prerequisites: SPED 400/SPED 500 or SPED 701/SPED 801

SPED 730 Single Subject Research (3 Credit Hours)

Single Subject Research.

SPED 740 Concepts and Principles in Behavior Analysis (3 Credit Hours)

This course focuses on the basic concepts and principles of behavior analysis and the identification of factors that increase or decrease the probability of behavior under specific circumstances.

Prerequisites: Admission to ODU Applied Behavior Analysis Certificate program

SPED 741 Research Methods in Behavior Analysis (3 Credit Hours)

Applications of single-case experimental research designs to the analysis of behavior, with emphasis on measurement, visual display of data, and interpretation, intervention and plan evaluation, and research ethics.

Prerequisites: Admission to Applied Behavior Analysis Certificate Program and completion of SPED 740 or consent of the instructor

SPED 742 Ethics in Behavior Analysis (3 Credit Hours)

This course provides a basis in Virginia Behavior Analyst Licensure law, the Behavior Analyst Certification Board's Ethical and Professional Issues including ethics codes and requirements, the BACB's code-enforcement mechanisms, and professionalism relevant to the delivery of behavior-analytic services.

Prerequisites: Admission to the Old Dominion University Applied Behavior Analysis Program and completion of SPED 740 or consent of the instructor

SPED 743 Assessments and Interventions I: Positive Behavior Support (3 Credit Hours)

This course focuses on the identification and assessment of problem behavior and socially appropriate behaviors, the development, implementation, and evaluation of function-based intervention plans, and the design of environments to prevent and address problem behavior.

Prerequisites: Admission to the Applied Behavior Analysis Certificate Program; successful completion of SPED 740 and SPED 741 or consent of the instructor

SPED 744 Theory and Philosophy in Behavior Analysis (3 Credit Hours)

This course focuses on the underlying theoretical and philosophical foundations of behavior analysis. A special emphasis will be placed on radical, contextual, and methodological behaviorism and their historical roots. Applications to behavior-analytic problem solving and case conceptualization in applied settings will be discussed.

Prerequisites: Admission to ODU Applied Behavior Analysis Certificate program and completion of SPED 740 or consent of the instructor

SPED 745 Assessments and Interventions II: Verbal Behavior (3 Credit Hours)

This course focuses on B. F. Skinner's analysis of verbal behavior, assessment of verbal behavior, and the development, implementation, and evaluation of interventions to enhance the communicative repertoire of individuals with complex communication needs.

Prerequisites: Admission to Old Dominion University Applied Behavior Analysis graduate program; successful completion of SPED 740, SPED 741, and SPED 743, or permission of instructor

SPED 746 Organizational Behavior Management (3 Credit Hours)

Application of behavior-analytic principles and procedures to personnel supervision and management as well as implementation of evidence-based practices to provide effective supervision and to enhance personnel performance across a variety of organizational settings.

Prerequisites: Admission to ODU Applied Behavior Analysis Certificate Program and completion of SPED 740 and SPED 741 or consent of instructor

SPED 769 Supervised Fieldwork in Applied Behavior Analysis (3 Credit Hours)

Supervised fieldwork experiences that apply University-approved coursework to instruction of children, youth, and their families in the natural environment. As stated in the BCBA Experience Standards, the purpose of supervised fieldwork experiences is to improve and maintain the behavior analytic, professional, and ethical repertoires of the supervisee and facilitate the delivery of high quality services to clients. Students can enroll in supervised fieldwork hours concurrently with the ODU ABA certificate approved sequence coursework.

Prerequisites: Admission to the ODU ABA certificate program and permission of advisor

SPED 797 Independent Study (3 Credit Hours)

Independent study of special topics in special education for advanced graduate, or doctoral students.

Prerequisites: Permission of Instructor

SPED 801 Historical and Contemporary Research in Special Education (3 Credit Hours)

This course covers contemporary and historical topics related to problem issues in special education. This is a course of study that will enable participants to examine various topics in special education and research a position on an issue.

SPED 802 Cognitive Processes and Learning Strategies for Students with Special Needs (3 Credit Hours)

The intent of this course is to provide an overview of research and critical issues relative to the cognitive and affective development of individuals with disabilities. Research-based interventions that address deficits of cognitive processes will be discussed and specific learning strategies will be presented.

SPED 803 Scholarly Writing for Doctoral Students (3 Credit Hours)

This course targets the knowledge and skills required to successfully engage in scholarly writing. Specific course topics include, the use of the American Psychological Association Publication Manual (APA) to guide the basic elements of style (i.e., creating and writing from an outline, manuscript organization, sentence and paragraph construction, marks of punctuation, use of quotations, use of references, bias free language, editing and revising, proofreading, revising drafts, and resubmission), and the development of professional writing skills, such as drafting, writing, editing, revising, responding to reviews, interpreting and synthesizing professional journal articles.

SPED 807 Advanced Instructional Procedures in Special Education (3 Credit Hours)

This course provides students with advanced skills in educational planning, development, and implementation for students with learning problems.

Techniques focus on inclusive and self-contained classroom arrangements.

Prerequisites: graduate standing

SPED 815 Alternative Strategies for Elementary Students: Prevention and Intervention (3 Credit Hours)

The intent of this course is to provide pre-service and in-service teachers with the knowledge and skill to collaborate with other professionals to identify and remediate students who are at-risk for school problems due to academic challenges and/or behavior, and to effectively support students with identified mild disabilities in general education classrooms. The course focuses on developing proactive pre-referral interventions and working with general educators to develop and implement effective interventions, accommodations, modifications and supports for students with mild difficulties in general education classes.

Prerequisites: SPED 400/SPED 500, SPED 415/SPED 515, and passing scores on Praxis I or equivalent as prescribed by the Virginia Board of Education

SPED 820 Curriculum and Instruction: Research Into Practice (3 Credit Hours)

This course provides an overview of research methods employed in the field of special education. Current trends related to curriculum and instruction in general and special education will be investigated. Strategies and procedures for identifying learner characteristics and application of that knowledge will be included. Implementation of quality curricular modifications and/or instructional accommodations for students with diverse needs in a variety of educational settings and evaluation of instruction will be addressed.

Prerequisites: SPED 400/SPED 500 or SPED 701/SPED 801

SPED 821 Critical Issues I: Readings in Special Education and Professional Writing (3 Credit Hours)

The intent of this course is to provide doctoral candidates the opportunity to further advance their research and professional writing skills and critically evaluate the quality and empirical evidence of critical and timely topics in special education by conducting systematic literature reviews and meta-analysis of published studies. The course stresses APA writing guidelines and style, conducting literature searches, and writing a product that is suitable for publication.

SPED 822 Critical Issues II: Research and Professional Writing (3 Credit Hours)

This course provides doctoral candidates an opportunity to (a) become familiar with reading, analyzing, synthesizing, and writing research related to their personal professional interests to contribute to the literature, (b) acquire skills related to developing original research, and (c) develop proposals, presentations, and other scholarly skills necessary for promotion and tenure in higher education and professional institutions. Emphasis is placed on the critical analysis of research and synthesis of the literature that identifies research gaps, and the design of a prospective study or dissertation proposal to examine the topic of interest.

Prerequisites: SPED 821

SPED 830 Single Subject Research (3 Credit Hours)

Single Subject Research.

SPED 868 Internship: Research in Special Education (3 Credit Hours)

This course provides doctoral students the opportunity to design and conduct an independent pilot research study in their area of interest under the guidance of a faculty member while refining their research skills. The successful completion of a 3-credit internship is required to fulfill the research competency of the program.

Prerequisites: SPED 830 and FOUN 812

SPED 893 Professional Seminar: Teaching, Research, and Service (3 Credit Hours)

This course prepares doctoral candidates to meet professional standards in teaching, research and service in special education in higher education institutions. Teaching includes an understanding of adult learning and the design, delivery, evaluation of content, and use of technology in college teaching. Research includes recognizing and critically discussing scholarly work, systematically planning and preparing for research, and developing research proposals. Service includes identifying professional organizations and agencies and creating integrated professional development programs. The course is designed to build skills necessary for advancement in higher education and professional institutions.

Prerequisites: SPED 821 and SPED 822

SPED 897 Independent Study: Teaching in Special Education (3 Credit Hours)

This course provides doctoral students the opportunity to teach an undergraduate or graduate-level course in special education using various delivery formats such as in-person, synchronous online, or asynchronous online while gaining experiences in teaching at the university level. The successful completion of this course is required to fulfill the teaching competency of the program.

Prerequisites: Co-teaching the course under the supervision of a faculty member; Permission of instructor

SPED 899 Dissertation (1-12 Credit Hours)

Dissertation.

Prerequisites: Successful defense of prospectus and admission to candidacy

SPED 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

SPED 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

STAT - Statistics

STAT 505 Introduction to Data Handling (3 Credit Hours)

This course will introduce SAS and R, two of the most widely used statistical software packages. This course will cover the basic skills needed for using computer packages to perform a variety of statistical analyses. Topics include data import/export, manipulation, descriptive statistics and visualization, advanced data handling, and the use of statistical computer packages for categorical data analysis, regression analysis, hypothesis testing, and more.

Prerequisites: A grade of C or better in STAT 130M or equivalent, and a grade of C or better in MATH 316 or equivalent, or permission of the instructor

STAT 531 Theory of Statistics (3 Credit Hours)

Topics include point and interval estimation, tests of hypotheses, introduction to linear models, likelihood techniques, and regression and correlation analysis.

Prerequisites: A grade of C or better in STAT 331 or permission of the instructor

STAT 532 Sampling Theory (3 Credit Hours)

Sampling from finite populations is discussed. Topics such as simple random sampling, stratified random sampling and ratio and regression estimation are included. Also discussed are aspects of systematic sampling, cluster sampling, and multi-stage sampling.

Prerequisites: A grade of C or better in STAT 431/STAT 531

STAT 535 Design and Analysis of Experiments (3 Credit Hours)

Topics include introduction to design of experiments, analysis of variance with a single factor, power and OC curves, and two factors with interactions, random effects models, randomized blocks, Latin square and related designs, introduction to factorial and 2k factorial designs. Statistical software will be used to analyze real life data.

Prerequisites: STAT 431/STAT 531 or STAT 437/STAT 537

Pre- or corequisite: STAT 405/STAT 505

STAT 537 Applied Regression and Time Series Analysis (3 Credit Hours)

Topics include introduction to regression and model building, simple linear regression, multiple regression, logistic regression, and simple time series, residual analysis, selection of variables, model adequacy checking, regression on dummy variables, analysis of covariance, regression analysis of time series data, and applications of these techniques to real life data using statistical software.

Prerequisites: A grade of C or better in STAT 531

Pre- or corequisite: STAT 405 or STAT 505

STAT 540 Clinical Trials (3 Credit Hours)

This course will introduce basic statistical concepts and methods used in clinical trials. Topics include phase-I trial designs including 3+3 and CRM dose-finding designs; phase-II trial designs including Gehan's two-stage and Simon's two-stage designs; phase-III trial designs including parallel, group allocation, cross-over, and factorial designs; randomization; sample size and power calculation; adaptive trials; and monitoring of trials for safety and efficacy.

Prerequisites: A grade of C or better in STAT 431 or STAT 531

STAT 542 Environmental Statistics (3 Credit Hours)

Topics include nonlinear and generalized linear models, quantitative risk assessment, analysis of stimulus-response and spatially correlated data, methods of combining data from several independent studies. Regression settings are emphasized where one or more predictor variables are used to make inferences on an outcome variable of interest. Applications include modeling growth inhibition of organisms exposed to environmental toxins, spatial associations of like species, risk estimation, and spatial prediction. SAS is used extensively in the course.

