



GRADUATE CATALOG

2018 – 2019

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The University reserves the right to refuse admission or to revoke admission to any applicant.

Delaware State University was founded in 1891 and is accredited by the Middle States Commission on Higher Education (MSCHE).

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A MESSAGE FROM PRESIDENT WILMA MISHOE



Prospective and Current Graduate Students,

Welcome to Delaware State University's *Graduate Catalog*. You may be using it to help you determine whether DSU could be a good fit for your advanced studies, or you may have already decided to pursue your master's or doctoral degree at this institution. Whichever the case, this catalog will provide you with valuable information about the University, its graduate admissions policies and procedures, and the diverse variety of academic programs offered at these levels.

As the president of Delaware State University, it pleases me greatly to write this introductory letter for this publication. It was under the presidency of my father, Dr. Luna I. Mishoe, that the institution established its first graduate degree program in 1981 – a Master of Arts in Education. By 1993, under the presidency of Dr. William B. DeLauder, there were seven master's degree programs offered, which helped then-Delaware State College make a successful case to persuade the Delaware State Legislature to change the institution's name to Delaware State University.

This 2018-19 publication of the *Graduate Catalog* coincides with the 25th anniversary of Delaware State University's elevation from college to university status. It is against the backdrop of that observance that we now proudly offer 16 master's degree programs – several with a choice of focus concentrations – and five doctoral programs. With its world-class faculty and researchers, DSU is an outstanding place to build upon your previous academic accomplishments and move forward with your career aspirations. Under the leadership of Dr. Patrice Gilliam-Johnson, dean of Graduate, Adult and Extended Studies, you will find a supportive environment and staff to assist you in achieving your academic goals.

As the University's graduate and doctoral programs represent a critical step to the great things that await you, I extend my very best wishes for your academic journey.

Dr. Wilma Mishoe
President
Delaware State University

THE UNIVERSITY

MISSION STATEMENT

Delaware State University is a public, comprehensive, 1890 land-grant institution that offers access and opportunity to diverse populations from Delaware, the nation, and the world. Building on its heritage as a historically black college, the University purposefully integrates the highest standards of excellence in teaching, research, and service in its baccalaureate, master's and doctoral programs. Its commitment to advance science technology, liberal arts, and the professions produces capable and productive leaders who contribute to the sustainability and economic development of the global community.

VISION STATEMENT

As one of America's most highly respected Historically Black Colleges and Universities, Delaware State University will be renowned for a standard of academic excellence that prepares our graduates to become the first choice of employers in a global market and invigorates the economy and the culture of Delaware and the Mid-Atlantic Region.

CORE VALUES

- Community
- Integrity
- Diversity
- Scholarship
- Outreach

BASIC PHILOSOPHY AND VALUES

Delaware State University is an 1890 land-grant institution committed to the philosophy on which it was founded. Thus, the mission can be simply stated as involving teaching, research and outreach.

The University strives for excellence and seeks to be the best in all that it does. Its belief is that this uncompromising pursuit of excellence is best achieved through teamwork and shared governance.

The University is committed to providing students with a complete and high-quality educational experience through outstanding academic programs and excellent campus life, including well-defined and well-managed extracurricular activities.

It is also dedicated to ensuring all undergraduate students receive a strong liberal arts education. This essential part of students' education serves as the foundation for studies in the major areas.

Delaware State University considers the changing needs of students as a major institutional priority and believes that: 1.) students must receive the education required for employment and upward mobility; 2.) more minority students must be prepared for graduate and professional education, especially in areas in which they are traditionally under-represented; and 3.) students should be exposed to new developments in currently existing curricula using diverse teaching strategies.

The University places major emphasis on teaching quality. At the same time, it recognizes that all faculty are obligated to expand the frontiers of knowledge in various disciplines and fields and, as appropriate, to apply that knowledge to the solution of community, regional, national and international problems. The University also believes that faculty involvement in research substantially enhances the quality of teaching and expects that students will be provided opportunities to engage in research. Through research, faculty members can continually expand their professional knowledge base and maintain the vitality of their teaching.

In addition to the primary emphasis on high-quality teaching and the related missions' areas of research and outreach, Delaware State University is committed to serving the surrounding communities, the state of Delaware and the nation.

STUDENT LEARNING GOALS

Delaware State University provides a wide range of experiences designed to prepare our graduates to be:

- competent communicators;
- effective inquirers, critical thinkers and problem-solvers able to use appropriate quantitative and qualitative information;
- ethical, collaborative and productive citizens of a complex, diverse world;
- independent learners able to integrate knowledge and technology to achieve personal and professional success.

Program learning goals are aligned with these learning goals. Course learning goals are aligned with the program learning goals.

HISTORY

The Delaware College for Colored Students, now known as Delaware State University, was established May 15, 1891, by the Delaware General Assembly under the provisions of the Morrill Act of 1890 by which land-grant colleges for blacks came into existence in states maintaining separate educational facilities.

Because there was already a private Delaware College (now the University of Delaware) located in Newark, Del., to avoid confusion new state legislation was passed and enacted in early 1893 to change the black school's name to the State College for Colored Students. That would be the institution's name for the next 54 years.

Through the conservative and practical planning of the Board of Trustees appointed by Gov. Robert A. Reynolds, the College was launched upon its mission of education and public service on February 2, 1892. Five courses of study leading to a baccalaureate degree were offered: Agricultural, Chemical, Classical, Engineering, and Scientific. A Preparatory Department was established in 1893 for students who were not qualified to pursue a major course of study upon entrance. A three-year normal course leading to a teacher's certificate was initiated in 1897. The College graduated its first class of degree candidates in May 1898.

In the 1916 to 1917 school year, the Preparatory Department was phased out, a Model Grade School was established, and a high school diploma was granted on completion of a four-year course of study. In 1923, a Junior College Division was added. Four-year curricula in the Arts and Sciences, Elementary Education, Home Economics, Agriculture, and Industrial Arts were established in 1932. The College graduated the first class of bachelor's degree candidates completing one of the courses of study in June 1934.

In 1944, the College received provisional accreditation by the Middle States Association of Colleges and Schools. The University's accreditation was most recently reaffirmed by the Middle States Commission on Higher Education (MSCHE) in 2012.

In 1947, the name of the institution was changed to "Delaware State College" by legislative action. On July 1, 1993, the College turned another chapter in its history when Gov. Thomas Carper signed a name change into law, renaming the institution Delaware State University.

The University has grown in stature as a center for teaching, research and public service. The purpose and objectives of the University have broadened in keeping up with changing times. While recognizing its historical heritage, the University provides higher education today for a diverse student population. Academic units are organized into the College of Agriculture, Science & Technology; the College of Business; the College of Health & Behavioral Sciences; and the College of Humanities, Education & Social Sciences.

The University offers 42 undergraduate degrees, which include unique and traditional majors such as Agriculture, Aviation, Computer Science, Criminal Justice, Forensic Biology, Kinesiology, Hospitality & Tourism Management, Management, Mass Communications, Natural Resources, New Media in Arts, Nursing, Physics, Social Work and Textiles & Apparel Studies.

Delaware State University also offers 16 master's degrees in Agriculture (Animal Science, Plant Science), Applied Optics, Biological Sciences (M.S.), Business Administration (Business Analytics, CPA, Finance, Information Systems), Applied Chemistry (M.S.), Computer Science, Educational Leadership, Food Science, Mathematics (Pure or Applied), Molecular and Cellular Neuroscience, Natural Resources, Physics, Public Administration, Social Work, Sport Administration, as well as Teaching English to Speakers of Other Languages/Bilingual Education (TESOL).

The University also has five doctoral programs in Applied Chemistry, Educational Leadership, Interdisciplinary Applied Mathematics and Mathematical Physics, Neuroscience, as well as Optics.

The institution has national academic program accreditations from the Accreditation Commission for Education in Nursing, the Council on Social Work Education, the Accreditation Commission for Programs in Hospitality Administration, the Council for the Accreditation of Educator Preparation, and the Accreditation Council for Education in Nutrition and Dietetics. The University's College of Business is an accredited member of AACSB International —The Association to Advance Collegiate Schools of Business.

The underpinning of the growth and development of Delaware State University has been the leadership of 11 permanent presidents and three acting presidents. The 11 permanent presidents have included Wesley P. Webb (1891-1895), William C. Jason (1895-1923), Richard S. Grossley (1923-1942), Howard D. Gregg (1942-1949), Oscar J. Chapman (1950-1951), Jerome H. Holland (1953-1960), Luna I. Mishoe (1960-1987), William B. DeLauder (1987-2003), Allen L. Sessoms (2003-2008), Dr. Harry L. Williams (2010-2017) and Dr. Wilma Mishoe (2018-present). The three acting presidents are listed as follows: Maurice E. Thomasson served twice as acting president from 1949-50 and 1951-1953; Dr. Claibourne Smith served as acting president from 2008-2010; and Dr. Wilma Mishoe served as acting president during the first six months of 2018.

As a result of the efforts of past and current presidents, administrators, faculty, staff and students, the University is well-positioned to reach new levels of prestige and respect in the new millennium.



Accredited by Middle States Commission on Higher Education
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<http://www.msche.org/>

Delaware State University is located in Dover, DE, in Kent County, 45 miles south of Wilmington on the Delmarva Peninsula. The campus is adjacent to U.S. Route 13, which provides direct access to Norfolk, VA; Salisbury, MD; Wilmington, DE; Philadelphia, PA; and Camden, NJ. Other connecting highways in the Dover area provide access to the Chesapeake Bay Bridge; Washington, D.C.; Baltimore, MD; and points west. The New York metropolitan area can be reached via the Delaware Memorial Bridge and the New Jersey Turnpike, which intersect Route 13 just south of Wilmington. The city of Dover is located on bus routes to major cities.

Dover, the capital of Delaware, is a community of approximately 36,000 people situated in the heart of the Delmarva Peninsula within easy reach of the resort areas of Rehoboth Beach, DE; Ocean City, MD; and Cape May, NJ. Founded in 1703, the city of Dover features many colonial buildings and several historical sites, including the home of John Dickinson, signer of the Declaration of Independence and the Constitution of the United States.

The physical facilities at the Dover campus support various University programs. Major administrative and academic facilities are listed below.

Claibourne D. Smith Administration Building accommodates a small Café, the Office of Admissions, the Office of Student Financial Services, the Office of Student Accounts, the Records Office, the Cashier's Office, the Human Resources Office, the Office of Institutional Research & Analysis, the Office of Finance and Administration, the Payroll Office, the Institutional Advancement Office, the Student ID/Photo Office, the Academic Affairs & Provost's Office and the President's Office.

Agriculture Annex Building is the home of the Department of Human Ecology, as well as certain offices and laboratories of the Department of Agriculture and Natural Resources.

Alumni Stadium serves as the site for many University activities, including football, track and field contests and other outdoor events.