Prerequisites: A grade of C or better in STAT 431 or STAT 531; STAT 437 or STAT 537 recommended

STAT 547 Analysis of Longitudinal Data (3 Credit Hours)

This course introduces statistical methods for analyzing multivariate and longitudinal data. Topics include multivariate normal distribution, covariance modeling, multivariate linear models, principal components, analysis of continuous response repeated measures, and models for discrete longitudinal data. Emphasis will be on the applications to the biological and health sciences and the use of the statistical software.

Prerequisites: A grade of C or better in STAT 431 or STAT 531

Pre- or corequisite: STAT 405 OR STAT 505

STAT 549 Nonparametric Statistics (3 Credit Hours)

Topics include statistical functionals, bootstrap and jackknife techniques, elements of U-statistics, nonparametric tests (including permutation and rank tests), time-to-event analysis, nonparametric density estimation, nonparametric smoothing, regression analysis, and inference. R and/or Python software will be used for computations.

Prerequisites: A grade of C or better in STAT 330 or STAT 331 or departmental permission

STAT 550 Categorical Data Analysis (3 Credit Hours)

Topics include types of categorical data, relative risk and odds ratio measures for 2 x 2 tables, the chi-square and Mantel-Haenszel tests, Fisher's exact test, analysis of sets of 2 x 2 tables using Cochran-Mantel-Haenszel methodology, analysis of I x J and sets of I x J tables for both nominal and ordinal data, logistic regression including the logit and probit models. Emphasis will be on the application of these statistical tools to data related to the health and social sciences. Interpretation of computer output will be stressed.

Prerequisites: A grade of C or better in STAT 431 or STAT 531

Pre- or corequisite: STAT 405 or STAT 505

STAT 597 Topics in Statistics (1-3 Credit Hours)

The advanced study of selected topics.

Prerequisites: permission of the instructor

STAT 603 Probability Models for Data Science and Analytics (3 Credit Hours)

This course will serve as an introduction for modeling data using probability and statistical methods. Topics include basic concepts of probability, Bayes theorem, frequently-occurring discrete and continuous probability distributions, as well as how to simulate data from these distributions. Basic properties of the probability distributions will be discussed, which will provide an insight into the use of these distributions in data science. R and/or Python will be the computation software used in class. This course is open only for students enrolled in the M.S. degree program in Data Science and Analytics.

Prerequisites: STAT 330 or equivalent or permission of the instructor

STAT 604 Statistical Tools for Data Science and Analytics (3 Credit Hours)

This course will cover statistical tools for data exploration. Topics taught include descriptive statistics, correlation, confidence intervals, linear and logistic regressions, t-test for one and two samples, and analysis of variance. For analyzing categorical data, students will study contingency tables, odds ratios for measuring association, and chi-square tests for testing independence. The course will also introduce principal components and clustering methods to analyze multivariate data. R and/or Python software for computing various statistics for real data analysis will be used. This course is open only for students enrolled in the M.S. degree program in Data Science and Analytics.

Prerequisites: STAT 603 or equivalent or permission of the instructor

STAT 613 Applied Statistical Methods I (3 Credit Hours)

Intended for graduate students in all academic disciplines; not available for credit to graduate students in the Department of Mathematics and Statistics. Topics include descriptive statistics, probability computations, estimation, hypothesis testing, linear regression, analysis of variance and categorical data analysis. Emphasis will be on statistical analysis of data arising in a research setting. The rationale for selecting methods to address research questions will be emphasized. Examples will be given from the health sciences, social sciences, engineering, education and other application areas.

Prerequisites: A grade of C or better in STAT 130M or STAT 330 or MATH 211 or permission of the instructor

STAT 625 Probability Theory for Data Science (3 Credit Hours)

An introduction to probability. Topics include axiomatic foundations of probability, conditional probability, Bayes formula, random variables, density and mass functions, stochastic independence, expectation, moment generating functions, transformations, common families of distributions, multiple random variables, covariance and correlation, multivariate distributions, convergence concepts, law of large numbers, limit theorems.

Prerequisites: A grade of C+ or better in STAT 531

STAT 626 Statistical Theory for Data Science (3 Credit Hours)

An introduction to statistical inference. Principles of data reduction, sufficiency, completeness, ancillary, likelihood principle, point estimation, method of moments, maximum likelihood and Bayes estimation, Cramer-Rao inequality, hypothesis testing, likelihood ratio tests, Bayesian tests, most powerful tests, Neyman-Pearson Lemma, interval estimates, pivotal quantities, asymptotic evaluations, consistency and asymptotic relative efficiency.

Prerequisites: A grade of C+ or better in STAT 625

STAT 630 Time Series Models (3 Credit Hours)

This course examines the principles and concepts of time series and forecasting. Study includes theory, methods, and model parameter estimation taking into account correlation and autocorrelation structures with data applications from pollution, economics, seasonal trends, and the stock market. Notions of autoregressive, moving, average, stationary and nonstationary ARIMA models will be discussed. The multivariate version and state-space models will also be introduced. Simulation of time series data will be discussed in depth.

Prerequisites: STAT 626, STAT 505, and STAT 537

STAT 632 Master's Project (3 Credit Hours)

Under the guidance of a faculty member in the Department of Mathematics and Statistics, the student will undertake a significant data analysis problem in a scientific setting outside the department. A written report and/or public presentation of results will be required.

Prerequisites: permission of graduate program director

STAT 635 Statistical Consulting (3 Credit Hours)

This course is intended to teach statistical consulting techniques to graduate students in statistics. Students are expected to work on statistical consulting problems brought by faculty and graduate students in various fields.

Prerequisites: STAT 626

STAT 637 Advanced Regression and Time Series (3 Credit Hours)

Topics include theory of least squares regression, multiple linear regression (including its matrix formulation), transformations and weighting, diagnostics for leverage and influence, polynomial and indicator regression model, multi-collinearity, variable selection and model building, validation of regression models, introduction to nonlinear regression, robust regression, regression for time series data, and applications of these techniques using statistical software.

Prerequisites: STAT 437/STAT 537

Pre- or corequisite: STAT 405/STAT 505

STAT 638 Advanced Design and Analysis of Experiments (3 Credit Hours)

Topics include blocking and confounding in factorial designs, power, balanced incomplete block designs, fractional factorial designs, factors with mixed levels, response surface methods and designs, Latin and Graeco-Latin square designs, optimality criterion, examples of optimal designs, experiments with random factors, nested and split-plot designs, analysis of covariance, robust designs. Statistical software will be used to analyze real life data.

Prerequisites: STAT 435/STAT 535 or STAT 437/STAT 537 or STAT 637

STAT 640 Survival Analysis (3 Credit Hours)

This course introduces basic concepts and methods for analyzing survival time data obtained from following individuals until occurrence of an event or their loss to follow-up. Topics include survival and hazard functions, censoring, Kaplan-Meier estimation, log-rank and related tests, Cox proportional hazards model, and the extended Cox model for time-varying covariates, and parametric models. Both SAS and R software will be used to analyze survival data.

Prerequisites: STAT 626

STAT 660 Advanced Programming in R (3 Credit Hours)

This course is intended to develop the ability to perform statistical computing using R statistical software. The course will cover programming topics (vectorization, data input and output, data manipulation, and building R packages), statistical and computational methods (visualization, optimization, simulation, and resampling), and direct integration and dynamic reporting using R markdown. Additionally, this course will include the use of high-performance computing resources at Old Dominion University. This is a finishing course for statisticians and professionals willing to pursue a career in statistical programming and simulation.

Prerequisites: A grade of C or better in STAT 505 and two of STAT 535, STAT 537, STAT 547 and STAT 550

STAT 667 Cooperative Education (1-3 Credit Hours)

Student participation for credit based on academic relevance of the work experience, criteria, and evaluative procedures as formally determined by the department and the cooperative education program prior to the semester in which the work experience is to take place.

STAT 697 Topics in Statistics (1-3 Credit Hours)

Advanced study of selected topics.

Prerequisites: permission of the instructor

STAT 725 Linear Statistical Models (3 Credit Hours)

Topics include the multivariate normal distribution, distributions of quadratic forms, the general linear model, estimability, the Gauss-Markov theorem and general linear hypotheses, analysis of variance (ANOVA) and covariance (ANCOVA) with special attention to unbalanced data, and analysis of mixed effects and variance components models including repeated measures and split-plot designs.

Prerequisites: STAT 626

STAT 727 Advanced Statistical Inference I (3 Credit Hours)

Topics to be covered include introduction to measure theoretic probability, properties of group and exponential families, sufficiency, unbiasedness, equivariance, properties of estimators, large sample theory, maximum likelihood estimation, EM algorithm, information inequality, asymptotic optimality.

Prerequisites: A grade of C+ or higher in MATH 517 and STAT 626

STAT 728 Advanced Statistical Inference II (3 Credit Hours)

Topics to be covered include convergence concepts, limit theorems, large sample theory, asymptotic distributions, decision theory, minimax, admissibility, Bayes estimates, generalized Neyman-Pearson Lemma, uniformly most powerful tests, unbiased tests, invariant tests, and Bayesian tests.

Prerequisites: A grade of C+ or higher in STAT 727 or STAT 827

STAT 730 Multivariate Statistics (3 Credit Hours)

Topics include the multivariate normal distribution, graphical display of multivariate data and tests for normality, Hotelling's T², multivariate analysis of variance (MANOVA) and regression, profile analysis, growth curve models, canonical correlation analysis, principal components, factor models, clustering, and discriminant analysis. All methods are implemented using the SAS statistical software.

Prerequisites: STAT 537 or STAT 725/STAT 825

STAT 740 Advanced Clinical Trials (3 Credit Hours)

This course will discuss sequential and adaptive designs for clinical trials; the statistical properties and challenges these designs engender; and the advantages and disadvantages of utilizing sequential and adaptive designs compared to a standard, fixed-sample design.

Prerequisites: STAT 440 or STAT 540

STAT 747 Advanced Analysis of Longitudinal Data (3 Credit Hours)

Topics include general linear models, weighted least squares (WLS), maximum likelihood (ML), restricted maximum likelihood (REML) methods of estimation, analysis of continuous response repeated measures data, parametric models for covariance structure, generalized estimating equations (GEE) for discrete longitudinal data, marginal, random effects, and transition models. Limitations of existing approaches will be discussed. Emphasis will be on the application of these tools to data related to the biological and health sciences. Methods will be implemented using statistical software.

Prerequisites: STAT 447/STAT 547

STAT 749 Advanced Nonparametric Statistics (3 Credit Hours)

Topics include multivariate nonparametric tests, multivariate nonparametric density estimation, kernel regression and reproducing kernel Hilbert spaces, generalized additive models, multivariate adaptive regression splines, nonparametric model selection, projection pursuit regression, and Bayesian nonparametric methods, including mixture models, Dirichlet process, and stick-breaking construction. Examples of R and/or Python package usage will be provided.

Prerequisites: STAT 449/STAT 549

STAT 750 Advanced Categorical Data Analysis (3 Credit Hours)

This course will cover statistical models and methods appropriate for analyzing categorical responses, contingency tables, Pearson Chi-square test, Fisher's Exact test, Mantel-Haenszel test, Cochran-Armitage trend test, independence and conditional independence, Simpson's paradox, generalized linear models, logistic and Poisson regression models, matched paired studies, McNemar test, conditional logistic regression model and random effects logistic model for data from matched paired studies, models for multinomial data.

Prerequisites: STAT 450/STAT 550

STAT 795 Seminar in Statistics (1-3 Credit Hours)

Seminar.