William W.W. Baker Building is the home of the Department of Agriculture and Natural Resources.

Bank of America Building is the home of the College of Business, which includes the departments of Accounting, Economics & Finance and Business Administration, as well as the Aviation Program and the Hospitality & Tourism Management Program, the Delaware Center for Enterprise Development and the IT Help Desk.

Delaware Hall houses the departments of Psychology and Sociology & Criminal Justice.

Education and Humanities Building houses the departments of Art, English & Foreign Languages, Education and Music. This facility also houses the Child Development Laboratory; the Office of the Dean of the College of Humanities, Education & Social Sciences; the Office of Distance Education & Learning Technologies; and Counseling Services. It also serves as the site for the University's wide-ranging cultural enrichment programs in the E&H Theatre.

ETV Building houses the departments of History, Political Science & Philosophy, Mathematical Sciences and Mass Communications.

Grossley Hall houses several classrooms, certain offices of the Athletics Department and the Office of International Affairs.

William C. Jason Library, a six-story structure, houses a collection of more than 490,333 publications, including books, electronic materials, media materials and microbooks. The library is also home to offices of Graduate Studies and Research and the Graduate Student Association, the Office of Student Success, as well as the Arts Center/Gallery, which traditionally features the works of critically acclaimed artists from the United States and abroad as well as art student and faculty exhibitions.

Loockerman Hall, built circa 1720, is often referred to as "the birthplace of Delaware State University." It is the only building from the institution's inaugural 1891 year that still exists. Though it has undergone a massive renovation, its architectural integrity has been preserved. It is listed on the National Register of Historic Places.

Martin Luther King Jr. Student Center is the home for the Student Government Association; *The DSU Hornet* (student newspaper); the Office of Career Services; the Copy Center, which serves the printing needs of the University; and the University Bookstore. Extramural activities for students are also held in the facility. The offices for the Vice President for Student Affairs, Student Leadership and Activities, Judicial Affairs and Alumni Relations are also located in this building.

Memorial Hall Complex houses the Department of Sport Management, the Physical Education Program, the Office of Sports Medicine and the Varsity Strength & Conditioning Center, as well as the intercollegiate sport gymnasium.

Luna I. Mishoe Science Center houses offices, classrooms and facilities for the departments of Biological Sciences, Chemistry, Computer & Information Sciences and Physics & Engineering.

John R. Price Building houses the offices of the dean of the College of Health and Behavioral Sciences. The departments of Public & Allied Health Sciences, Nursing and Social Work are also located in this facility.

Maurice Thomasson Center houses the Division of Adult and Continuing Education, Assessment Office, Office of Testing, Office of Title III and DSU Alumni Association office.

Optical Science Center for Applied Research (OSCAR) Building houses state-of-the-art advanced optical research laboratories. A suite of shared laboratories provides advanced technology testing and instrumentation to support a myriad of research needs. The OSCAR Building provides for the full spectrum of research needs including wet chemistry, nanochemistry, conventional and confocal microscopy, scanning electronic and atomic force microscopy, as well as a complete image analysis suite.

Ulysses S. Washington Cooperative Extension Center houses the University's Cooperative Extension outreach programs that include youth development, family life education, community resource development and agriculture education. The Center is also the home of the Herbarium, which houses the most extensive collection of plants that is indigenous to the Delmarva Peninsula.

Wellness & Recreation Center includes dual basketball courts with seating areas and men and women's locker rooms on the first floor. The second floor has a variety of Life Fitness weight machines and free weights as well as a running track that winds around the exercise areas and overlooks the basketball courts on the floor below. The facility also has a swimming pool and sections for aerobic and other fitness classes.

Fall 2018 Academic Calendar

May 1 (Tuesday).....International Applicants: Deadline for Receipt of Complete Graduate Applications for Fall 2018
Please review all requirements via sgsr.desu.edu/admissions. The applicant is encouraged to contact his or her program(s) of interest via sgsr.desu.edu/about/graduate-program-directory as some have earlier deadlines.

June 30 (Saturday).....Domestic Applicants: Deadline for Receipt of Complete Graduate Applications for Fall 2018
Please review all requirements via sgsr.desu.edu/admissions. The applicant is encouraged to contact his or her program(s) of interest via sgsr.desu.edu/about/graduate-program-directory as some have earlier deadlines.

July 27 (Friday).....Graduate Orientation— Dover
All first-time graduate enrollees are expected to participate in this activity. Details will be posted at the School of Graduate Studies website: sgsr.desu.edu.

August 2 (Thursday).....Graduate Orientation — DSU@Wilmington

August 5 (Sunday).....Fall 2018 Billing Due Date

August 23 (Thursday).....Residence Halls Open for New Students Only

August 24 (Friday).....Faculty & Staff Institute

August 25 (Saturday).....Residence Halls Open for Returning Students

August 27 (Monday).....Classes Begin at 8 a.m.

August 27 (Monday).....Late Registration Begins

September 3 (Monday).....Labor Day (University Closed)

September 5 (Wednesday).....Last Day for Graduate Students to Meet Financial Obligations

September 5 (Wednesday).....Last Day for Adding Classes

September 5 (Wednesday).....Last Day to Change Course(s) to Audit Status

September 5 (Wednesday).....Late Registration Ends

September 6 (Thursday).....Effective Date for \$10 Per Drop Processing Fee

September 6 (Thursday).....Effective Date for Receiving a Grade of "W" for Dropped Courses

September 6 (Thursday).....General Faculty Meeting

September 6-11 (Thursday-Tuesday).....Documentation for Non-Attendance Submission Period

September 7 (Friday).....Last Day for Submission of Committee Forms to School of Graduate Studies and Research for Approval.

Thesis students should establish committees no later than the end of the 2nd semester of full-time enrollment; Ed.D. students should meet this milestone by the end of the 3rd semester of full-time enrollment; Ph.D. students, by the 5th semester of full-time enrollment.

September 7-28 (Friday-Friday).....Academic Early Alert

September 13 (Thursday).....Convocation

September 21 (Friday).....Applications & Audits for December 2018 Commencement due to Graduate Studies for review and approval prior to submission to the Registrar's Office by September 28

October 1-5 (Monday-Friday).....Midterm Evaluations Administered

October 4 (Thursday).....Last Day to Remove Incompletes

October 8 (Monday).....Mid-Term Grades Due in Chairs' Offices

October 12 (Friday).....Last Day to Schedule a Thesis or Dissertation Defense with School of Graduate Studies and Research for December 2018 Graduation

October 12 (Friday).....Last Day for Submission of Candidacy Forms along with supporting documentation to the School of Graduate Studies and Research

for approval. Students must be in academic good standing in order to meet this milestone. Students must complete the requisite number of course requirements (as noted in the Plan of Study) with minimum GPA of 3.0 (some programs may have more stringent requirements) along with identified activities designated to meet the culminating activity. Graduate students must meet candidacy requirements (as determined in your Program of Study) no later than one semester prior to graduation. Doctoral students must meet candidacy requirements no later than two semesters prior to graduation (or sooner if noted in your program of study).

October 15-November 2 (Monday-Friday).....Academic Advisement Period

October 20 (Saturday).....Fall Open House

October 20-28 (Saturday-Sunday).....Homecoming Week

October 27 (Saturday).....Homecoming Game

October 28-November 23 (Sunday-Friday).....Fall Course Evaluations

October 31 (Wednesday).....Financial Aid SAP Appeal Due for Spring 2019

November 2 (Friday).....Financial Aid 60% Completion Date

November 2 (Friday).....Last Day to Complete the Thesis or Dissertation Defense for December 2018 Graduation

November 2 (Friday).....Exit Interview for December 2018 Graduates

November 5 (Monday).....Priority Pre-Registration

November 6 (Tuesday).....Election Day (University Closed)

November 7-November 21 (Tuesday-Wednesday).....Preregistration for Winter, Spring and Summer

November 9 (Friday).....Last Day for December 2018 Graduates to File thesis or dissertation outcome reports to the School of Graduate Studies and Research

November 16 (Friday).....Last Day to Submit Final Copies of the Thesis or the Dissertation via ProQuest with the School of Graduate Studies and Research for Review/Approval.

Please review the Thesis/Dissertation Handbook: sgsr.desu.edu/admissions/current-students. Questions regarding general formatting of theses/dissertations may be forwarded to gradstudies@desu.edu for review. Outcomes reports must have been submitted by the noted deadline for review and approval of all submissions.

November 16 (Friday).....Last Day to Submit the Thesis/Dissertation Approval Page to the School of Graduate Studies and Research

November 21 (Wednesday).....Residence Halls Close at 8 p.m.

November 22-25 (Thursday-Sunday).....Thanksgiving Recess

November 28 (Wednesday).....Last Day to Drop/Withdraw from the University

December 6 (Thursday).....Last Day of Classes

December 6 (Thursday).....Plan of Study Due for Fall 2018 Enrollees

December 7 (Friday).....Reading Day

December 10-14 (Monday-Friday).....Final Examinations

December 13 (Thursday).....Spring 2019 Billing Due Date

December 14 (Friday).....Winter Recess Begins (Students)

December 14 (Friday).....Residence Halls Close at 8 p.m.

December 15 (Saturday).....December Commencement

December 17 (Monday).....Non-thesis Outcomes Reports Due to the School of Graduate Studies for December 2018 Graduation

December 17 (Monday).....Final Grades Due

December 22-January 1 (Saturday-Tuesday).....Winter Recess (University Closed)

Spring 2019 Academic Calendar

November 1 (Thursday).....International Applicants: Deadline for Receipt of Complete Graduate Applications for Spring 2019

Please review all requirements via sgsr.desu.edu/admissions. The applicant is encouraged to contact his or her program(s) of interest via sgsr.desu.edu/about/graduate-program-directory as some have earlier deadlines.

November 15 (Thursday).....Domestic Applicants: Deadline for Receipt of Complete Graduate Applications for Spring 2019

Please review all requirements via sgsr.desu.edu/admissions. The applicant is encouraged to contact his or her program(s) of interest via sgsr.desu.edu/about/graduate-program-directory as some have earlier deadlines.

December 13 (Thursday).....Spring 2019 Billing Due Date

January 3 (Thursday).....Residence Halls Open for New Students Only

January 3-4 (Thursday-Friday).....New Student Registration

January 3-5 (Thursday-Saturday).....I Love DSU Week

January 5 (Saturday at noon).....Residence Halls Open for Returning Students

January 7 (Monday).....Classes Begin at 8 a.m.

January 7 (Monday).....Late Registration Begins

January 10 (Thursday).....General Faculty Meeting

January 16 (Wednesday).....Late Registration Ends

January 16 (Wednesday).....Last Day to Add Classes

January 16 (Wednesday).....Last Day to Change Course(s) to Audit Status

January 17 (Thursday).....Documentation for Non-Attendance Submission Begins

January 17 (Thursday).....Effective Date for \$10 Per Drop Processing Fee

January 17 (Thursday).....Effective Date for Receiving a Grade of "W" for Dropped Courses

January 18-February 8 (Friday-Friday).....Academic Early Alert

January 18 (Friday).....Plans of Study Due for Fall 2018 Enrollees

January 18 (Friday).....Deadline for Submission of Committee Forms to School of Graduate Studies and Research for Approval.

Thesis students should establish committees no later than the end of the 2nd semester of full-time enrollment; Ed.D. students should meet this milestone by the end of the 3rd semester of full-time enrollment; Ph.D. students, by the 5th semester of full-time enrollment.

January 21 (Monday).....Martin Luther King Jr. Observance (University Closed)

January 25 (Friday).....Last Day for Graduate Students to Meet Financial Obligations

January 25 (Friday).....Applications & Audits for May 2019 Commencement due to Graduate Studies for review and approval for submission to the Registrar's Office by February 8

February 7 (Thursday).....Founders Day

February 11-15 (Monday-Friday).....Midterm Evaluations Administered

February 14 (Thursday).....Last Day to Remove Incompletes

February 18 (Monday).....Mid-Term Grades Due in Chairs' Offices

February 25-March 29 (Monday-Friday).....Spring Faculty Evaluations

February 25-March 23 (Monday-Friday).....Academic Advisement Period

March 11-15 (Monday-Friday).....Spring Break (MEAC)

March 13 (Wednesday).....Financial Aid 60% Completion Date

March 13 (Wednesday).....Deadline for Submission of Candidacy Forms along with supporting documentation to the School of Graduate Studies and Research for approval. Students must be in academic good standing in order to meet this milestone. Students must complete the requisite number of course requirements (as noted in the Plan of Study) with minimum GPA of 3.0 (some programs may have more stringent requirements) along with identified activities designated to meet the culminating activity. Graduate students must meet candidacy requirements (as determined in your Program of Study) no later than one semester prior to graduation. Doctoral students must meet candidacy requirements no later than two semesters prior to graduation (or sooner if noted in your program of study).

March 15 (Friday).....Last Day to Schedule a Thesis or Dissertation Defense with School of Graduate Studies and Research for May 2019 Graduation

March 27 (Wednesday).....Last Day to Drop/Withdraw from the University

April 1 (Monday).....Priority Pre-Registration

April 2-12 (Tuesday-Friday).....Pre-Registration for Summer, Fall, Winter

April 5 (Friday).....Last Day to Complete the Thesis or Dissertation Defense for May 2019 Graduation

April 6 (Saturday).....Spring Open House

April 11 (Thursday).....Exit Interview for May 2019 Graduates Due

April 12 (Friday).....Third Annual Delaware State University Research Day

April 12 (Friday).....Last Day for May 2019 Graduates to File Thesis or Dissertation Outcome Reports to the School of Graduate Studies and Research

April 18 (Thursday).....Last Day to Submit Final Copies of the Thesis or the Dissertation via ProQuest with the School of Graduate Studies and Research for review/approval.

Please review the Thesis/Dissertation Handbook: sgsr.desu.edu/admissions/current-students. Questions regarding general formatting of theses/dissertations may be forwarded to gradstudies@desu.edu for review. Outcomes reports must have been submitted by the noted deadline for review and approval of all submissions.

April 18 (Thursday).....Last Day to Submit the Thesis/Dissertation Approval Page to the School of Graduate Studies and Research

April 19-22 (Friday-Monday).....Easter Recess (University Closed)

April 25 (Thursday).....Last Day of Classes

April 26 (Friday).....Reading Day

April 29-May 3 (Monday-Friday).....Final Examinations

May 2 (Thursday).....Summer 2019 Billing Due Date

May 3 (Friday).....Residence Halls Close at 8 p.m.

May 6 (Monday).....Non-thesis Outcomes Reports Due to the School of Graduate Studies for May 2019 Graduation

May 6 (Monday).....Final Grades Due

May 7 (Tuesday).....Assessment Summit

May 9 (Thursday).....General Faculty Meeting

May 11 (Saturday).....May Commencement

May 31 (Friday).....Financial Aid SAP Appeals Due for Fall 2019

GRADUATE APPLICATION DEADLINES

APPLICATION DEADLINES (Domestic)

- June 30 for Fall (August) enrollment
- September 1 for Fall Session II (October) enrollment
- November 15 for Spring (January) enrollment
- February 1 for Spring Session II (March) enrollment
- April 15 for Summer (May) enrollment

APPLICATION DEADLINES (International)

- May 1 for Fall (August) enrollment
- August 1 for Fall Session II (October) enrollment
- November 1 for Spring (January) enrollment
- January 15 for Spring Session II (March) enrollment
- April 1 for Summer (May) enrollment

*The MBA, MPA, and MSA Programs offered at the Wilmington location feature rolling admissions. Enrollment is contingent upon receipt of all required documents no later than two weeks prior to the enrollment period for domestic applicants and four weeks for international applicants.

GRADUATE ADMISSION POLICIES AND PROCEDURES

ELIGIBILITY AND APPLICATION PROCEDURES

For admission to graduate study, applicants must show evidence of an earned baccalaureate degree from an accredited college or university and the potential to produce graduate work of high quality. An official transcript of all previous undergraduate and graduate work must be submitted. Applicants for degree status should have a minimum cumulative undergraduate grade point average of 2.50 (on a 4-point scale) and a scholastic average of 3.0 in their undergraduate major. The applicant must have successfully completed requisite courses or a specified degree program at the undergraduate level as determined by the recommending program. For all graduate programs, official scores on the Graduate Record Examination (GRE), Graduate Management Admission Test (GMAT), Miller Analogies Test (MAT), or other specified examinations or documents as defined by the recommending program is required. Students scoring below the 50th percentile on the verbal and/or analytical writing section of their standardized examination may be required to demonstrate additional proficiency. Individual departments and doctoral programs may have more rigorous standards and earlier deadlines. Applicants are therefore encouraged to contact the program of interest prior to submission of application materials. Test scores are valid up to five years from test dates.

A completed application package consists of the following:

- An online application, available at the following link: <https://www.applyweb.com/desug>;
- Letters of recommendation submitted by persons acquainted with your academic and/or professional performance as well as your potential for graduate study in the noted discipline (see **program requirements**);
- Standardized examination scores (see **program requirements**);
- One official transcript from each college or university attended;
- Supplemental documents (see **program requirements**); and
- A nonrefundable \$50.00 application fee.

All official documents must be forwarded to the Delaware State University Office of Graduate Admissions, c/o DSU@Wilmington 3931 Kirkwood Hwy., Wilmington, DE 19808. GRE Scores are received electronically via the University Testing Service; please select code 5153 for electronic submission of your scores.

*Please note that all application materials are to be received by the deadline noted. Incomplete applications **will not be** reviewed. Some graduate programs have earlier deadlines and more stringent admission requirements than noted for Graduate Studies and Research. Also note that some programs only admit once per year. The applicant is therefore advised to contact the prospective program of interest prior to submission of the application. **Complete** applications are reviewed and evaluated by the respective Department, which recommends action to the Dean of Graduate Studies and Research. The Dean of Graduate Studies and Research reviews all recommendations along with application materials, renders an admission decision and extends an offer of admission to the applicant.

RETENTION OF APPLICATIONS

The application and credentials of applicants, including transcripts of their academic records from other institutions, are placed in a student's admissions file. They are not returned to the student.

In cases where application materials are incomplete with respect to required credentials (including test scores), an applicant has not been accepted for admission, or an applicant does not register for the term to which she/he has been admitted, the application and its accompanying credentials will be retained for two years by the University.

GRADUATE INTERNATIONAL ADMISSIONS

In addition to the requirements noted above, international applicants to graduate programs of study must demonstrate a satisfactory level of proficiency in the English language. This proficiency requirement may be satisfied by meeting the criteria in any one of the following categories:

- Foreign applicants who hold the baccalaureate degree from a regionally accredited college or university within the United States are presumed to be proficient in the English language.
- Foreign applicants who hold the baccalaureate degree or its equivalent from a foreign institution in which English is the language of instruction are presumed to be proficient in English.
- Foreign applicants who do not meet the requirements outlined in 1 and 2 above must take the Test of English as a Foreign Language (TOEFL). Applicants should attain a score of at least 550 on the TOEFL (paper-based test), or a 79 (new Internet-based TOEFL) or a 6.5 minimum IELTS score. Have transcripts evaluated by the World Education Service (WES), Educational Credential Evaluators (ECE), Global Credential Evaluations Inc. (GCE) or the Association of Collegiate Registrars and Admissions Officers (AACRAO) and then forwarded by the evaluating organization to the Delaware State University Office of Graduate Admissions c/o DSU@Wilmington, 3931 Kirkwood Hwy., Wilmington, DE 19808. All academic records must be converted into their U.S. education equivalents by a University-recognized credential agency to obtain transfer credit for education completed at non-U.S. postsecondary institutions. Transcript evaluations must be submitted sealed from the evaluating organization.
- Complete and submit an I-20 Application, F-1 Student Seeking Financial Statement, and an Affidavit of Support for Free Room & Board (<https://www.desu.edu/academics/international-programs/resources-forms>) to the Office of International Affairs (cmoore@desu.edu).

Official scores (along with all official documents) should be submitted to the Delaware State University Office of Graduate Admissions c/o DSU@Wilmington, 3931 Kirkwood Hwy., Wilmington, DE 19808.

PLEASE NOTE: Graduate Studies and Research reserves the right to request that transcripts from international English-speaking institutions be evaluated by WES or any of the other recognized credential agencies if educational equivalency cannot clearly be determined.

IN-STATE PERMANENT RESIDENT

A student with an Alien Registration Receipt Card ("Green Card") has been given permanent residence in the United States as an immigrant, refugee, or alien and, therefore, may enroll at any University location for full- or part-time study. Tuition costs are determined by location of residency. Verification of permanent residence status is required at the time of application. Any student without appropriate identification as a permanent resident of Delaware will be required to pay out-of-state tuition and fees.

- To apply as a student with permanent residency status, please note this information on the citizenship section of the online application and provide a notarized copy of permanent resident status, temporary evidence, or actual Alien Registration Receipt Card (Green Card) as an admission requirement.

To apply as a student with permanent residency status in the State of Delaware, please be prepared to submit the following documents to be used as verification:

- A notarized copy of your Alien Registration Receipt Card ("Green Card");
- If dependent, proof that your parents or guardian has maintained a continuous residence in the state of Delaware for a period of 12 full consecutive months (verified by a deed or lease and/or Delaware tax return forms) immediately prior to the first day of classes for the semester or session for which Delaware residency status is claimed;
- If independent, proof that you have maintained continuous residence in the state of Delaware for a period of 12 full consecutive months (verified by deed or lease) immediately prior to the first day of classes for the semester or session for which Delaware resident status is claimed;
- An independent out-of-state resident who has worked in the state of Delaware for at least 12 consecutive months (excluding work study) may qualify for in-state residence classification (verified by Delaware tax return forms).