Prerequisites: permission of the instructor

STAT 797 Topics in Statistics (1-3 Credit Hours)

Advanced study of selected topics.

Prerequisites: Permission of the instructor

STAT 825 Linear Statistical Models (3 Credit Hours)

Topics include the multivariate normal distribution, distributions of quadratic forms, the general linear model, estimability, the Gauss-Markov theorem and general linear hypotheses, analysis of variance (ANOVA) and covariance (ANCOVA) with special attention to unbalanced data, and analysis of mixed effects and variance components models including repeated measures and split-plot designs.

Prerequisites: STAT 626

STAT 827 Advanced Statistical Inference I (3 Credit Hours)

Topics to be covered include introduction to measure theoretic probability, properties of group and exponential families, sufficiency, unbiasedness, equivariance, properties of estimators, large sample theory, maximum likelihood estimation, EM algorithm, information inequality, asymptotic optimality.

Prerequisites: A grade of C+ or higher in MATH 517 and STAT 626

STAT 828 Advanced Statistical Inference II (3 Credit Hours)

Topics to be covered include convergence concepts, limit theorems, large sample theory, asymptotic distributions, decision theory, minimax, admissibility, Bayes estimates, generalized Neyman-Pearson Lemma, uniformly most powerful tests, unbiased tests, invariant tests, and Bayesian tests.

Prerequisites: A grade of C+ or higher in STAT 727 or STAT 827

STAT 830 Multivariate Statistics (3 Credit Hours)

Topics include the multivariate normal distribution, graphical display of multivariate data and tests for normality, Hotelling's T², multivariate analysis of variance (MANOVA) and regression, profile analysis, growth curve models, canonical correlation analysis, principal components, factor models, clustering, and discriminant analysis. All methods are implemented using the SAS statistical software.

Prerequisites: STAT 537 or STAT 725/STAT 825

STAT 840 Advanced Clinical Trials (3 Credit Hours)

This course will discuss sequential and adaptive designs for clinical trials; the statistical properties and challenges these designs engender; and the advantages and disadvantages of utilizing sequential and adaptive designs compared to a standard, fixed-sample design.

Prerequisites: STAT 440/STAT 540

STAT 847 Advanced Analysis of Longitudinal Data (3 Credit Hours)

Topics include general linear models, weighted least squares (WLS), maximum likelihood (ML), restricted maximum likelihood (REML) methods of estimation, analysis of continuous response repeated measures data, parametric models for covariance structure, generalized estimating equations (GEE) for discrete longitudinal data, marginal, random effects, and transition models. Limitations of existing approaches will be discussed. Emphasis will be on the application of these tools to data related to the biological and health sciences. Methods will be implemented using statistical software.

Prerequisites: STAT 447/STAT 547

STAT 849 Advanced Nonparametric Statistics (3 Credit Hours)

Topics include multivariate nonparametric tests, multivariate nonparametric density estimation, kernel regression and reproducing kernel Hilbert spaces, generalized additive models, multivariate adaptive regression splines, nonparametric model selection, projection pursuit regression, and Bayesian nonparametric methods, including mixture models, Dirichlet process, and stick-breaking construction. Examples of R and/or Python package usage will be provided.

Prerequisites: STAT 449/STAT 549

STAT 850 Advanced Categorical Data Analysis (3 Credit Hours)

This course will cover statistical models and methods appropriate for analyzing categorical responses, contingency tables, Pearson Chi-square test, Fisher's Exact test, Mantel-Haenszel test, Cochran-Armitage trend test, independence and conditional independence, Simpson's paradox, generalized linear models, logistic and Poisson regression models, matched paired studies, McNemar test, conditional logistic regression model and random effects logistic model for data from matched paired studies, models for multinomial data.

Prerequisites: STAT 450/STAT 550

STAT 895 Seminar in Statistics (1-3 Credit Hours)

Seminar.

Prerequisites: permission of the instructor

STAT 897 Topics in Statistics (1-3 Credit Hours)**STAT 898 Research (1-9 Credit Hours)****STAT 899 Dissertation (1-9 Credit Hours)****STAT 999 Doctoral Graduate Credit (1 Credit Hour)**

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

STEM - Science, Technology, Engineering, and Mathematics Education

STEM 533 Developing Instructional Strategies PreK-6: Mathematics (3 Credit Hours)

Following a theory into practice philosophy, students explore, develop, and use instructional strategies, materials, technologies, and activities to promote children's development of attitudes, behaviors, and concepts in mathematics in grades PreK-6 in support of NCTM national instructional standards and the Virginia Standards of Learning.

Prerequisites: TLED 617

STEM 534 Developing Instructional Strategies PreK-6: Science (3 Credit Hours)

Following a theory into practice philosophy, students explore, develop, and use instructional strategies, materials, technologies, and activities to promote children's development of attitudes, behaviors, and concepts in science in grades PreK-6 in support of AAAS national instructional standards and the Virginia Standards of Learning.

STEM 595 Topics (1-3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule.

STEM 655 Culturally Responsive Classroom (3 Credit Hours)

This course will focus on the following elements of effective teaching practice: understanding discipline specific content and methods, employing best-practice strategies to teach discipline specific skills and concepts, assessing student learning, legal and safety issues, use of technology, issues of diversity, engagement with the community, and strategies for continuing to grow as a teacher and learner.

STEM 720 STEM Educational Foundations (3 Credit Hours)

A multidisciplinary course designed to provide insights about the fundamental concepts and basis for STEM education programs. Standards for the school subjects of science, technology, engineering education and mathematics literacy will be reviewed. Connections between these subjects will be explored.

STEM 721 Science, Technology, Engineering, and Mathematics Connection and Integration (3 Credit Hours)

A course designed to teach how to plan integrated STEM curriculum and instructional materials. A review of projects that have undertaken STEM integration will be made. Students will learn how to map STEM content and then design STEM integrated curriculum and instructional materials.

Prerequisites: STEM 720 or STEM 820

STEM 730 Introduction to Technology (3 Credit Hours)

Order and structure the discipline of technology by identifying and analyzing the component parts and examining technical means as critical variables in the affairs of humankind. Based on the Standards for Technological Literacy.

STEM 731 Technical Systems (3 Credit Hours)

Analyze the technical concepts common and unique to the technical systems of technology.

STEM 732 Program Development for Technology Education (3 Credit Hours)

Plan and develop effective program in technology related activities. Focus is on identification and development of resources, activities, and materials for classroom programs.

STEM 795 Topics (1-3 Credit Hours)

Topics.

STEM 820 STEM Educational Foundations (3 Credit Hours)

A multidisciplinary course designed to provide insights about the fundamental concepts and basis for STEM education programs. Standards for the school subjects of science, technology, engineering education and mathematics literacy will be reviewed. Connections between these subjects will be explored.

STEM 821 Science, Technology, Engineering, and Mathematics Connection and Integration (3 Credit Hours)

A course designed to teach how to plan integrated STEM curriculum and instructional materials. A review of projects that have undertaken STEM integration will be made. Students will learn how to map STEM content and then design STEM integrated curriculum and instructional materials.

Prerequisites: STEM 720 or STEM 820

STEM 830 Introduction to Technology (3 Credit Hours)

Order and structure the discipline of technology by identifying and analyzing the component parts and examining technical means as critical variables in the affairs of humankind. Based on the Standards for Technological Literacy.

STEM 831 Technical Systems (3 Credit Hours)

Analyze the technical concepts common and unique to the technical systems of technology.

STEM 832 Program Development for Technology Education (3 Credit Hours)

Plan and develop effective program in technology related activities. Focus is on identification and development of resources, activities, and materials for classroom programs.

STEM 895 Topics (3 Credit Hours)

Topics.

TAX - Taxation

TAX 650 Tax Strategies for Business Decisions (3 Credit Hours)

An intensive course in taxation. Focuses on the choice of business entity by covering taxation of corporations (both C and S corporations), partnerships and sole proprietor-ships. The course emphasizes research skills and professional ethics.

TAX 651 Taxation of Corporations I (3 Credit Hours)

Covers federal income taxation of corporations and shareholders. Includes organizing a corporation; establishing capital structure; determining tax liability; dividends and other non-liquidating distributions; stock redemptions; and liquidations.

Prerequisites: ACCT 521 or equivalent

TAX 652 Taxation of Partners and Partnerships (3 Credit Hours)

Taxation of partners and partnerships: formation, termination, distributions and liquidations, and sales of partnership interests. Limited partnerships in conjunction with their use as tax shelters, and the multifaceted attributes of family partnerships.

Prerequisites: ACCT 521 or equivalent

TAX 653 Taxation of Estates and Gifts (3 Credit Hours)

Examines transfers under federal estate and gift tax laws. Includes property owned by the decedent; retained life estates; transfers taking effect at death; transfers with retained powers; concurrent property interest; powers of appointment; valuation problems; expenses, debts, and taxes; charitable bequests; marital deduction; taxable inter vivos gifts; gift splitting and credits; consideration of Chapter 14 and asset freezing techniques; and transfer taxation of life insurance.

Prerequisites: ACCT 521 or equivalent

TAX 654 Income Taxation of Estates, Trusts & Beneficiaries (3 Credit Hours)

Examines simple, complex, and revocable trusts; trusts accumulation distributions; income in respect of decedents; trust accounting income; distributable net income; terminations; excess deductions; basis rules; and the decedent's final income tax return.

Prerequisites: TAX 653

TAX 655 Taxation of Corporations II (3 Credit Hours)

Analyzes the different types of taxable and tax-free acquisitions and reorganizations. Includes determining tax consequences for corporations and shareholders involved in an acquisition or reorganization and analyzing necessary requirements for a tax-free corporate division (spin-off). Covers aspects of filing consolidated federal income tax returns.

Prerequisites: TAX 651

TAX 656 Taxation of Deferred Compensation (3 Credit Hours)

Discusses federal income taxation of deferred compensation plans with emphasis on qualified retirement plans. Reviews plan qualification requirements, reporting and disclosure requirements, and distribution rules. Includes discussion of specific types of plans such as Sec. 401(K) and ESOPs.

Prerequisites: TAX 651

TAX 657 State and Local Taxation (3 Credit Hours)

Examines state levying of individual income, corporate income, property, sales, and excise taxes.

Prerequisites: ACCT 521 or equivalent

TAX 658 Tax Aspects of International Business (3 Credit Hours)

Taxation of foreign persons conducting business in the U.S. including FIRPTA, source of income rules, and residency requirements; taxation of U.S. individuals and businesses doing business abroad including FSCs, CFCs, FHP Co's and possessions corporations.

Prerequisites: ACCT 521 or equivalent

TAX 660 Taxation of Property Transactions (3 Credit Hours)

Covers determination of realized and recognized gains and losses and their tax treatment on property dispositions. Includes consequences of property transactions, such as depreciation, depletion, basis and capital gains problems.

Prerequisites: ACCT 521 or equivalent

TAX 661 Taxation of the Small Business Corporation (3 Credit Hours)

Covers federal income taxation of S corporations including election eligibility; termination of status; treatment of income and deduction items; distributions; and basis of stock and debt. Also discusses compensation arrangements in closely held corporations; fiscal year issues; personal service corporations; the advantages of C corporations versus S corporations; corporation liquidation and redemption rules; and the S corporations' built-in gains tax.

Prerequisites: ACCT 521 or equivalent

TAX 662 Tax Procedure and Practice (3 Credit Hours)

Discusses procedures for dealing with the IRS. Includes sources of IRS policy; processing returns; auditing returns; rulings and determination letters; assessments and collections; and interest and civil penalties.

Prerequisites: ACCT 521 or equivalent

TAX 695 Selected Topics in Taxation (3 Credit Hours)

Examines the unique rules applicable to federal taxation of farmers and ranchers. Also, covers the basics on the new Limited Liability Company and Virginia law on LLCs. Topics may vary each year.

Prerequisites: ACCT 521 or equivalent and approval of the chair and graduate program director of the School of Accountancy

TAX 697 Independent Study (3 Credit Hours)

Individually supervised research projects in selected tax areas. Approval of supervising professor as to topic and evaluation of project required at time of registration.

Prerequisites: ACCT 521 or equivalent and approval of instructor

THEA - Theatre

THEA 542 Principles of Directing (3 Credit Hours)

An examination and practical application of principles of stage direction as influenced by play script, acting talent, set and lighting design, and the technical facilities of production organizations.

THEA 543 Acting Three (3 Credit Hours)

An advanced scene study class exploring issues of style and period pertinent to portraying characters on stage.

Prerequisites: THEA 152, THEA 252 or permission of instructor

THEA 545 Experimental Theatre (3 Credit Hours)

An in-depth study of avant-garde theatre scripts and performance techniques from 1900 to the present.

Prerequisites: THEA 230 or permission of instructor

THEA 549 Script and Performance Analysis (3 Credit Hours)

Approaches script and performance analysis by examining the separate elements of action, character, language, music, spectacle or "mise en scene" in order to discover play spine and style as a basis for staging the play. Also examines the method of "scoring a role" or finding character motivations in relation to overall play spine.

THEA 552 Acting Four (3 Credit Hours)

An advanced scene study class exploring issues of style and period pertinent to portraying characters on stage.

THEA 571 International Film History (3 Credit Hours)

An examination of world cinema as a technology, a business, an institution, and an art form from its inception to the present. Emphasis is on the narrative fiction film, its technological and aesthetic development, economic organization, and socio-cultural context. Representative classic and contemporary works will be screened and analyzed.

THEA 579 American Film History (3 Credit Hours)

An examination of American motion pictures as an art form, a business and an institution from its inception to the present. Primary attention is accorded to the narrative fiction film, its aesthetic and technological development, economic organization and social impact. This course highlights the many connections between film history and American culture.

THEA 580 The Video Documentary II (3 Credit Hours)

A production/studio course designed to complement the work developed in Theatre 380: The Video Documentary I. Discussion/presentation topics range from production field work to post-production editing. The final third of the semester will be devoted to compiling the rough footage in post production.

THEA 586 Advanced Filmmaking (3 Credit Hours)

This course offers students an opportunity to collaborate on a faculty led project beyond the scope of typical classroom projects. Students will execute an assigned duty for the duration of the semester.

THEA 595 Topics in Theatre (1-3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule and will be more fully described by academic advisors.

THEA 596 Topics in Theatre (1-3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule and will be more fully described by academic advisors.

THEA 597 Tutorial Work in Special Topics in Theatre (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

THEA 598 Tutorial Work in Special Topics in Theatre (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

THEA 697 Tutorial Work in Special Topics in Theatre (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: graduate standing and approval of the department chair

THEA 698 Tutorial Work in Special Topics in Theatre (1-3 Credit Hours)

Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate.

Prerequisites: graduate standing and approval of the department chair

TLCI - Teaching & Learning - Curriculum & Instruction

TLCI 668 Internship in Curriculum and Instruction (3 Credit Hours)

Designed in consultation with advisor to provide in-depth experience in a school or community setting in which to enact a guided project on a topic of interest.

TLCI 700 Social/Emotional Aspects of Child Development (3 Credit Hours)

The emphasis of this course is on the theoretical approaches to the social/emotional development of the child that include the psychodynamic, humanistic, cognitive, behavioral, and social learning models as applied to responsive practices that promote the healthy emotional wellbeing of children.

TLCI 702 Historical and Contemporary Perspectives on Education (3 Credit Hours)

The present educational system, its social impact and future implications are viewed in historical, philosophical, and sociological perspectives. Special attention is given to technology, research, multicultural education/equity and leadership.

TLCI 703 Theoretical Perspectives in Curriculum and Instruction (3 Credit Hours)

This course introduces a range of theoretical perspectives and epistemologies in the field of curriculum and instruction. Students will gain strategies for critical reading, scholarly writing, and identify areas for prospective inquiry.

TLCI 704 Instruction Theories and Models (3 Credit Hours)

Students will investigate a range of instructional theories and design theories in terms of learning domains and pedagogical approaches to the teaching/learning process in a variety of educational settings. Students will utilize a systematic design process grounded in theories and research to propose/develop instruction for specific learning goals related to their own professional situations.

TLCI 705 Critical Issues in Curriculum Research (3 Credit Hours)

Explores the relationship between the historical, philosophical, and sociopolitical influence on curriculum development and evaluation. Historical and cultural approaches to designing and implementing curricular models, curriculum reform, and understanding the politics of conceptualizing the curriculum process are highlighted. Major issues concerning educational curriculum reform are addressed and reviewed.

Prerequisites: graduate standing

TLCI 722 Curriculum Seminar in Content Areas (3 Credit Hours)

Investigates the role and nature of the curriculum for particular subject-matter specialties - e.g., math, social studies, science, English, school librarianship, reading, etc. Objectives are tailored to specific content areas.

Prerequisites: graduate standing

TLCI 726 Advanced Supervision of Reading Programs (3 Credit Hours)

Explores various models of supervision and relates them to the administration and supervision of reading programs. Also prepares the prospective administrator/supervisor to make decisions relative to the methods and materials used to teach reading.

TLCI 727 Advanced Practicum in Reading (3 Credit Hours)

This course is designed for teachers having completed the initial reading practicum. Its focus is on the refinement and further exploration of ways to work with students experiencing reading difficulties. Both group and individual tutoring experiences will be provided. Ways will be explored to encourage involvement in existing educational programs and schools.

TLCI 728 Contemporary Issues in Literacy Research (3 Credit Hours)

Directed study of current topics of interest to students involved in literacy research. Topics to include emergent literacy assessment, adult literacy programs, and other areas of investigation. Students will be required to prepare a scholarly paper reporting results for publication.

Prerequisites: M.S.Ed. in Reading Education

TLCI 731 Instructional Technology Trends in Curriculum and Instruction (3 Credit Hours)

Examines selected issues and trends involving the use of technology in curriculum and instruction. Students develop a critical awareness of contemporary technology, an understanding of current research regarding the successful implementation of technology in curriculum and instruction, and strategies for using new technology in the future.

TLCI 735 Participatory Research: Theory and Methods (3 Credit Hours)

This course will explore theoretical and methodological orientations towards conducting research with youth and adults. Students will focus on ethical, political, and pedagogical considerations that arise in employing participatory practices, explore methods for listening and representing participant voice, and consider implications for policy and practice

TLCI 736 Reconceptualizing Theory and Practice for Work with Children and Families (3 Credit Hours)

This graduate seminar explores post-structural theories as they relate to understandings about young children, families, and education. The focus is on intersections of race, class, gender, and age as potential constructs of how thought and action are organized and the political, historical, and economic contexts that contribute to such discourses. Students will consider theory, research and practices in readings, discussions and class assignments.

TLCI 740 Contemporary Perspectives in Early Literacy (3 Credit Hours)

This graduate seminar explores perspectives on early literacy that draw from sociocultural, postmodern, and post-structural theories. Viewing literacy as a social practice, students will explore children's literacy with an emphasis on children's agency and their roles as active producers of meaning. Students will be asked to critically examine early literacy research and practice to contribute to rich understandings of diverse learning needs across social, economic, and multilingual contexts.

TLCI 741 Change Issues in Curriculum and Instruction (3 Credit Hours)

Explores questions and issues related to the evolving nature of curriculum and instruction and the design of the contemporary curriculum. Through readings and projects, students will examine new discoveries in research and technology, the effect of these and other changes on education, and the challenges of life-long learning as an influence on change.

Prerequisites: graduate standing

TLCI 788 Seminar in the Multicultural Environment (3 Credit Hours)

Explores topics related to the cultural characteristics of ethnically diverse populations and how these diverse populations and characteristics interact with social, political and economic institutions and the dominant culture to create the contemporary environment.

TLCI 795 Topics in Education (1-3 Credit Hours)

Provides opportunities for doctoral students to explore topics related to curriculum, instructional strategies, and evaluation.

TLCI 797 Independent Study (1-3 Credit Hours)

Hours to be arranged. Provides opportunities for the doctoral student to do independent research in an area of his/her particular interests and needs.

TLCI 800 Social/Emotional Aspects of Child Development (3 Credit Hours)

The emphasis of this course is on the theoretical approaches to the social/emotional development of the child that include the psychodynamic, humanistic, cognitive, behavioral, and social learning models as applied to responsive practices that promote the healthy emotional wellbeing of children.

TLCI 802 Historical and Contemporary Perspectives on Education (3 Credit Hours)

The present educational system, its social impact and future implications are viewed in historical, philosophical, and sociological perspectives. Special attention is given to technology, research, multicultural education/equity and leadership.

TLCI 803 Theoretical Perspectives in Curriculum and Instruction (3 Credit Hours)

This course introduces a range of theoretical perspectives and epistemologies in the field of curriculum and instruction. Students will gain strategies for critical reading, scholarly writing, and identify areas for prospective inquiry.

TLCI 804 Instruction Theories and Models (3 Credit Hours)

Students will investigate a range of instructional theories and design theories in terms of learning domains and pedagogical approaches to the teaching/learning process in a variety of educational settings. Students will utilize a systematic design process grounded in theories and research to propose/develop instruction for specific learning goals related to their own professional situations.

TLCI 805 Critical Issues in Curriculum Research (3 Credit Hours)

Explores the relationship between the historical, philosophical, and sociopolitical influence on curriculum development and evaluation. Historical and cultural approaches to designing and implementing curricular models, curriculum reform, and understanding the politics of conceptualizing the curriculum process are highlighted. Major issues concerning educational curriculum reform are addressed and reviewed.

Prerequisites: graduate standing

TLCI 808 Critical Sociocultural Theories of Learning (3 Credit Hours)

This course will establish a theoretical lens by which students will understand learning as socially and culturally constituted and apply this foundation to literacy acquisition and learning.

Prerequisites: Admission to the Curriculum and Instruction doctoral program

TLCI 809 Youth Ideology, Culture and Education (3 Credit Hours)

This course will draw on sociocultural perspectives to provide an empirical, historical, and theoretical examination of issues that impact youth in societies characterized by structural inequalities. These inequalities may be based on class, race, ethnicity, and sexual/gendered relations of dominance and subordination. Exploration through various texts from several academic disciplines will enable course participants to analyze the intersection of education, social change, and youth development in the contexts of self-discovery, identity, culture, belonging, citizenship, participation, and activism.

TLCI 814 Qualitative Research Design in Education (3 Credit Hours)

This course concentrates on the theoretical underpinnings of qualitative research, methodology and methods including identification of ways to collect and analyze qualitative data; examination of ethical issues; development of proposals; and writing up studies.

TLCI 815 Advanced Qualitative Research (3 Credit Hours)

This advanced qualitative course is an introduction to emerging research approaches and alternative data collection methods and analyses in education, counseling and other related disciplines. Content addressed includes visual and audio research, historical movements in qualitative research, critical theory, feminism, queer theory, ethnomethodology, autoethnography, content analysis, and mixed methods research.