PLEASE NOTE: *The tax return should show proof that you (or whoever claimed you as a dependent) paid taxes to the state of Delaware for one full year.*

APPLICATION FOR A STUDENT VISA*

The Office of International Student Services issues the Form I-20 A-B Certificate of Eligibility for Nonimmigrant (F-1) to students who receive an offer of admission; for graduate students the offer is via Graduate Studies and Research. Additionally, students must complete the I-20 application, financial statement for F-1 students and an affidavit of support for room and board if residing off campus. Documentation of financial support for F-1 students is comprised of an affidavit of annual cash support with the following attachments:

- A Financial Statement or a signed copy of your award letter or contract stating the exact amount of funds you will be receiving and for how long.
- An official letter from the student's bank on official letterhead stating the current balance and date the account was opened; or
- An official letter from the University sponsor noting the source, amount, and length of university support; an Affidavit of Support for Free Room and Board (submit only if you will reside with a friend or relative).
- A copy of the deed, lease or rent receipts (submit only if you will reside with a friend or relative) and an official letter from the sponsor's or student's employer stating his/her position and income.

Additionally, students must also indicate their level of support for the remaining years of their program of study. Interested applicants are strongly encouraged to visit the Office of International Affairs website at: <https://www.desu.edu/academics/international-programs>.

Affidavits along with their attachments should be submitted to: The Office of International Student Services via email: internationalaffairs@desu.edu; by mail: Delaware State University, Office of International Student Services, 1200 North DuPont Highway, Grossley Hall, Room 115A, Dover, DE 19901; or by fax: 302.857.6567.

Questions regarding this process should be directed to Mrs. Candace Alphonso-Moore at 302-857-6474 or cmoore@desu.edu.

F-1 TRANSFER STUDENTS*

Graduate students with an F-1 Visa seeking to transfer to Delaware State University from another U.S. institution must meet admission standards as previously noted. Additional requirements include:

- A copy of the I-20 from the previous institution
- An International Student Transfer Form
- Documentation of financial support as noted in the previous section

***Students issued an F-1 visa are required to maintain full-time status during their entire graduate matriculation.**

STUDENTS WITH OTHER TYPES OF VISAS

Prospective students with a temporary Visa status such as J or B (i.e., visitors, business, exchange, etc.) should contact the Office of International Student Services if they wish to change their status to an F-1 Student Visa.

Nonimmigrant students, other than F-1 international student Visa holders, may take as many credit courses as their admission status permits, as long as the term begins and ends within the duration of stay indicated on the visa in their passport. All international students studying on visas enrolled at DSU are subject to the out-of-state tuition rates. Refunds will not be issued after the term's scheduled drop dates.

GRADUATE ADMISSION STATUS

Applicants for graduate degrees are considered for admission and, if admitted, classified in one of four categories: Unconditional Admission, Provisional Admission, Conditional Admission, and Non-Degree Admission. Successful applicants are notified of their classification at the time of admission. While guidelines are noted below, please note that all graduate programs reserve the right to note more stringent admission guidelines and earlier deadlines than Graduate Studies and Research. It is therefore advisable to discuss program requirements with the program director prior to submission of application materials.

UNCONDITIONAL ADMISSION REQUIRES:

- A bachelor's degree from a fully accredited four-year college or university;
- A minimum of 2.50 cumulative grade point average (GPA) as well as a scholastic average of 3.00 in the major on a 4.00-point system of grading (or the equivalent in another grading system);
- An acceptable score on the specified standardized examination;
- Completion of all undergraduate prerequisites for the selected graduate program; and

PROVISIONAL ADMISSION INCLUDES:

- An applicant who has not attained a baccalaureate degree from a fully accredited four-year college or university but who has completed at least 80 percent of degree requirements in the requisite or closely related discipline at the time of application submission and meets all other graduate admission requirements. Applicants in this category must submit official transcripts documenting receipt of the baccalaureate degree at least 30 days prior to the first date of enrollment in order to be eligible to register for graduate courses. International applicants must provide WES, GCE, AACRO or ECE evaluated transcripts 60 days prior to enrollment noting completion of the baccalaureate degree.

CONDITIONAL ADMISSION INCLUDES:

- An applicant who has attained a baccalaureate degree from a fully accredited four-year college or university in the requisite or closely related discipline and meets all graduate admission requirements, but must show proficiency in select upper division undergraduate or foundational graduate courses, earning a grade of B or better during the first year of enrollment. Specific course will be noted on the offer letter.
- A graduate of an accredited college or university who does not meet minimum graduate admission requirements and/or prescribed program requirements. Students in this category are required to meet the conditions noted in the admission offer or risk termination from their program.
- An applicant who has not attained the requisite degree at the time of application but will have met these requirements prior to graduate enrollment. Native students unable to document degree receipt prior to enrollment will be admitted provisionally for one semester. For international applicants, this requires a third party-evaluated transcript via WES, AACRO, ECE, GCE noting receipt of all degrees by the prescribed date of enrollment.
- Prospective international students who have not completed or do not meet the prescribed TOEFL or IELTS score requirement or who do not demonstrate English proficiency sufficient for academic success, but meet all other admissions criteria may be admitted conditionally where proficiency will be determined prior to enrollment in any credit-bearing courses. All of the appropriate application fees and verification of financial support must be submitted to the Office of International Affairs, which will complete the appropriate immigration forms, usually a Form I-20 in preparation for a student's arrival to the United States.

NON-DEGREE ADMISSION

Non-degree admission is granted to those who wish to enroll in courses but who do not intend to qualify for a degree. The non-degree admission category includes those enrolling in graduate study for any of the following purposes:

- To complete certification requirements,
- To earn hours beyond the master's degree;
- To enrich their professional development; or
- To transfer earned credits to a degree program at another institution.

A non-degree seeking student who is subsequently admitted into a Delaware State University graduate degree program may petition to carry forward no more than 9 semester hours of credit earned while in this status. Review and recommendation of transfer credit is made by the Chairperson or Program Director to the Dean, Graduate Studies and Research, for approval.

The applicant is advised that only fully admitted students, those admitted unconditionally, are eligible to receive federally funded financial aid. This information is also noted to the applicant in the admission offer.

SUBMITTING AN APPEAL REGARDING DENIAL OF ADMISSION

Applicants wishing to file an appeal concerning denial of admission to a graduate program should be submitted only if there is evidence of a policy breach, as follows:

- Applicants wishing to appeal a denial of admission must do so 30 days prior to the first date of the enrollment term. Applicants should file, in writing, the appeal to the appropriate Chairperson or Graduate Program Director for resolution. The Chairperson or Graduate Program Director (under the direction of the Chairperson) shall submit any recommendation changes to Graduate Studies and Research, copying the student within 10 working days.
- If the disposition is not favorable, the Dean of Graduate Studies and Research shall provide the final decision in writing to the student copying the Graduate Program Director and Department Chairperson within 10 working days. The Dean will only consider requests that can document evidence of a policy violation. All applicants are advised to review program admission standards prior to application submission as well as submission of an appeal.

CHANGE OF STATUS

Admission status and requirements for change of status will be noted on each student's Program of Study and submitted to Graduate Studies and Research by the end of the first semester of enrollment by the Graduate Program Director. Provisionally admitted students must satisfy all admission requirements by the time noted in their offer of admission. Application for change of status must be submitted to the respective Graduate Program Director, who recommends action to the Dean of Graduate Studies and Research. Students who are not fully admitted are limited to taking no more than 9 credit hours of graduate courses toward a graduate degree.

TRANSFER OF CREDIT

Applicants who have earned a grade of "B" or higher in graduate courses taken at an accredited institution and related to their proposed program of study can request consideration for transfer of credit. These courses will be evaluated on an individual basis by the respective Graduate Program. Applicants admitted to master's degree graduate programs may transfer a maximum of 9 graduate credits from another accredited institution toward the master's degree provided these credits have not been used to meet the requirements of a degree previously earned.

In all cases, the credit must be directly related to the graduate student's Program of Study and must have been completed within the time limit allowed by Delaware State University for the graduate degree sought by the applicant. Requests for transfer of graduate credit to master's programs should be included on the student's Program of Study and recommended by the Graduate Program Director, accompanied by an official transcript and submitted to Graduate Studies and Research for review and approval no later than the end of the student's first semester of enrollment.

Applicants admitted to doctoral programs with an earned master's degree from an accredited institution must provide supporting documentation (as requested by the Program) at the time of admission. Program Directors will review all documentation and note the allowable course waivers in the program's recommendation to Graduate Studies and Research. The Dean of Graduate Studies and Research will note approval of hours in the admissions offer.

This policy does not pertain to courses taken at another institution during graduate matriculation at Delaware State University per the approval of the program administrators and the University Registrar.

READMISSION

Students wishing to return after a lapse in enrollment are required to reapply for admission. Applicants for re-admission must update their credentials by providing information relevant to any courses taken at other institutions during their absence from the University; time limits and transfer limits apply unless other courses were approved in advance by the Graduate Program. If the request for readmission is based upon academic probation or dismissal, the application must be accompanied by a recommendation from the program director, approved by the Department Chairperson, and must be accompanied by a success plan for the student along with a revised Plan of Study.

Students requesting reinstatement of their financial aid must file the appropriate documents as noted via the Office of Financial Aid in addition to receiving reinstatement from Graduate Studies and Research.

APPLICANT CLASSIFICATION DEFINITIONS

Delaware Resident - A student who is a resident of the state of Delaware or whose parent(s) are residents of the state of Delaware (if the student is a dependent) is considered a resident of the state. If the student is a dependent, and graduated from an out-of-state College or University, proof of residency must be submitted in order to avoid out-of-state tuition. Original (or notarized copies) of two of the following items can be submitted to show proof of residency:

- A completed Delaware tax return form from the previous year;
- A lease or mortgage agreement.

Applicants should indicate residency on their application for admission to the University. Applicants who are minors are considered to be resident applicants if their parent(s) or legal guardian(s) have been residents of Delaware for at least one year. Adult applicants (at least 24 years of age) are considered to be residents of Delaware if they have been residents of the state for at least one year prior to the date of their initial quest for admission to the University. A student who may have been admitted into the University at non-residency or out-of-state status may apply for a change in residency status after being enrolled at the University for 12 consecutive months. A student seeking a change in residency status should complete a Request for Change of Residence Form and submit an original or notarized copy of two of the following supporting documents to the Office of the Registrar:

- A completed Delaware tax return form from the previous year;
- A lease or mortgage agreement; and
- A Delaware State University student I.D.

Please Note: The aforementioned does not apply to international students.

Non-Resident - A student who is not a resident, or whose parent(s) are not residents of the State of Delaware (if considered a minor or dependent).

International - A student who is not a citizen or immigrant (permanent resident) of the United States of America is considered an international student. International students who are not US citizens or immigrants should have a completed admission application on file three months prior to the beginning of the term in which they intend to enroll (**please review admission program requirements and deadlines**).

Questions regarding residency or changes in residency status should be directed to the Office of Records and Registration: 302.857.6375 or registrar@desu.edu

GRADUATE ACADEMIC POLICIES AND REGULATIONS

ACADEMIC MISCONDUCT - ACADEMIC MISCONDUCT MAY ENCOMPASS ANY COMBINATION OF THE FOLLOWING:

Cheating – The unauthorized use of information or materials, falsification of data and/or results, or the receipt of outside assistance in connection with any submitted work or activity for credit. This may include (but is not limited to) quizzes, projects, reports, papers, examinations, thesis, and/or dissertations.

Plagiarism – The act of taking credit for the ideas, words, or work of another. This includes (but is not limited to) quoting, summarizing, or paraphrasing from the work(s) of another without proper attribution.

ACADEMIC INTEGRITY POLICY

- All graduate faculty should discuss the importance of academic integrity to the graduate education and research process. Academic misconduct should clearly be defined on course syllabi and graduate handbooks **along with the consequences to academic infractions**.
- Any faculty observing any graduate student involved in academic misconduct should submit a memorandum summarizing the alleged infraction(s) along with any documentation and proposed sanctions in writing to the student; copying the Department Chair, the Graduate Program Director, the Dean of the Academic unit in which the infraction occurred, and the Dean, Graduate Studies and Research, within 24 hours of the alleged infraction.
- The alleged infraction will be addressed through established Departmental/Academic College processes and will come to Graduate Studies and Research only if a resolution cannot be reached.
- A memorandum will be forwarded to Graduate Studies and Research within two business days following any decision made at the Program, Department, or College level and placed in the student's file. If the situation cannot be resolved, then the student(s) in question must appear before the Graduate Studies Academic Misconduct Committee within five business days from receipt of the College's final decision. The committee chair will submit a summary report within 48 hours of the hearing to the Dean, Graduate Studies and Research. If the student admits to the infraction and agrees with the proposed sanction, then these actions will constitute the summary report. If the student(s) do not agree that they are guilty of the alleged infraction and/or the sanction proposed by the faculty member, then the committee's findings and recommendation should be included in the summary report.
- Any graduate student observing academic misconduct will notify a department faculty member, graduate Program Director, or Department Chair who will submit to the previously described process within 24 hours of receiving any pertinent information.
- The Dean, Graduate Studies and Research, will submit a recommendation in writing to the Provost and Vice President, Academic Affairs, whose decision will be final. The findings will be relayed in writing to the student(s) in question and copied to the Program Director, Department Chairperson, and Academic Dean.

ENROLLMENT DEFERMENT

Students who have met all admission standards and have therefore been unconditionally admitted to a graduate program of study may request a deferral of up to one academic year subject to the approval of the program administrators. Deferred students are subject to any program changes that have been implemented during the deferment and any funding offers made at the time of the initial offer are no longer binding.

CONTINUOUS ENROLLMENT

It is a requirement that all degree-seeking graduate students maintain their enrollment status throughout the duration of their program of study. All students must be registered in the semester (or term) in which the degree is officially awarded. This will require enrollment during fall and spring semesters until all degree requirements are completed.

Only students seeking to graduate during the summer must enroll during the summer session. Students out of compliance will be required to reapply to their program and if readmitted, will be subject to any program changes or admission standards implemented during their lapse of enrollment.

MINIMUM REGISTRATION REQUIREMENTS

The number of credits required for enrollment may vary based upon the Program of Study. International students must remain enrolled full-time throughout the duration of their Program of Study in order to maintain their visa status.

Students receiving financial assistance in the form of an extramurally funded grant will be held to the enrollment requirements stipulated by the grant or funding agency. Students receiving funding via University scholarships, graduate assistantships or work-study will be held to enrollment standards defined by these programs.

LEAVE OF ABSENCE

Students who have an extenuating circumstance may request a leave of absence for up to one academic year. The student will submit his or her request in writing to the Chair of their Advisory Committee. The committee will meet with the student and render a decision. This decision will be reviewed by the Graduate Program Director and submitted to the Department Chairperson for approval and forwarded to the Dean, Graduate Studies and Research, for final approval. If granted, the leave of absence will stop the clock for the enrolled student but it does not extend the enrollment timeline. Students requiring an extension will request an extension of time via their Advisory Committee.

DEGREE COMPLETION TIMING

- All master's programs must be completed within five years of initial enrollment including any transfer courses applied to the current program of study.
- All doctoral programs must be completed within seven years from the time of first enrollment.

EXTENSION OF TIME

Students with extenuating circumstances may petition their Advisory Committee for an extension of time. Students must be in good standing academically and must have successfully completed all candidacy requirements. The committee will review the candidate's petition, render a decision and forward their recommendation to the Graduate Program Director. This decision will be reviewed by the Graduate Program Director and submitted to the Department Chairperson for approval and forwarded to the Dean, Graduate Studies and Research, for final approval. If the recommendation for an extension is approved, the recommendation must be accompanied with a review of any course work outside the time limit and a recommendation on how the student will bridge this gap. Options include the following:

- **Examination:** The Department or Program may elect to examine the student (orally or in writing) and report the results to Graduate Studies and Research.
- **Independent Study:** The Department or Program may elect to design an independent study if no course currently exists by which the student may update course content.
- **Repeat the Course:** The student may repeat expired course work if the content has changed significantly since previous enrollment.
- **Additional Hours:** The Department or Program may assign additional hours of course work to ensure currency of knowledge in rapidly changing content areas;
- **No Additional Work Assigned:** The Department or Program has evaluated the curriculum and acknowledges that no significant curricula or program change has occurred since the student's first date of enrollment and therefore no additional work is assigned.

SUSTAINING CREDIT

Students who are in good standing, having successfully completed all course and candidacy requirements, must register for sustaining credit until their degree is awarded. Sustaining credit will carry with it the designation of full-time enrollment (6 hours' credit) and will be designated as thesis, dissertation, or non-thesis. These courses will replace existing sustaining graduate credit courses. Sustaining credit enrollment will be subject to the approval of the Dean, Graduate Studies and Research. Successive enrollment will require meeting established milestones from the previous term and will be designated with the grade of Q. (See Sustaining Fee information in the Tuition and Fees section).

HEALTH RECORDS

The University requires that all international graduate students as well as all U.S. graduate students who will be living on campus must fill out a Student Health Form. If a U.S. student does not live on campus, he or she does not have to complete a health form. If a U.S. graduate student decides that he or she wants to receive treatment from the Student Health Center and does not live on campus, the student must fill out the Student Health Form. These forms are available at the following link:

https://www.desu.edu/sites/flagship/files/document/1/dsu_student_health_form.pdf

ACADEMIC ADVISEMENT

Students accepted into a graduate program are assigned a Faculty Advisor by their Graduate Program Director. Graduate students should consult with their Advisor in selection of courses, degree requirements, and related matters. After the schedule is approved by the Program Director or Advisor, a student should receive a PIN number and is then allowed to web register, or the Advisor may choose to register incoming graduate students. Course lists are published each semester by the Registrar's Office and are available for viewing at the [myDESU](#) student services portal. Prior to development and submission of the Plan of Study to Graduate Studies and Research, degree-seeking students must consult with an Advisor prior to registering. After the initial consultation, graduate students should be able to follow their plan only seeking guidance as needed.

Every student is expected to complete registration before the first day of classes each semester. Students are officially registered for a course only when they have completed all procedures applying to registration, including **making full payment** or payment arrangements for any outstanding balance. **Students not officially registered for a course will not receive credit for the course at the end of the semester.**

A student who fails to register prior to the Late Registration period, which begins on the first day of classes, is charged a late registration fee. Returning students who register during the late registration period are assessed a failure to pre-register fee and a late registration fee.

ONLINE REGISTRATION

Degree-seeking students may consult with an Advisor prior to registering; however, their Plan of Study should provide them with the guidance needed for registration. Students may have their academic departments continue to enter their registrations and schedule changes (drop/adds) or they may register and make adjustments to their schedule online. To register online, students may visit the University's myDESU website at [my.desu.edu](#).

Students may view their transcripts, as well as Student Accounts and Financial Aid information, at the myDESU website listed above. Unofficial transcripts and schedules may also be printed.

CHANGE IN MAJOR OR PERSONAL DATA

Students must submit personal data (address or telephone number) changes on the appropriate forms available in the Office of Registration and Records as often as changes are made or may update their personal data on the myDESU website listed above. Graduate students wishing to change programs **must apply to and be recommended for acceptance** by the new program. Students wishing to change concentrations within a program may do so based upon the recommendation of the Program Director and approval of Department Chairperson within the first year of enrollment. This information will be relayed to Graduate Studies and Research via a revised Plan of Study for the student. This revised plan will be forwarded to the Office of Registration and Records via Graduate Studies and Research.

CREDIT HOURS

Academic work in University courses is measured in semester hours of credit. A semester hour is equal to 50 minutes of recitation or lecture work per week for one semester (16 weeks). Programs offering accelerated/shorter sessions must adjust contact hours based upon this calculation. A minimum of two hours of laboratory work yields one semester hour.

Credit will not be accepted for a course in which a student is not officially registered, nor will credit be granted for the same course twice with the exception of Thesis/Dissertation research as noted in the Program's Plan of Study.

GRADING POLICIES

A grade is reported for each course in which a student is enrolled. The grade is an indication of the quality of the student's performance in a course.

Mid-semester and final grades will be issued to all students for all courses enrolled. Final grades become a part of the student's permanent record and are used in computing grade point averages. If a student repeats a course, the highest grade in the course is calculated in the grade point average (GPA). The lower grade earned in the course is disregarded when calculating the GPA, but is not deleted from the student's record. On the student's transcript, an "E" placed next to a course indicates the repetition of a course excluded from the GPA and an "I" indicates the repetition of a course included in the GPA. The GPA is computed by dividing the total number of quality points by the total number of GPA hours earned. Non-traditional grades including grades of I, W, WA, AU, S, U, and P are not computed in the GPA.

The **Dean of the College** in which the course is offered must approve grade changes during the semester of instruction **immediately** following the semester the grade was issued. All grade changes submitted later than the succeeding semester must be approved by the Provost and Vice President for Academic Affairs. Approved grade changes will be forwarded to the Office of Registration and Records for processing.

Graduate students are issued grades at the end of each term. For each course in which the graduate student was enrolled, either a letter grade or a symbol will be entered on the graduate student's academic record. Only courses completed with a grade of "A," "B," or "C" can be used toward fulfilling the graduation requirements for a graduate degree. A grade of "Q" is to be used when thesis or dissertation research is in progress and proceeding satisfactorily. If the thesis or dissertation is not proceeding satisfactorily, a "U" grade is given. The "Q" grade can be used for several semesters. At the time the thesis or dissertation is presented, defended, and graded, the thesis/dissertation advisor will submit the appropriate quality grade (A, B, C, D, F, S, or U) for the final term, and use grade change forms to convert a sufficient number of prior to the final grade that the number of graded thesis/dissertation credits is equal to the number required for the degree.