Prerequisites: TLCI 814

TLCI 817 Mixed Methods Research in Education (3 Credit Hours)

This course will provide an overview of mixed methods research, with an emphasis on its application in education. The course will begin with a discussion of the history and philosophy of mixed methods research, and will maintain a focus on the epistemological underpinnings of both mixed methods designs and their component parts. Consideration will be given to a number of research traditions that can be subsumed under the general headings of 'quantitative' and 'qualitative' methods, including surveys, in-depth qualitative interviewing, ethnography, and social network analysis. Methods for collecting, analyzing, integrating, and reporting data from multiple sources will be discussed. The course will have an applied focus and will include lectures, presentations of applied mixed methods research by guest experts, applied and methodological readings, and student presentations.

Prerequisites: FOUN 812 and TLCI 814

TLCI 828 Contemporary Issues in Literacy Research (3 Credit Hours)

Directed study of current topics of interest to students involved in literacy research. Topics to include emergent literacy assessment, adult literacy programs, and other areas of investigation. Students will be required to prepare a scholarly paper reporting results for publication.

Prerequisites: M.S.Ed. in Reading Education

TLCI 830 Contemporary Research and Critical Issues in STEM Education (3 Credit Hours)

This course is designed to provide disciplinary and interdisciplinary overviews of STEM issues and trends that will help graduate students construct their own theoretical foundations and practical understanding of STEM education. In the course, students will discuss a wide range of current issues, movements, and research-supported practices in STEM education in K-16 classrooms as well as informal education settings. Students will learn about the research paradigms guiding STEM education research with a critical analysis of those most utilized across contemporary STEM education research fields.

TLCI 831 Instructional Technology Trends in Curriculum and Instruction (3 Credit Hours)

Examines selected issues and trends involving the use of technology in curriculum and instruction. Students develop a critical awareness of contemporary technology, an understanding of current research regarding the successful implementation of technology in curriculum and instruction, and strategies for using new technology in the future.

TLCI 835 Participatory Research: Theory and Methods (3 Credit Hours)

This course will explore theoretical and methodological orientations towards conducting research with youth and adults. Students will focus on ethical, political, and pedagogical considerations that arise in employing participatory practices, explore methods for listening and representing participant voice, and consider implications for policy and practice

TLCI 836 Reconceptualizing Theory and Practice for Work with Children and Families (3 Credit Hours)

This graduate seminar explores post-structural theories as they relate to understandings about young children, families, and education. The focus is on intersections of race, class, gender, and age as potential constructs of how thought and action are organized and the political, historical, and economic contexts that contribute to such discourses. Students will consider theory, research and practices in readings, discussions and class assignments.

TLCI 840 Contemporary Perspectives in Early Literacy (3 Credit Hours)

This graduate seminar explores perspectives on early literacy that draw from sociocultural, postmodern, and post-structural theories. Viewing literacy as a social practice, students will explore children's literacy with an emphasis on children's agency and their roles as active producers of meaning. Students will be asked to critically examine early literacy research and practice to contribute to rich understandings of diverse learning needs across social, economic, and multilingual contexts.

Pre- or corequisite: TLCI 740

TLCI 845 Concepts and Contexts in School Librarianship (3 Credit Hours)

Will introduce candidates to the broad landscape of school librarianship and its relationship to the greater library and information profession. Includes a critical examination of benchmarks and key concepts tied to literacies, information science, and technical innovation.

TLCI 861 Ethnographic Research and Narrative & Historical Research Methods and Design (3 Credit Hours)

In this advanced qualitative research course, students will focus on ethnographic methods such as ethnography, ethnomethodology, and autoethnomethodology. Students will also learn about participatory research methods. The course will examine narrative and historical research approaches including biography and autobiography.

Prerequisites: TLCI 815

TLCI 862 Critical and Indigenous Research Methods and Design (3 Credit Hours)

In this advanced qualitative methods course, students will explore readings related to critical and indigenous research, methodologies and paradigms as well as engage in activities to decolonize traditional research approaches with specific groups. This course refers to indigenous peoples as individuals and groups belonging to developing or underdeveloped regions nationally or internationally.

Prerequisites: TLCI 815

TLCI 863 Emerging Qualitative Research Methods (3 Credit Hours)

This advanced qualitative research course examines emerging and lesser known qualitative research methods such as self-study, portraiture, arts-based research, photovoice, rhizomatic analysis and critical policy analysis.

Prerequisites: TLCI 815

TLCI 864 Case Study, Grounded Theory, & Phenomenological Research Methods & Design (3 Credit Hours)

This advanced qualitative research course examines the intricacies of case study methods. It also delves into the various qualitative research methods surrounding experience and theory formation such as Grounded Theory, Phenomenology, Heuristic Inquiry and Consensual Qualitative Research.

Prerequisites: TLCI 815

TLCI 865 Independent Qualitative Research (3 Credit Hours)

This capstone course involves the student developing and completing an original qualitative research project independent from the dissertation.

Prerequisites: TLCI 815

TLCI 868 Internship: Early Childhood (3 Credit Hours)

Independent research study allows the student to explore a topic of interest under the close supervision of a faculty member. The coursework may include directed readings, applied independent investigations - collaboration with a faculty member with a research project or carrying out an independent research project - and other activities deemed appropriate including grant proposal writing or programmatic evaluation work. Regardless of the nature of the experience, the work must culminate in a formal paper suitable for inclusion in a published research manuscript.

TLCI 875 Research and Practice in Teacher Education (3 Credit Hours)

This course provides experiences that examine the theoretical and practical foundations of research and practice in teacher education. The course explores various facets of field- and university-based teacher education practices, which include but are not limited to school-university partnerships, mentor teaching and supervision of teacher candidates, and teaching education coursework. Students also consider the development of teacher educator identity, the benefits of collaborative inquiry, and research methods used to investigate teacher education learning and practice.

TLCI 876 Grant Writing (3 Credit Hours)

This course provides students with an applied introduction to proposal and grant writing. Doctoral students who successfully complete the course will be prepared to seek external funding to support their continuing graduate studies and to support their future success as academics.

TLCI 888 Seminar in the Multicultural Environment (3 Credit Hours)

Explores topics related to the cultural characteristics of ethnically diverse populations and how these diverse populations and characteristics interact with social, political and economic institutions and the dominant culture to create the contemporary environment.

TLCI 890 Seminar in Academic Writing (3 Credit Hours)

This course provides a guide through the process of academic writing, following practices for manuscript publication and dissertation writing. Peer feedback and individualized writing are hallmarks of the course. This course provides students with the knowledge and skills to become better academic writers through practice of successful strategies and habits related to the writing process as well as examinations of exemplars.

TLCI 895 Topics in Education (1-3 Credit Hours)

Provides opportunities for doctoral students to explore topics related to curriculum, instructional strategies, and evaluation.

TLCI 897 Independent Study (1-3 Credit Hours)

Hours to be arranged. Provides opportunities for the doctoral student to do independent research in an area of his/her particular interests and needs.

TLCI 899 Dissertation (1-12 Credit Hours)

Preparation of dissertation.

Prerequisites: graduate standing, successful completion of candidacy exam and permission of the instructor

TLCI 999 Doctoral Graduate Credit (1 Credit Hour)

This course is a pass/fail course doctoral students may take to maintain active status after successfully passing the candidacy examination. All doctoral students are required to be registered for at least one graduate credit hour every semester until their graduation.

TLED - Teaching & Learning-Education

TLED 532 Developing Instructional Strategies PreK-6: Language Arts (3 Credit Hours)

Following a theory into practice philosophy, students explore, develop, and use instructional strategies, materials, technologies, and activities to promote children's development of attitudes, behaviors, and concepts in language arts in grades PreK-6 in support of NCTE national instructional standards and the Virginia Standards of Learning.

Prerequisites: a grade of C or higher in TLED 617 and TLED 468/TLED 568

TLED 535 Developing Instructional Strategies PreK-6: Social Studies (3 Credit Hours)

Following a theory into practice philosophy, students explore, develop, and use instructional strategies, materials, technologies, and activities to promote children's development of attitudes, behaviors, and concepts in social studies in grades PreK-6 in support of NCSS national instructional standards and the Virginia Standards of Learning.

Prerequisites: TLED 617

TLED 551 Developing Instructional Strategies for Teaching in the Middle/High School: English (3 Credit Hours)

Following a theory/research-into-practice philosophy, students explore, develop, and use instructional strategies, materials, technologies, and activities to promote the development of attitudes, behaviors, and concepts in English, grades 6-12, informed by national instructional standards and the Virginia Standards of Learning; 35 hours of teaching practicum required.

Prerequisites: TLED 608 or TLED 636, IDT 618, a criminal background check, acceptance into teacher education, no grade less than C- in content area and professional education core, minimum major and overall GPA of at least 3.0

Corequisites: TLED 583

TLED 552 Developing Instructional Strategies for Teaching in Middle/High School: Math and Science (3 Credit Hours)

This science and mathematics course will provide methods for teaching diverse learners through culturally sustaining pedagogy, inquiry-oriented, and problem solving strategies using technology and engineering design principles. Students in this course take a required practicum (35 hours) in a secondary science or mathematics classroom to complete assigned content-focused activities.

Prerequisites: TLED 608 or TLED 636, and IDT 618

Corequisites: TLED 583

TLED 555 Developing Instructional Strategies for Teaching in the Middle/High School: Social Studies (3 Credit Hours)

Following a theory/research-into-practice philosophy, students explore, develop, and use instructional strategies, materials, technologies, and activities to promote the development of attitudes, behaviors, and concepts in social studies, grades 6-12, informed by national instructional standards and the Virginia Standards of Learning; 35 hours of teaching practicum required.

Prerequisites: TLED 608 or TLED 636, IDT 618, a criminal background check, acceptance into teacher education, no grade less than C- in content area and professional education core, minimum major and overall GPA of at least 3.0

Corequisites: TLED 583

TLED 568 Language Acquisition and Reading for Students with Diverse Learning Needs (3 Credit Hours)

This course provides an overview of normal language development and language disorders which impact the acquisition of language based curriculum skills such as listening, speaking, reading, and written expression. Emphasis is on instructional techniques to assist students with diverse learning needs to achieve reading and comprehension skills. Effective reading strategies and curricula for individuals with disabilities will also be reviewed.

TLED 574 Foundations and Contemporary Issues in Early Childhood Education (3 Credit Hours)

This course addresses current issues related to children and families in early childhood settings. Contemporary research on pedagogical and formative assessment practices related to the education of young children will be discussed through critical exploration. This course will also have an associated 40 hour practicum (20 hours in an infant or toddler classroom and 20 hours in a preschool age classroom).

TLED 578 Integrating Instruction Across the Curriculum PreK-6 (3 Credit Hours)

Following a theory into practice philosophy and building on the instructional strategies for specific disciplines, students explore, develop, and use advanced instructional materials, technologies, and activities to promote interdisciplinary and multidisciplinary instruction across the curriculum in grades PreK-6 in support of national standards and the Virginia Standards of Learning. The field experience component (40 hours) includes participation in preK-3 and 4th-6th grade classrooms in an accredited public or non-public school, per program requirement.

Prerequisites: TLED 301 or TLED 290, passing scores on PRAXIS Core or met equivalent scores as established by VA Board of Education, a criminal background check, acceptance into teacher education, no grade less than C in content area and professional education core, minimum major overall GPA of at least 3.0 and at least two of the following: TLED 532, TLED 535, STEM 533, and STEM 534

TLED 579 Classroom Management and Practice PreK-3; PreK-6 (3 Credit Hours)

Course prepares prospective PreK-3 and PreK-6 teachers to provide instruction and management addressing the intellectual, physical, emotional and social needs of PreK-6 learners founded in empirically based practice. The field based component (70 hours) includes participation in PreK-3 and 4th-6th grade classrooms in an accredited public or non-public school. Students in the PreK-3 program are required to complete 35 hours in the Children's Learning and Research Center. Attendance at seminars and debriefing sessions is required.