REMOVAL OF INCOMPLETES

Incomplete course work due to reasons clearly beyond the control of the student will yield the grade "I". This grade must be removed by the end of the first six weeks of the next semester of the current academic year (i.e., for fall, the next semester is spring; for spring, the next semester is fall) unless prior arrangements are made in writing with the Instructor, with a copy sent to the Registrar. Otherwise, the grade "I" is automatically changed to "F" by the Office of Records and Registration.

NOTE: No student may graduate with an "I" grade or "In Progress" on his or her transcript.

The grading system at Delaware State University is shown below:

Grade	Quality Points	Explanation
A	4.0	Excellent
B	3.0	Good
C	2.0	Fair
D	1.0	Poor
F	0.0	Failure
WF	0.0	Withdrawal/Fail
I	Not Computed in GPA	Incomplete
W	Not Computed in GPA	Withdrew
WA	Not Computed in GPA	Administrative Drop
AU	Not Computed in GPA	Audit – Not Taken For Credit
S	Not Computed in GPA	Satisfactory
U	Not Computed in GPA	Unsatisfactory
P	Not Computed in GPA	Pass
Q	Not Computed in GPA	Thesis/Dissertation in progress proceeding satisfactorily

GRADUATE COURSE LEVEL

Courses which may apply toward a Graduate Program are numbered 500 and above.

COURSE LOADS

Full-time graduate enrollment is defined at DSU as a minimum of 6 credit hours. Students enrolled in less than 6 credit hours per semester hours are considered part-time students, with those enrolled for 3 credit hours defined as half-time students. Graduate students must therefore complete a minimum of 12 hours of course work each academic year to qualify for financial aid. In addition, full-time students must meet the academic regulations specified within this document to remain in good standing.

UNDERGRADUATE STUDENT ELIGIBILITY FOR TAKING GRADUATE-LEVEL COURSES

Students who have accrued the requisite number of hours to be classified as seniors and who have also accrued a minimum grade point average of 3.0 within the major or program of interest are eligible to take introductory graduate courses. These courses should typically be those offered in the first year core to graduate students but minimally should be those not requiring any graduate course pre-requisites.

Undergraduates who meet eligibility requirements must also receive permission of the Advisor, Instructor, and Department Chairperson (or designee). If enrolled as a full-time undergraduate, the student will be charged at the undergraduate tuition rate for up to 9 credits.

The student may elect to use the graduate course in order to meet a credit hour requirement or to fulfill an undergraduate course requirement in cases where an undergraduate course is not available. If the student elects to use the course to fulfill an undergraduate requirement, the Department may waive this requirement should the student continue in a Graduate Program requiring the course, but the student will be required to take an additional course to meet the requisite credit hour requirement. If the student continues in a Graduate Program and elects to use the course to fulfill a graduate requirement, the Department is free to allocate the credit toward the student's graduate Plan of Study. In the latter instance, however, the student is subject to the policies governing graduate student academic performance.

AUDITING CLASSES

Courses may be taken for audit by graduate or non-degree students with the permission of the instructor and the student's advisor. No credits are earned for auditing courses. The deadline for designating a course as an audit is at the end of the first week of each semester. A grade of "AU" is entered on the graduate student's record for the course. Persons carrying less than full-time credit hour load of 6 credit hours are charged the per credit hour fee for the course. The final grade of "AU" is assigned to the course and does not affect the grade point average. Courses taken for audit do not count toward full-time enrollment or for financial aid eligibility. Official requests to audit a course are accepted by the Office of Records and Registration during the period between pre-registration and late registration (the period for submitting a request to audit a course coincides with the add period.) The Notice of Class Change form (Drop/Add Slip) should be used to change a course to audit status.

DOCUMENTATION FOR NON-ATTENDANCE (NO SHOW POLICY)

All enrolled students are required to attend each class at least once during the first week of classes in order to verify participation in the class. Failure to verify participation in a class before the end of the first week of classes will result in the student being classified as a "no show" for the course. All tuition and fees for the course will be refunded and no grade will be issued.

ADDING AND DROPPING CLASSES ONLINE

Eligible students without financial holds are permitted to add and drop classes online at the University's myDESU website at my.desu.edu. The approval to adjust the course schedule online must be obtained from the student's academic Advisor prior to going online to adjust his or her schedule.

ADDING CLASSES

To add a class, students may go online after obtaining approval from their academic Advisor or Department Chair or follow the steps below:

- Obtain a Notice of Class Change form (Drop/Add Slip) from their academic department.
- Complete the student and class information portions of the form.
- Obtain the signatures of the appropriate instructor and the appropriate Advisor/ Chair.
- Submit the completed form to the Office of Records and Registration. The effective date of the drop is the date the slip is filed in the Records Office.

The deadline for adding of classes is outlined in the Academic Calendar. For courses offered on a schedule different from the regular fall, spring, and summer terms, the add period is the shorter of one week or the calendar equivalent of 13 percent of the instructional time. For such courses that meet only once per week, the add period ends on the day before the second meeting of the class. The last day to drop such a course is prior to completion of 60 percent of the instructional time.

DROPPING CLASSES

To drop a class, students may go online after obtaining approval from their academic Advisor or Department Chair or follow the steps below:

THROUGH THE END OF LATE REGISTRATION

- Obtain the Notice of Class Change Form (Drop Slip) from the academic department.
- Have Instructors and Advisors/Chairs sign and date the form.
- Submit the form to the Office of Records and Registration.

The effective date of the drop is the date the slip is filed in the Records Office. Courses dropped prior to the end of the Late Registration Period will not appear on the student's grade report or transcript (a current Refund Policy statement may be obtained from the Office of Student Accounts to determine the student's financial responsibility).

AFTER LATE REGISTRATION THROUGH THE SCHEDULED LAST DAY FOR DROPPING CLASSES

- Obtain the Notice of Class Change Form (Drop Slip) from the academic department.
- Have Instructors and Advisors/Chairs sign and date the form.
- Submit the form to the Office of Records and Registration.

The effective date of the drop is the date the slip is filed in the Records Office. The dropped course will appear on the grade report and transcript with a grade of "W" for "Withdrawn" (a current Refund Policy statement may be obtained from the Office of Student Accounts to determine the student's financial responsibility for courses dropped during this period).

AFTER THE SCHEDULED LAST DAY FOR DROPPING CLASSES AND UP TO THE LAST WEEK OF CLASSES

- Obtain the Notice of Class Change Form (Drop Slip) from the academic department.
- Have Instructors and Advisors/Chairs sign and date the form.
- Students must obtain the signature of the dean of the school/college.
- Submit form to the Office of Records and Registration. Course will appear on grade report and transcript with a grade of "WA" for "Administrative Withdrawal."

The Dean is the only University official who may approve the dropping of a class at this point in the semester. The appropriate Dean shall permit students who officially request to drop specific classes from their academic schedules to do so only in cases involving extraordinary circumstances that are clearly beyond the control of the students making such a request. **In no case shall a student be permitted to drop a class for any reason that relates exclusively to academic performance.**

WITHDRAWAL FROM COURSES OR THE UNIVERSITY

After the last day to drop courses, withdrawal from a course requires a graduate student to obtain the Advisor's approval and then to petition the Dean of Graduate Studies and Research, explaining that he is she is interested in withdrawing from the course due to extenuating circumstances beyond control. Such a petition must contain conclusive evidence, properly documented, of the situation that prevents completion of the course. Acceptable reasons do not include dissatisfaction with performance in a course, with instruction, or with an expected grade. If the petition is approved, the graduate student will receive a grade of "WA" (Administrative Withdrawal) in the course.

A graduate student who wishes to withdraw from all courses or the graduate program must obtain and complete a Withdrawal Form from the Registrar's Office. Withdrawal is complete when all necessary signatures have been obtained and the form has been received in and processed by the Registrar's Office. A student who withdraws from the University will receive a grade of "W" in each course enrolled that term. All withdrawals must be completed on or before the last day to withdraw from the University as indicated on the Academic Calendar for the term.

For graduate courses offered on a schedule different from the standard academic terms, the last day to withdraw from a course is prior to completion of 60 percent of the instructional time. The last day to withdraw from the University is prior to the final week of the student's classes.

To re-enter the graduate program after withdrawing from the University, a graduate student must reapply for admission.

ADMINISTRATIVE WITHDRAWAL FROM THE UNIVERSITY

A student with a compelling reason (such as documented extreme personal difficulty or documented medical reason) may request to be administratively withdrawn from the University for a previous term. Administrative withdrawal is rarely granted, but it may be warranted in some circumstances. Only the Provost and Vice President for Academic Affairs may authorize such withdrawal, and the following procedure must be followed.

- The student must submit a written request for administrative withdrawal from the University to the Dean of Graduate Studies and Research. The request must state the compelling reason, specify the term to be withdrawn, and be accompanied by documentation of the validity of the reason.
- The Dean of Graduate Studies and Research reviews the request and submits his or her recommendation in writing to the Provost and Vice President for Academic Affairs, along with the request and documentation from the student.

If the Provost and Vice President for Academic Affairs approve the request, the student is reported to the Registrar's Office as "Administratively Withdrawn," and a grade of "WA" is assigned for all courses taken during that semester. The Provost and Vice

President for Academic Affairs also inform the student in writing of the decision

Please Note: If a student has received financial aid, including a refund, from Title IV funds and completed less than 60 percent of the semester from which he/she wishes to withdraw, then that student must refund the percentage of financial aid corresponding to the percentage of the semester the student has not completed.

ACADEMIC PROBATION, SUSPENSION AND DISMISSAL

Graduate students who receive a grade of "U" in a graduate course or thesis/dissertation or do not achieve a cumulative grade point average of or greater at the end of their second semester are placed on academic probation for the following term.

DISMISSAL

Any of the following situations will result in the academic dismissal of a graduate student working toward a graduate degree:

1. Receiving a grade of "D" or "F" in a graduate course;
2. Failure to achieve a term grade point average of 3.0 or greater while on academic probation;
3. Being placed on academic probation for more than two (2) terms; or
4. Receiving three (3) grades of "C."

TRANSCRIPT REQUESTS

A transcript of a student's academic record is released to a third party upon the written and signed request of the student. In accordance with the Family Educational Rights & Privacy Act (FERPA), exceptions to this include release of academic records to University officials with legitimate rights, educational interests, and transfer institutions.

An official transcript, one bearing the seal and Registrar's signature, is sent from the Office of Records and Registration directly to the official or institution specified by the student. There is a fee of \$10.00 for each transcript requested. A request for a transcript will normally be processed within 5-7 business days (*subject to change*) except during peak work periods such as registration, pre-registration, final examinations, and commencement. An official transcript includes all academic course work at Delaware State University.