Prerequisites: TLED 301, passing scores on Praxis Core or met equivalent scores as established by VA Board of Education, a criminal background check, acceptance into teacher education, no grade less than C in content area and professional education core, minimum major and overall GPA of at least 2.8 and at least two of the following courses: TLED 432 or TLED 532, TLED 435 or TLED 535, TLED 478 or TLED 578, STEM 433 or STEM 533, STEM 434 or STEM 534

TLED 580 Multicultural Young Adult Literature in Schools (3 Credit Hours)

This course will explore the reading and teaching of diverse young adult literature. Topics addressed include ideas about adolescents and their learning practices; characteristics of young adult literature and literary criticism; analysis of texts from a range of young adult genres; methods for teaching young adult literature; and lesson and unit design.

TLED 583 Seminar in Teacher Education (1 Credit Hour)

This course explores issues, problems, concerns, and processes related to teaching and entering the profession of teaching. Passing score on Elementary Education Multiple Subjects Assessment in licensure content area, and where appropriate passing scores on Reading for Virginia Educators are required to pass this course.

Prerequisites: admitted to approved teacher education program

TLED 586 Student Teaching for Special Endorsement (3-6 Credit Hours)

Internship in school. Available for pass/fail grading only.

Prerequisites: Collegiate Professional Certificate and/or completion of an approved program in teacher education, passing scores on the Praxis Core examination or equivalent SAT or ACT scores as established by VA Board of Education, passing scores on the appropriate Praxis II content examination, passing score on the Virginia Communication and Literacy Assessment, departmental approval, permission of the director of teacher education services, meet grade requirement in the specific content area and professional education core, minimum major and overall GPA of at least 3.0, and a criminal background check

TLED 595 Topics in Education (1-4 Credit Hours)

Explores contemporary problems and trends in education. Emphasis is placed upon topics related to curriculum, instructional strategies, and evaluation.

Prerequisites: graduate standing

TLED 596 Topics in Education (1-3 Credit Hours)

Cannot be applied to a Master of Science in Education degree in the Department of Teaching and Learning. Explores contemporary problems and trends in education. Emphasis is placed upon topics related to curriculum, instructional strategies, and evaluation.

Prerequisites: graduate standing

TLED 597 Independent Study (1-3 Credit Hours)

Hours to be arranged. Allows the student to engage in independent study of issues and trends in education. Emphasis is placed upon topics related to curriculum, instructional strategies, and evaluation.

Prerequisites: graduate standing

TLED 608 Foundations of Education and Instructional Assessment (3 Credit Hours)

Provides students with an understanding of historical, philosophical, economic, and sociological issues in American education, their effect on student achievement, and the impact of social change on existing institutions. Includes the development of instruction based on assessment data including the use, construction, interpretation, and analysis of valid assessments. A 30-hour observation/participation experience is required in an appropriate prek-6, 6-8, or 6-12 grade level.

Prerequisites: graduate standing

TLED 614 Arts in Education (3 Credit Hours)

This course is designed to provide students with a range of approaches for thinking about the arts in education, with specific emphasis on the visual arts. It assumes that life in the 21st century calls for competencies that are critical, flexible, collaborative, and relational and forwards artistic thinking as complementary to this need. In addition to course readings that explore cognitive, developmental, cultural, and social dimensions of art and learning, students will be asked to participate in activities associated with making and viewing art, as well as consider implications for designing K-12 curriculum.

TLED 615 Teaching in the Middle School (4 Credit Hours)

Focusing on middle school teaching, this course examines the organization, curriculum, instructional strategies, classroom management techniques, and teaching methods for working with young adolescents. Also covered are middle school guidance, exploratories, scheduling, and parent-school relations. A 30-hour practicum in a middle school is required.

Prerequisites: Graduate standing

TLED 618 Assessment and Evaluation in PK-12 Schools (3 Credit Hours)

This course will prepare teachers for the appropriate use of formative and summative assessment and evaluation principles in support of students' learning and development. Students will learn to analyze assessment data to evaluate reliability and validity, interpret student performance, and make instructional decisions.

TLED 620 Education and Public Policy (3 Credit Hours)

This course is designed to provide students with an understanding of the political nature of education and its implications for teaching and learning. Students will be expected to critically consider the development and implementation of formal policies designed to improve education in U.S. schools. To do so, students will consider historical and contemporary trends in educational theory and research to situate current policies and practices in our nation's schools, with a clear focus on understanding the range and scope of policy dilemmas in the public pre-K-12 sector of education.

TLED 621 Foundations and History of Education (3 Credit Hours)

This seminar explores foundational ideas of democratic education. While focusing on the contexts and conditions of contemporary education, it traces the roots of educational theory and philosophy from the formation of the common school to the policy reforms of the 21st century. This look at the present through the past provides insight into the interactions between social, economic, political, ideological, and environmental factors and its impact on the purposes of education, school curriculum and ideas of measurement and evaluation. Students will be expected to consider the implications of/ for democratic education, historically and presently, as it relates to issues of race, class, gender, and multiculturalism.

TLED 623 Introduction to the Contemporary Student (3 Credit Hours)

The course is designed to explore contemporary youth as learners with multiple dimensions of identity, including cultural and linguistic diversity. Topics explored include physical, social, emotional, language and conceptual development; digital and print production and consumption; and the selection, development, and use of appropriate curricula, methodologies, and materials for the contemporary student. The course includes a practicum experience (20 hours) as well.

TLED 626 Teaching Language, Culture, and Society in Elementary Education (3 Credit Hours)

This course will provide methods for teaching diverse learners through culturally sustaining pedagogy, effective methods for designing instructional strategies and materials for teaching social studies and language arts in the elementary grades. Students in this course take a corequisite practicum (40 hours) in elementary classrooms to complete assigned activities designed to further practical development.

TLED 627 Classroom Management, Discipline, and Practice (3 Credit Hours)

This course prepares prospective PreK-3 and PreK-6 teachers to provide instruction and management addressing the intellectual, physical, emotional and social needs of PreK-6 learners founded in empirically based practice. The field based component (40 hours) includes participation in PreK-3 and 4th-6th grade classrooms in an accredited public or non-public school setting.

TLED 628 Middle Level Philosophy, School Organization and the Young Adolescent (3 Credit Hours)

This course focuses on theories and principles of adolescent development and learning in family, school, and community contexts. Candidates examine adolescents from biological, psychological, cognitive, and social perspectives. This includes how adolescents learn and what motivates them to learn, and how schools contribute to adolescents' growth by teaching in ways that "fit" their developmental and cultural needs.

TLED 630 Develop and Enhancing Literacy with Culturally and Linguistically Diverse Learner Across Content Areas (3 Credit Hours)

This course focuses on the development and implementation of strategies that will accommodate how language and cultural differences affect communication and learning; knowledge of the impact of language-based curriculum skills such as listening, speaking, reading, and writing; instructional techniques needed to assist individuals identified as culturally, linguistically, and academically diverse in achieving reading and comprehension skills; comprehension strategies; and an understanding of reading across the disciplines.

TLED 631 Classroom Based Inquiry (3 Credit Hours)

This course is designed to integrate the research on effective teaching and learning with theory and practice through the lens of democratic education. As an introductory survey course, the focus will be on developing the competencies related to the critical consumption of research literature in order to further the teacher candidates' understanding of the physical, social, emotional, speech and language and intellectual development of children.

TLED 632 Multicultural Education (3 Credit Hours)

This course will explore critical multicultural education situated within culturally sustaining pedagogical practices to explore issues related to race, ethnicity, class, gender, sexuality, religion, power, and language use; however, this course is not about a celebration of difference, but is designed to enable students to investigate how socially constructed categories such as social class, race, gender, sexual orientation, and disability are used to privilege some and marginalize others.

TLED 633 Middle Level Instruction and Assessment (3 Credit Hours)

This course will provide opportunities to examine the theoretical and practical applications of data-driven decision making, assessments, and curriculum planning for middle level educators. Students will consider adolescent development as well as student behaviors to analyze standards and effectively plan instruction and assessment. Further, students will apply principles of culturally sustaining pedagogy to middle school instruction and assessment planning and practices.

TLED 636 Problems in Education (3 Credit Hours)

This course focuses on historical, philosophical, and sociological foundations underlying the role, development, and organization of public education in the United States. Attention is given to the legal status of teachers and students, including federal and state laws and regulations; school as an organization and culture; and contemporary issues and current trends in education, including the impact of technology on education. The role of the teacher is highlighted in this course, including professionalism, ethical standards, and personal integrity as well as Virginia's Guidelines for Uniform Performance Standards and Evaluation Criteria for Teachers. A 30-hour observation/participation experience is required in an appropriate grade level classroom.

TLED 638 Researching Teaching in Elementary and Secondary Grades (3 Credit Hours)

In this course, students will learn the processes of reflective inquiry and conduct informal inquiries of the teaching and learning dynamic in preK-12 school settings. Activities include explorations of professional biography school and classroom culture and practice, student demographics, curriculum, and other critical components of teaching and learning.

Prerequisites: graduate standing

TLED 639 Seminar in Education (3 Credit Hours)

Hours to be arranged. Explores in depth a variety of current topics, trends and concerns in K-12 education.

Prerequisites: 15 graduate hours in education, including all core courses

TLED 640 The Management of Learning and Instruction (3 Credit Hours)

This course explores classroom and behavior management techniques including teacher-student relationships, rules and procedures, and disciplinary interventions. Emphasis is placed on building a diverse repertoire of approaches to classroom management at the individual and classroom level. Candidates will develop a classroom management plan that includes techniques for engaging families.

TLED 643 Introduction to the Contemporary Student (3 Credit Hours)

The course is designed to be an exploration of contemporary youth as learners situated in/by many identities, including those aspects of self related to cultural and linguistic diversity. Among the subjects to be explored are: physical, social, emotional, language and conceptual development; digital and print production and consumption; and the selection, development, and use of appropriate curricula, methodologies, and materials for the contemporary student.

TLED 646 Classroom Based Inquiry (3 Credit Hours)

This course is designed to integrate the research on effective teaching and learning with theory and practice through the lens of democratic education. As an introductory survey course, the focus will be on developing the competencies related to the critical consumption of research literature in order to further the candidates' understanding of the physical, social, emotional, speech and language and intellectual development of children. Diverse approaches based upon culturally responsive behavioral, cognitive, affective, social, and ecological theory and practice will be utilized in guiding the learning experience of the course.

TLED 647 Education and Public Policy (3 Credit Hours)

This course is designed to provide students with an understanding of the political nature of education and its implications for teaching and learning. Students will be expected to critically consider the development and implementation of formal policies designed to improve education in US schools. To do so, students will consider historical and contemporary trends in educational theory and research to situate current policies and practices in our nation's schools, with a clear focus on understanding the range and scope of policy dilemmas in the public pre-K–12 sector of education.

TLED 650 Mathematics Specialists as Teacher Leaders (3 Credit Hours)

The critical characteristics and responsibilities of Mathematics Specialists as teacher leaders will be explored. Structuring professional learning for classroom teachers through peer coaching, mentoring, observations, conferencing and relational group learning will be explored for developing teacher leadership capacity.

TLED 651 Teaching Mathematics for All Using Culturally Responsive Approaches (3 Credit Hours)

Adapting the mathematics teaching and learning practices to accommodate diverse populations will be explored. The essential knowledge and understanding needed by mathematics specialists to support classroom teachers to effectively utilize culturally responsive pedagogies to differentiate instruction and support all learners.

TLED 653 Participatory Action Research for Mathematics Specialists (3 Credit Hours)

Participatory Action Research is introduced to conduct community, school, or classroom-based research for improving mathematics learning and teaching.

TLED 654 Practicum for Mathematics Specialists (3 Credit Hours)

This course requires candidates to complete a 150-hour practicum that is designed to provide opportunities and learning experiences to refine and reinforce mathematical and leadership skills, understandings, and dispositions for optimal performance as a Mathematics Specialist.

Pre- or corequisite: TLED 650

TLED 658 Mathematical Assessment for Data Driven Decisions (3 Credit Hours)

Selected key differences between assessment for and of learning will be examined. Students will design quality assessment systems that provide numerical and descriptive information about student learning and explore ways to use these data to drive instructional decisions for improved learning.

TLED 666 Internship/Student Teaching and Seminar (9 Credit Hours)

Five days per week for 14 weeks. Available for pass/fail grading only. Provides practice in teaching in grades 6-8 and in analyzing teaching approaches and behaviors. Examines instructional problems and concerns. **Prerequisites:** completion of an approved program in teacher education, 6-8, passing scores on PRAXIS I or equivalent SAT or ACT scores as established by VA State Board of Education, passing scores on the appropriate PRAXIS II content examination, departmental approval, permission of the director of teacher education services, no grade less than C- in content area and professional education core, minimum major and overall GPA of at least 2.75

TLED 667 Internship/Student Teaching and Seminar in PreK-3 (3 Credit Hours)

This course provides practice in teaching in grades PK-3 and in analyzing teaching approaches and behaviors. It examines instructional problems and concerns. Each semester the candidate must maintain continuance and a 3.0 GPA to enroll in each teacher candidate internship semester for a total of 9 semester credit hours. Available for pass/fail grading only.

Prerequisites: admission to the approved teacher education program; completion of all undergraduate content courses, professional education courses, and all Virginia Department of Education licensure assessments for admission into the ECE graduate program; no grade less than C in content area and professional education core; minimum major and overall GPA of at least 2.8; and permission of the department

TLED 668 Internship/Student Teaching and Seminar (9 Credit Hours)

Five days per week for 14 weeks. Available for pass/fail grading only. Provides practice in teaching in grades PK-6 and in analyzing teaching approaches and behaviors. Examines instructional problems and concerns.

Prerequisites: completion of an approved program in teacher education PreK-6, passing scores on PRAXIS I or equivalent SAT or ACT scores as established by VA State Board of Education, passing scores on the appropriate PRAXIS II content examination, departmental approval, permission of the director of teacher education services, no grade less than C- in content area and professional education core, minimum major and overall GPA of at least 2.75

TLED 669 Internship/Student Teaching and Seminar (3-9 Credit Hours)

Five days per week for 6-14 weeks. Available for pass/fail grading only. Provides practice in teaching and in analyzing teaching approaches and behaviors. Examines instructional problems and concerns.

Prerequisites: Completion of an approved program in teacher education, passing scores on the appropriate licensure assessments, departmental approval, permission of the director of teacher education services, no grade less than C- in content area and professional education core, minimum major and overall GPA of at least 2.75, GPA of 3.0 required for graduate programs

TLED 670 Assessment and Evaluation (3 Credit Hours)

Students will design a three-chapter research proposal and study the appropriate statistical references. Evaluation methodologies leading to this research are explored (portfolio/rubrics). Instructional technology and its classroom applications are interwoven into research and evaluation.

TLED 671 Practitioner Inquiry in Elementary and Secondary Grades (3 Credit Hours)

In this course, students will explore research methods and forms of data collection and analysis associated with practitioner inquiry, including self-study and action research. Students will be required to design a research proposal using practitioner inquiry research methods.

TLED 672 Integrating Children's Lit, Language Arts & Social Studies Across Early Child Curriculum (3 Credit Hours)

This course emphasizes the development of K-6 students' multiple and multimodal literacies and the promotion of active literacy and social studies explorations within the early and elementary classroom and aligned with the Virginia Standards of Learning. The course will focus on the five domains of social studies education and children's holistic literacy development. Multiple perspectives and approaches to planning, teaching, and assessing literacy and social studies in the early and elementary classroom are explored and practiced. This course includes a 35-hour practicum experience in an early or elementary classroom.

TLED 673 Integrating Science and Mathematics Across the Early Childhood and Elementary Curriculum (3 Credit Hours)

This course emphasizes the development of young children's inquiry and problem-solving skills and content learning through inquiry-based science and problem-based mathematics explorations. Multiple perspectives and approaches to planning, teaching, and assessing science and mathematics in the early childhood and elementary grades classroom are explored and practiced. This course includes a 35-hour practicum experience in an early or elementary classroom.

TLED 676 Teaching Diverse Learners in Elementary & Secondary Schools (3 Credit Hours)

The course will emphasize evidence-based instructional practices and strategies to teach students with diverse interests, abilities, and prior knowledge. This course examines the impact of students' varied home support mechanisms and resources on the academic skills among students in contemporary schools. Additionally, the course will focus on instructional strategies that are varied and accessible from many perspectives; emphasis is given to methods of instruction that have evidence to support resulting improved student outcomes.

TLED 677 Learning and Development Across Historical and Contemporary Educational Environments (3 Credit Hours)

This course explores foundational ideas of democratic education in light of contemporary understandings of how children and youth construct knowledge. While focusing on the contexts and conditions of contemporary education, it traces the roots of educational theory and philosophy from the formation of the common school to the policy reforms of the 21st century. This understanding is coupled with the major theories of children's learning and development as well as all aspects of their physical, social, emotional, and intellectual development from birth through adolescence. The course requires that students learn the concepts and terminology associated with each theory and be able to use them in analyzing, interpreting, promoting, and evaluating children's growth and learning in the classroom.

TLED 679 Advanced Classroom Management and Practicum in PreK-6 (3 Credit Hours)

This course will examine advanced methods for educators to use in order to make their classroom teaching and management more efficient and effective. This will include supervised involvement of the student in a practicum setting where the student, instructor and classroom teacher work together closely to develop knowledge and gain expertise in teaching children in a positive and effective learning environment. A weekly seminar is required.

TLED 680 Teacher Candidate Internship – MAT Program (5 Credit Hours)

Field-based internship. Provides practice in teaching and in analyzing teaching approaches and behaviors. Examines instructional problems and concerns. This experience is a crucial part of a teacher candidate's preparation to becoming a Professional Educator.

Prerequisites: Completion of an approved program in teacher education, passing scores on the appropriate licensure assessments, departmental approval, permission of the director of teacher education services, no grade less than C- in content area and professional education core, minimum major and overall GPA of at least 2.75

TLED 681 Critical Pedagogy in Early Childhood (3 Credit Hours)

Building from early childhood traditions that recognize the importance of children's participation in learning, students will employ critical perspectives of early childhood to develop awareness of paradigmatic changes in thinking about young children by considering the heterogeneous nature of childhood. Students will examine and critically reflect on models of the learner and curriculum contexts in early education through an inter-disciplinary focus that views childhood as a complex web of interdependence. This course will provide students with an understanding of how cultural texts and representation practices shape curricular and pedagogical decisions as well as resources for planning curriculum and instruction from constructivist paradigms.

Prerequisites: Departmental approval required

TLED 687 Pedagogy Principles & Models of Instruction (3 Credit Hours)

Students will investigate and analyze a range of pedagogical approaches from the objectivist, constructivist and social family of learning models including major psychological and philosophical approaches. Students will assess the syntax of instructional models that can be applied across a variety of content areas and demonstrate their understanding of various teaching models through the development of lesson plans in their content area.

TLED 690 The Child and the Family (3 Credit Hours)

This course will examine children in the context of the families in which they live. Family systems theory provides the basis for study, and students do an in-depth examination of their own families of origin. The stages of the family life cycle are taught; principles of healthy family functioning are emphasized to promote healthy growth for children.

TLED 695 Topics in Education (1-3 Credit Hours)

Provides opportunities for graduate students to explore current topics, trends and issues related to curriculum, instructional strategies, and evaluation.

Prerequisites: Graduate standing

TLED 697 Independent Study (1-4 Credit Hours)

Hours to be arranged. Provides opportunities for the master's student to do independent research in an area of his/her particular interests and needs.

Prerequisites: graduate standing

TLED 699 Thesis (3-6 Credit Hours)

Master's-level research and thesis in topics related to curriculum, instructional strategies, and evaluation in educational settings.

Prerequisites: graduate standing and permission of the instructor

TLED 701 Teacher as Leader (3 Credit Hours)

This course prepares elementary and secondary teachers to become facilitators of change in schools and communities. They will explore various leader roles in the K-12 context, including exemplary and critically minded practitioner, curriculum decision-maker, researcher, advocate, and facilitator of job-embedded professional development

TLED 702 Coaching and Mentoring (3 Credit Hours)

This course prepares teachers to be effective coaches of teacher candidates and inservice teachers in K-12 settings. They will develop understandings of student-centered, evidence-based models of coaching and mentoring, and acquire specific knowledge and skills of effective coaching and mentoring.

TLED 703 Curriculum Leadership (3 Credit Hours)

This course prepares teachers to enact dynamic curriculum leadership. They will explore curriculum as a design for learning, a set of school experiences based on goals and values, that take into account diverse learners and other stakeholders, including families and communities.

TLED 704 Collaboration and Advocacy (3 Credit Hours)

The purpose of this course is to develop teacher leaders' skills in facilitation, collaboration, and advocacy at the school, division, and community levels. Emphasis is placed on engaging with diverse stakeholders through culturally responsive means to foster student academic achievement.

TLED 724 Curriculum Development Principles and Practices in Elementary Schools (3 Credit Hours)

This course will engage students in the on-going debates about the development and shaping of curricula with an emphasis on how these forces play out in elementary schools. The course requires students to investigate the scope and components of curriculum planning, development, and delivery. Students are first expected to develop an understanding of the many forms of dynamic tension at play in curriculum debates, and, subsequently, they are required to develop an understanding of specific ways in which teachers and curriculum leaders can shape the instructional process, and select and use curriculum materials.

TLED 725 Curriculum Development Principles and Practices in Secondary Schools (3 Credit Hours)

This course will engage students in the on-going debates about the development and shaping of curricula with an emphasis on how these forces play out in secondary schools. The course requires students to investigate the scope and components of curriculum planning, development, and delivery. Students are first expected to develop an understanding of the many forms of dynamic tension at play in curriculum debates, and, subsequently, they are required to develop an understanding of specific ways in which teachers and curriculum leaders can shape the instructional process, and select and use curriculum materials.

TLED 734 Problems of Teaching in the Elementary Grades (3 Credit Hours)

This course addresses the prevailing issues and trends affecting elementary education in the United States. An understanding of contemporary issues that influence education will assist students in utilizing a critical lens to address those issues in their classrooms. This course provides an opportunity to examine and explore significant theorists, researchers and readings considered foundational as well as contemporary related to sociocultural and political issues within the field of elementary education.

TLED 735 Problems of Teaching in the Secondary Grades (3 Credit Hours)

This course addresses the prevailing issues and trends affecting secondary education in the United States. An understanding of contemporary issues that influence education will assist students in utilizing a critical lens to address those issues in their classrooms. This course provides an opportunity to examine and explore significant theorists, researchers and readings considered foundational as well as contemporary related to sociocultural and political issues within the field of secondary education.

TLED 744 Diversity and Equity in Elementary Education (3 Credit Hours)

This course focuses on factors of diversity and social justice that effect decisions elementary teachers must make regarding design and implementation of curriculum, teaching strategies, and materials in order to provide equity and excellence for all learners in the elementary grades.