Transcripts submitted by the student from other institutions become the property of Delaware State University and are not reissued or copied for release. Requests for other institutions' transcripts must be made directly to the respective institutions.

NOTIFICATION OF RIGHTS UNDER FERPA FOR DELAWARE STATE UNIVERSITY STUDENTS

The Family Educational Rights & Privacy Act (FERPA) affords students certain rights with respect to their education records: They are:

- The right to inspect and review the student's education records within 45 days of the day the University receives a request for access. Students should submit to the Registrar, Dean, Head of the Academic Department, or other appropriate official, written requests that identify the record(s) they wish to inspect. The University official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the University official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.
- The right to request the amendment of the student's education records that the student believes are inaccurate or misleading. Students may ask the University to amend a record that they believe is inaccurate or misleading. They should write the University

official responsible for the record, clearly identify the part of the record they want changed, and specify why it is inaccurate or misleading. If the University decides not to amend the record as requested by the student, the University will notify the students of the decision, and advise the student of his or her right to a hearing regarding the request for amendment. Additional information regarding the hearing procedures will be provided to the student when notified of the right to a hearing.

- The right to consent to disclosures of personally identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent. **One exception**, which permits disclosure without consent, is disclosure to school officials with legitimate educational interests. A school official is a person employed by the University in an administrative, supervisory, academic or research, or support staff position (including law enforcement unit personnel and health staff); a person or company with whom the University has contracted (such as an attorney, auditor, or collection agent); a person serving on the Board of Trustees; or a student serving on an official committee, such as a disciplinary or grievance committee, or assisting another school official in performing his or her tasks. A school official has a legitimate educational interest if the official needs to review an education record in order to fulfill his or her professional responsibility. Upon request, the University discloses education records without consent to officials of another school in which a student seeks or intends to enroll.
- The student has the right to file a complaint with the U.S. Department of Education concerning alleged failures by Delaware State University to comply with the requirements of FERPA. The name and address of the Office that administers FERPA is:
Family Policy Compliance Office | U.S. Department of Education
400 Maryland Avenue, SW Washington, D.C. 20202-4605

DIRECTORY INFORMATION

The Family Educational Rights and Privacy Act permits the release of directory-type information to third parties outside the institution without written consent of the student provided the student has been given the opportunity to withhold such disclosure.

The University releases, upon inquiry to third parties outside the University, directory information without written consent of the student. Directory information at Delaware State University includes:

- Name
- Address (including email address)
- Telephone number
- College/School
- Classification
- Major field of study
- Dates of attendance
- Enrollment status
- Academic Honors
- Degree(s) conferred (including dates)

Graduate students who do not wish to have the above information released should complete an information exclusion card available at the Records Office.

Please Note: While the withholding request may be made at any time, students wishing to have directory information withheld from the student directory should submit their requests no later than three weeks prior to the first day of fall semester classes.

MATRICULATION DOCUMENTS/PROCESSES

Change of Admission Status: All **provisionally** admitted students must be fully admitted by the end of the first year of enrollment or as noted on their offer of admission in order to continue with their program of study. **Only fully admitted students are eligible to receive federally funded financial aid.** Once the change of status is approved, fully admitted the student to his or her Graduate Program, this information is forwarded to the Office of the Registrar and the Office of Financial Aid.

Plan of Study: The Program Director or assigned Advisor should review the general Program of Study with each student. An individual plan should be submitted to Graduate Studies and Research by the end of the student's first semester of enrollment. This document should be signed by the student, Program Advisor, Program Director and Chairperson prior to submission to the Dean, Graduate Studies and Research, for approval. This process signifies that the student has been advised and is aware of all requirements for successful matriculation. This document will be used for audit purposes as the student matriculates through the Program of Study. Any revisions to the plan should be submitted to Graduate Studies and Research. Requests for **transfer of credit** should be noted on this form as well and accompanied with an official transcript. This information once approved by Graduate Studies and Research is forwarded to the Office of Registration and Records and noted on the student's DSU transcript.

Advisory Committee: For all thesis and dissertation programs, the Program Director (or designated advisor) is responsible for fostering the committee appointment process. The committee should be formulated no later than the end of the 2nd semester of enrollment for master's programs, the end of the 3rd semester of enrollment for the doctor of education program, or the 5th semester of enrollment for doctor of philosophy programs. The Program Director (or designee) will schedule an initial meeting with the student during the first semester of enrollment to develop a Plan of Study at which time the process for establishment of an Advisory Committee will be discussed. A meeting will be called in which all committee members will assemble to discuss the responsibilities of the committee, the student's capstone project, and frequency (and mode) of meeting. The Chair of the Advisory Committee should hold faculty rank in the same Department/Program of the student. All committee signatures are gathered at this meeting; a copy will be submitted to the Graduate Studies and Research Office, one retained by the student, and one copy retained in the Department Office. The Program Director will monitor student progress via this committee once established. Programs not requiring a thesis or dissertation but require a culminating activity requiring committee approval should forward this document to Graduate Studies and Research or the Program Director may submit a memorandum noting the decision process for their program.

Application for Advancement to Candidacy: All graduate students **must petition** their program administrators for **permission** to advance to candidacy status. Students must be fully admitted and in good standing academically in order to meet this milestone. Students enrolled in master's programs requiring a thesis must complete the candidacy application following successful completion of the required curriculum and approval of a research proposal or prospectus (as well as successful defense for some programs) by their Advisory Committee (per the DSU Graduate Catalog). For students enrolled in non-thesis programs, candidacy admission is based upon successful completion of the required or core curriculum. Completion of a capstone or culminating activity will be noted on the Plan of Study. Outcomes reports along with rubrics will be submitted prior to graduation. Doctoral students are admitted to candidacy following successful completion of qualifier or comprehensive examinations. Successful submission and defense of a dissertation is a requirement for all Ph.D. programs as well as the dissertation track for the Ed.D. program, and therefore the proposal defense is a requirement for the dissertation (per the DSU Graduate Catalog). If the research project requires IRB approval, this should be acquired following the proposal defense and prior to beginning the research project. This documentation is also required with the candidacy application. All master's students should complete this requirement along with any supporting documentation no later than the semester prior to graduation while doctoral students must do so no later than two semesters prior to graduation.

THESIS SUBMISSION PROCESSES

A master's degree student who elects or is required to complete a thesis must have a Thesis Committee established no later than the end of the second semester of full-time residency (as previously noted). The committee shall consist of a minimum of four members' equivalent to the rank of Assistant Professor or above, at least one of whom shall be from outside the Department (some programs have more stringent requirements). The external member is prohibited from serving as chair. The Committee membership must be approved by the Research Advisor, Department Chairperson or designee, College Dean, and Dean of Graduate Studies and Research.

A graduate student initiating a thesis project should select a topic in consultation with the Research Advisor and the Graduate Program Director. The graduate student must file for and receive approval from the Thesis Committee during the semester prior to beginning work on the thesis. At a minimum this request will require the student to submit a brief written thesis proposal to the committee for its approval. Graduate programs may have additional requirements, including but not limited to oral presentation of the project proposal. This document is submitted with the candidacy application as noted.

Due to the nature of research and creative work at the graduate level, it is expected that the thesis project may evolve in unanticipated ways. Graduate students are strongly advised to consult frequently with their Research Advisor and to keep their Thesis Committee members apprised of progress. In the event that the student and the Advisor decide to make substantive changes in the project's goals, aims, or scope, a revised thesis proposal should be submitted, reviewed, and approved in the same manner as the initial proposal.

A graduate student preparing a thesis must present and satisfactorily defend the thesis in an oral presentation and examination to the Thesis Committee during the student's final semester. All members of the committee shall be given a copy of the final draft of the thesis at least one week (7 days) prior to the examination for master's theses. The **completed** thesis should be submitted to the respective committee for review and if deemed acceptable, an oral examination consisting principally of a defense of the thesis will be scheduled. **Only students admitted to candidacy are eligible to schedule a defense.** The [Defense Scheduling Form](#) is used for this purpose. The document must be submitted to Graduate Studies and Research no later than **four weeks** prior to the requested date. It is the responsibility of **Graduate Studies and Research** to inform the University community of the pending defense via publication in the e-news so that interested persons can attend the presentation portion.

The thesis defense has four components:

- Presentation of the work by the student;
- Defense of the thesis by the student through questioning in an open session by the committee members and others in attendance and, if requested by the committee, at a closed session for the committee and the student only;
- Discussion by the committee in a closed session to determine whether or not the thesis, including its defense, is satisfactory; and
- Communication to the student by the committee chairperson the outcome of the defense.

The committee has five alternatives:

- Accept the thesis without any recommended changes, and for all members to sign the approval page;
- Accept the thesis, subject to the student making the recommended changes, with all committee members, except the chairperson signing the approval page, and the chairperson responsible for checking the revised thesis to ensure the changes were made, and signing approval at that time;
- Recommend revision to the thesis, but not to sign until the revised thesis has been submitted to and reviewed and approved by the committee members;
- Recommend revision of the thesis and a second meeting of the committee with the student to review the thesis and complete the defense; or
- The thesis, including its defense, is determined to be unsatisfactory, and therefore the student fails.

The **Defense Outcomes Form** is a report to Graduate Studies and Research on the candidate's performance (as the oral examination is in partial fulfillment of the degree) and is expected within five business days following the defense. No thesis will be reviewed by Graduate Studies and Research without receipt of this documentation. With the exception of accepting the document without any changes, the chairperson will attach a summary of expectations and/or processes required for completion of all revisions/ corrections as well as the expected timeline for completion. If the candidate fails the defense, the chairperson will attach a summary and if/when a second examination (defense) will be scheduled. A document approved by the committee is submitted to the Dean of the College and finally to the Dean, Graduate Studies and Research, for final approval. Graduate Studies and Research is not responsible and will not provide editorial services for candidates. Documents not adhering to general guidelines will be sent back to the Academic College for review. Graduate Studies and Research reviews general formatting and the following content areas:

- Introduction including background, significance and scope of the study undertaken.
- Review of the Literature
- Research Methodology or Experimental Procedure
- Discussion of Research Findings
- Conclusion(s) and suggested future work

An extensive review is provided in the Thesis/Dissertation Handbook found at the following link:

https://sgsr.desu.edu/sites/sgsr/files/document/6/thesis_and_dissertation_handbook.pdf

Graduate students must have the thesis completed, defended, approved, and submitted to ProQuest for binding prior to the date noted in the Academic Calendar. Students whose final signed theses/dissertations are not submitted to ProQuest before the noted deadline will not be eligible to participate in Commencement ceremonies.