TLED 745 Diversity and Equity in Secondary Education (3 Credit Hours)

This course focuses on factors of diversity and social justice that effect decisions secondary teachers must make regarding design and implementation of curriculum, teaching strategies, and materials in order to provide equity and excellence for all learners in the secondary grades.

TLED 775 English Language Learners in the PK-12 Classroom (3 Credit Hours)

The course is designed to infuse the teachers' competencies related to meeting the instructional needs of English language learners. The course will explore the language, culture, instruction, assessment, and professionalism in order to understand and teach linguistically diverse learners effectively.

TLED 998 Master's Graduate Credit (1 Credit Hour)

This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

UNIV - University

UNIV 507 Design Thinking (3 Credit Hours)

Design thinking is a human-centered approach to innovation that uses design methods and tools to integrate the needs of people and organizations, the opportunities of technology, and the requirements for personal, organizational, and business success. The design thinking course introduces students to a robust process for understanding problems, ideation, innovation, and entrepreneurship. This course is facilitated using workshops where students will work in project teams in a design thinking innovation challenge.

WCS - World Cultural Studies

WCS 510 Berlin-Paris: Crucibles of European Ideas (3 Credit Hours)

This course explores the cultural movements that have characterized German-French commonalities and differences from the early 1900s through the 1990s in cross-disciplinary discourses such as film, literature, art, politics, and economics.

WCS 521 The Question of Memory in World Cultures (3 Credit Hours)

This class explores how societies across the world choose to remember people and events through culture. Students will consider 'official' manifestations – government-sponsored or public memorials and art – as well as general and popular culture such as museums, literature, film, TV, music, etc. The class will interrogate not only what is chosen to be memorialized but how it is memorialized, and how public memory of events is shaped by such choices. Students will consider what decisions are made at the local and national level, how those decisions are made, and what consultations or processes are considered necessary or desirable when deciding public memorials and artwork.

Prerequisites: Graduate standing

WCS 545 German Cinema I (3 Credit Hours)

The first half of the 20th century was the most creative and destructive period in German and European history. Its rich cultural achievements included Viennese psychoanalytical theory of the turn of the century, Art Nouveau, German Expressionism, and the avant garde aesthetics of the Weimar Republic. Conversely, World War I and II exposed the cultural agony and human depravity of modern civilization. This course will trace these various aspects and developments in a variety of exemplary genres. Readings and discussions in German. (Cross-listed with GER 445/GER 545 and COMM 444/COMM 544)

WCS 571 Hispanic Women Authors (3 Credit Hours)

A study of fictional and non-fictional works by Spanish, Spanish-American, and U.S. Latina writers from the 16th to the 20th century. The course analyzes gender identity and roles and the interaction of gender, race, and class in literary representations of courtship and marriage, spirituality, nationalism, colonialism, and multiculturalism.

WCS 576 German-Jewish Literature and Culture (3 Credit Hours)

A survey of seminal texts by German-Jewish philosophers and writers from the Enlightenment to the present day, including Marx, Kafka, Freud, Schnitzler and Arendt.

WCS 595 Topics in World Cultural Studies (1-3 Credit Hours)

This course invites students to discover approaches to global problems and concerns through an analysis of cultural expressions from around the world. Students will consider the ways in which literary and artistic expression (literature, film, visual art, music) draw from and impact broader social and political contexts.

WCS 596 Topics in World Cultural Studies (1-3 Credit Hours)

This course invites students to discover approaches to global problems and concerns through an analysis of cultural expressions from around the world. Students will consider the ways in which literary and artistic expression (literature, film, visual art, music) draw from and impact broader social and political contexts.

WGS - Women's and Gender Studies

WGS 500 History of U.S. Women's Activism (3 Credit Hours)

This course historicizes U.S. women's social, political, and rhetorical activism over the last 200 years, tracing their entry into and shaping force upon public life. The course examines the development of women's activism in the nineteenth century, the twentieth-century women's (or feminist) movement, and its current status, particularly in relation to postfeminism and a 'third' wave.

Prerequisites: WGS 201S

WGS 501 Women: A Global Perspective (3 Credit Hours)

An analysis of the global forces that impact women's lives throughout the world. Particular emphasis is placed on the status of women in the developing world, international institutions that protect women's rights, and efforts to promote gender equality worldwide.

Prerequisites: WGS 201S and a grade of C or better in ENGL 211C or ENGL 231C

WGS 502 Feminisms and Sexualities (3 Credit Hours)

This course will examine feminist approaches to the subject of sexuality in the twentieth and twenty-first centuries. The course examines theorizations of sexuality, such as radical, critical race, and transnational feminisms, queer theory, and trans studies. Key questions will be: how have feminists theorized sexualities? What does sexuality have to do with feminist studies or practices? How do other identities, such as race and class, inform sexuality?

Prerequisites: WGS 201S, WGS 390T, or instructor approval

WGS 505 Gender and Media (3 Credit Hours)

This course examines media-based sites of knowledge production using a feminist approach, in order to imagine new and more complex ways to think about media rhetorics; celebrity culture; digital media; and the politics of representation. Key questions will be: What roles do media play in shaping social movements? What are the promises and pitfalls of activist interventions in the realm of commercial culture? In what ways might we complicate narratives of co-optation or selling out? The course explores these questions using an intersectional lens attentive to the complex interconnections of race, class, gender, and sexuality. Case studies will include national, international, and transnational media events.

Prerequisites: WGS 201S, WGS 390T, or instructor approval

WGS 506 Gender, Fashion & the Body (3 Credit Hours)

This interdisciplinary class explores the body as a canvas for both history and the future of our concept of individualism. Students will have the opportunity to reflect not only on their own understanding of the body but also that of the body across a variety of experiences. Students will complete auto-ethnographic essays and a course paper on the body relating to her/his/their academic research interests.

Prerequisites: WGS 201S

WGS 510 Sexing the Body (3 Credit Hours)

This course will explore the spectrum of what it means when we consider humans to exist in a gendered and sexed world. Students will critique their own preconceived notions of sex, probe issues of equality and social justice, and discuss what these questions mean both in the United States and globally. The course will culminate with a restructuring of how we understand the ways in which we define sex, sexuality, and sexual practice, taking into consideration how our own identities are impacted by culture and society.

Prerequisites: WGS 201S

WGS 515 Migration and Refugee Studies (3 Credit Hours)

This course explores the international context of refugees and migrants from a humanitarian perspective. Global conditions that lead to forced migration are analyzed to inform a larger understanding of human displacement. The course works directly with refugee resettlement organizations at the national and local levels.

WGS 560 Feminist and Queer Theory (3 Credit Hours)

This course will examine feminist and queer theories, specifically intersectional, transnational, and radical perspectives. It explores how feminist and queer scholars approach research, writing, and knowledge production, and applies these insights to students' own interests. The course analyzes how feminist and queer scholars have written about storytelling, the body, and desire, and links these discussions to how to produce positive social change in our world. This course is fundamentally interdisciplinary; students are encouraged to make connections between the course materials, their research interests, and other fields of study. This is a writing intensive course.

Prerequisites: WGS 201S or WGS 302W and a grade of C or better in ENGL 211C or ENGL 231C

WGS 570 Feminist Research Methods (3 Credit Hours)

This course explores the ethics, practice, and multiple forms of conducting feminist research. Narrative research methods are practiced through hands-on oral herstory assignments. Throughout the course, the process of knowledge construction is interrogated from a feminist perspective.

WGS 595 Topics in Women's, Gender, and Sexuality Studies (3 Credit Hours)

Advanced seminars on selected topics. The subject matter is usually be interdisciplinary and aligns with faculty teaching and research strengths.

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Prerequisites: WGS 201S or instructor approval

WGS 597 Independent Study (1-6 Credit Hours)

Independent study of an interdisciplinary topic in Women's, Gender, and Sexuality Studies, or a reading plus internship project to be selected under the direction of a faculty member. Conferences and papers as appropriate.

Prerequisites: WGS 201S and approval of instructor and chair of the department

WGS 598 Independent Study (1-6 Credit Hours)

Independent study of an interdisciplinary topic in Women's, Gender, and Sexuality Studies, or a reading plus internship project to be selected under the direction of a faculty member. Conferences and papers as appropriate.

Prerequisites: WGS 201S and approval of instructor and chair of department

WGS 668 Internship (3-6 Credit Hours)

Course provides an opportunity to gain experience working in organizations and government agencies. Students' work should engage with women's issues at the local, regional, national, and/or global levels. Students must work for at least 50 hours per course credit.

Prerequisites: Graduate standing and instructor approval required

WGS 695 Topics in Women's, Gender, and Sexuality Studies (3 Credit Hours)

The advanced study of selected topics which permit small groups of qualified students to work on subjects of mutual interest under the direction of an instructor. Courses may not be offered regularly; when offered courses appear in the course schedule and are more fully described in information distributed to advisors.

WGS 696 Topics in Women's, Gender, and Sexuality Studies (1-3 Credit Hours)

The advanced study of topics which permit small groups of qualified students to work on subjects of mutual interest under the direction of an instructor. Courses may not be offered regularly; when offered, courses appear in the course schedule and are more fully described in information distributed to advisors.

WGS 697 Independent Study (1-3 Credit Hours)

Independent study of an interdisciplinary women's studies topics to be selected under the direction of a women's studies faculty member. Conferences and papers as appropriate.

Prerequisites: Graduate standing

WGS 698 Independent Study (3 Credit Hours)

Independent study of an interdisciplinary women's studies topics to be selected under the direction of a women's studies faculty member. Conferences and papers as appropriate.

Prerequisites: Graduate standing

WGS 715 Advanced Migration and Refugee Studies (3 Credit Hours)

This seminar course explores the international context of refugees and migrants from a humanitarian perspective. Global conditions that lead to forced migration are analyzed to inform a larger understanding of human displacement. Through analysis at the community, national, and international levels, participants will gain both in-depth content on this contemporary human rights topic and tools for application in a number of fields.

WGS 795 Topics in Women's, Gender, and Sexuality Studies (3 Credit Hours)

The advanced study of selected topics that permit small groups of qualified students to work on subjects of mutual interest under the direction of an instructor. Courses may not be offered regularly; when offered courses appear in the course schedule and are more fully described in information distributed to advisors.

Prerequisites: Instructor approval

WGS 797 Independent Study (1-3 Credit Hours)

Independent study of an interdisciplinary women's studies topic to be selected under the direction of a women's studies faculty member. Conferences and papers as appropriate.

Prerequisites: Graduate standing

WGS 815 Advanced Migration and Refugee Studies (3 Credit Hours)

This seminar course explores the international context of refugees and migrants from a humanitarian perspective. Global conditions that lead to forced migration are analyzed to inform a larger understanding of human displacement. Through analysis at the community, national, and international levels, participants will gain both in-depth content on this contemporary human rights topic and tools for application in a number of fields.

WGS 895 Topics in Women's, Gender, and Sexuality Studies (3 Credit Hours)

The advanced study of selected topics that permit small groups of qualified students to work on subjects of mutual interest under the direction of an instructor. Courses may not be offered regularly; when offered, courses appear in the course schedule and are more fully described in information distributed to advisors.

WGS 897 Independent Study (1-3 Credit Hours)

Independent study of an interdisciplinary women's and gender studies topic to be selected under the direction of a women's and gender studies faculty member. Conferences and papers as appropriate.

Prerequisites: Doctoral standing

WLC - World Languages Cultures

WLC 595 Topics in World Languages & Cultures (1-3 Credit Hours)

The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule.

Prerequisites: Permission of the instructor