The thesis and all related procedures must be completed as noted in the Academic Calendar for those planning to graduate at the conclusion of the fall or spring semester. The finished thesis, which includes changes resulting from the oral examination along with a completed approval form, must comply with criteria described in the Thesis Handbook. The finished document must be submitted online to ProQuest at <http://www.etdadmin.com/cgi-bin/school?siteId=801>. Prior to submission, all students will be required to view the ProQuest Submission Tutorial. The distribution of bound copies will be as follows at the expense of the student:

- One bound original (8.5" x 11.0") to the University Library;
- Personal copy(ies) at your discretion.

A graduate student who requires more than one semester to complete the thesis will receive the symbol "Q" (Thesis incomplete) for each semester in which progress is satisfactory, until the thesis is satisfactorily completed. A graduate student who has previously registered for thesis and completed all course and research requirements may choose not to register for, or work on the thesis, but must pay the current Sustaining Fee (all other fees waived) for each semester until the degree is completed. Semesters not registered will count toward the time limit allotted to complete the degree. The Department Chairperson (or designee) must recommend to the Dean of Graduate Studies and Research approval of all registrations for the Sustaining Thesis beyond one semester.

NON-THESIS OUTCOMES REPORTING

Capstone or culminating activities reports along with rubrics are due as noted for all graduating students as noted on the Academic Calendar (but no later than the date for submission of grades to the Office of the Registrar). The outcome may be summarized on the defense outcomes report the same form as the thesis defense noting the activity and the selection of the outcome as previously noted.

DISSERTATION SUBMISSION PROCESSES

A doctoral degree student must have a Dissertation Committee established not later than the end of the third semester of full-time residency or before his or her dissertation project begins. For a doctoral dissertation, the committee will be augmented by an additional expert member from outside the University at the time of dissertation defense. The committee shall consist of five members equivalent to the rank of Assistant Professor or above, at least one of whom shall be from outside the Department. The external member is prohibited from serving as chair. The committee membership must be approved by the Research Advisor, Department Chairperson (or designee), College Dean, and Dean of Graduate Studies and Research.

A doctoral student initiating a dissertation project should select a topic in consultation with the Research Advisor and the Graduate Program Director. The graduate student must file for and receive approval from the Dissertation Committee during the semester prior to beginning work on the dissertation. At a minimum this request will require the student to submit a brief written dissertation proposal to the committee for its approval. Graduate programs may have additional requirements, including but not limited to oral presentation of the project proposal. This document is submitted along with the application for candidacy. Students engaged in research requiring Institutional Review Board (IRB) approval must do so prior to beginning the research project and should provide this documentation as noted on the candidacy application.

Due to the nature of research and creative work at the graduate level, it is expected that the dissertation project may evolve in unanticipated ways. Graduate students are strongly advised to consult frequently with their Research Advisor and to keep their Dissertation Committee members apprised of progress. In the event that the student and the Advisor decide to make substantive changes in the project's goals, aims, or scope, a revised dissertation proposal should be submitted, reviewed, and approved in the same manner as the original proposal.

A doctoral student preparing a dissertation must present and satisfactorily defend the dissertation in an oral presentation and examination by the Dissertation Committee during the student's final semester. The **completed** dissertation should be submitted to the respective committee for review and if deemed acceptable, an oral examination consisting principally of a defense of the dissertation will be scheduled. All members of the committee shall be given a copy of the final draft of the dissertation three weeks (15 business days) prior to the examination for a doctoral dissertation. Defense will be conducted with a maximum of two presentations -- one, open to the general public and one, closed session. Number of question(s) will be determined by the Program Director. **Only students admitted to candidacy are eligible to schedule a defense.** The [Defense Scheduling Form](#) is used for this purpose. The document must be submitted to Graduate Studies and Research no later than **four weeks** prior to the requested date. It is the responsibility of **Graduate Studies and Research** to inform the University community of the pending defense via publication in eNews so that interested persons can attend the presentation portion.

The dissertation defense has four components:

- Presentation of the work by the student;
- Defense of the dissertation by the student through questioning in an open session by the committee members and others in attendance and, if requested by the committee, at a closed session for the committee and the student only;
- Discussion by the committee in a closed session to determine whether or not the dissertation, including its defense, is satisfactory; and
- Communication to the student by the committee chairperson the outcome of the defense.

The committee has five alternatives:

- Accept the dissertation without any recommended changes, and for all members to sign the approval page;
- Accept the dissertation, subject to the student making the recommended changes, with all committee members, except the chairperson signing the approval page, and the chairperson responsible for checking the revised dissertation to ensure the changes were made, and signing approval at that time;

- Recommend revision to the dissertation, but not to sign until the revised dissertation has been submitted to and reviewed and approved by the committee members;
- Recommend revision of the dissertation and a second meeting of the committee with the student to review the dissertation and complete the defense; or
- The dissertation, including its defense, is determined to be unsatisfactory, and therefore the student fails.

The **Defense Outcomes Form** is a report to Graduate Studies and Research on the candidate's performance (as the oral examination is in partial fulfillment of the degree) and is expected within 5 business days following the defense. No dissertation will be reviewed by Graduate Studies and Research without receipt of this documentation. With the exception of accepting the document without any changes, the chairperson will attach a summary of expectations and/or processes required for completion of all revisions/ corrections as well as the expected timeline for completion. If the candidate fails the defense, the chairperson will attach a summary and if/when a second examination (defense) will be scheduled. A document approved by the committee is submitted to the Dean of the College and finally to the Dean, Graduate Studies and Research, for final approval. Graduate Studies and Research is not responsible and will not provide editorial services for candidates. Documents not adhering to general guidelines will be sent back to the Academic College for review. Graduate Studies and Research reviews general formatting and the following content areas:

- Introduction including background, significance and scope of the study undertaken.
- Review of the Literature
- Research Methodology or Experimental Procedure
- Discussion of Research Findings
- Conclusion(s) and suggested future work

An extensive review is provided in the Thesis/Dissertation Handbook found at the following link:

https://sgsr.desu.edu/sites/sgsr/files/document/6/thesis_and_dissertation_handbook.pdf

Doctoral students must have the dissertation completed, defended, approved, and submitted to ProQuest for binding prior to the date noted in the Academic Calendar. Students whose final signed dissertations are not submitted to ProQuest before the noted deadline will not be eligible to participate in Commencement ceremonies.

The dissertation and all related procedures must be completed as noted in the Academic Calendar for those planning to graduate at the conclusion of the fall or spring semester. The finished dissertation, which includes changes resulting from the oral examination along with a completed approval form, must comply with criteria described in the Thesis/Dissertation Handbook. The finished document must be submitted on-line to ProQuest at <http://www.etsdadmin.com/cgi-bin/school?siteid=801>. Prior to submission, all students will be required to view the ProQuest Submission Tutorial. The distribution of bound copies will be as follows at the expense of the student:

- One bound original (8.5" x 11.0") to the University Library;
- Personal copy(ies) at your discretion.

A doctoral student who requires more than one semester to complete the dissertation will receive the symbol "Q" (Dissertation incomplete) for each semester in which progress is satisfactory, until the dissertation is satisfactorily completed. A doctoral student who has previously registered for dissertation research credit and completed all course and research requirements may choose not to register for, or work on the dissertation, but must pay the current Sustaining Fee (all other fees waived) for each semester until the degree is completed. Semesters not registered will count toward the time limit allotted to complete the degree. The Graduate Program Director must recommend to the Dean of Graduate Studies and Research approval of all registrations for the Sustaining Dissertation beyond one semester.

A graduate student who requires more than one semester to complete the dissertation will receive the symbol "Q" (dissertation incomplete) for each semester in which progress is satisfactory, until the dissertation is satisfactorily completed. A graduate student who has previously registered for dissertation and completed all course and research

requirements may choose not to register for, or work on the dissertation, but must pay the current Sustaining Fee (all other fees waived) for each semester until the degree is completed. Semesters not registered will count toward the time limit allotted to complete the degree. The Graduate Program Director and Dean of Graduate Studies and Research must approve all registrations for the Sustaining Dissertation beyond one semester.

DEGREE REQUIREMENTS AND APPLICATION FOR GRADUATION

In order to earn a master's or a doctorate degree, graduate students must satisfy all of the institutional requirements as well as the specified requirements of the program in which they are enrolled. At a minimum to earn a master's degree, a student must have earned at least 30 graduate credits, of which no more than 6 may be thesis, internship, or other special project. At a minimum to earn a doctoral degree, a student must have earned at least 60 graduate credits (including those previously applied toward a master's degree and accepted as part of the doctoral curriculum), of which not more than 18 may be for the dissertation. Students may take additional thesis or dissertation credits, as needed, for the duration of their project. In no cases may additional thesis/dissertation credits be substituted for core or elective courses in determining qualification for the degree.

To earn a graduate degree, the graduate student must have a cumulative grade point average of 3.0 or higher (on a 4.0 scale) for all work taken on the graduate level.

Graduate students who expect to graduate in December or May must file an Application and Audit for Graduation with Graduate Studies and Research for review as noted in the Academic Calendar. Upon review and approval from the Dean, Graduate Studies and Research, the application and audit will be forwarded to the Office of Registration and Records by its noted deadline.

Graduate audits require submission and approval of all required documentation in order to remain in good standing:

- Plan of Study (with any requested transfers of credit) by the end of the first semester of enrollment;
- Thesis/Dissertation Programs - Advisory Committee prior to beginning culminating activity requirement; and
- Thesis/Dissertation Programs - Candidacy Application no later than 1 semester prior to graduation for graduate students; 2 semesters prior to graduation for doctoral students.

PARTICIPATION IN GRADUATION EXERCISES

Graduate students may participate in the annual graduation exercises in May only if the following conditions are met:

- File the application and audit for graduation and all supporting documents as previously noted.
- Enroll in all courses required to complete degree requirements.
- Successfully complete those courses of current enrollment and satisfy all degree program requirements.
- Submit any required thesis or dissertation to the library for binding as noted in the Academic Calendar.
- Satisfy all financial obligations to the University.

Graduate degree recipients interested in participating in Commencement ceremonies must submit the Application for Graduation according to the procedures and deadlines in place, even if they completed the requirements the previous August or December.

SUBMITTING AN APPEAL

Appeals concerning reevaluation of a final course grade should be submitted as follows:

Graduate students should file, in writing, the complaint or appeal to the appropriate Graduate Program Director for resolution. The Graduate Program Director shall reply to the student within 10 business days;

- If the disposition is not favorable, the graduate student may appeal to the respective College Dean, by submitting the previous appeal documents, the Graduate Program Director's response, and any additional relevant information. The Dean shall reply to the student within 10 business days.
- If the disposition is not favorable, the final appeal may be brought in writing to the Dean of Graduate Studies and Research. All prior documents plus additional information must be submitted.
- The Dean of Graduate Studies and Research shall reply to the student within 10 business days.

Appeals concerning reinstatement from dismissal from a graduate program must be submitted to the Dean of Graduate Studies and Research. The appeal must be in writing, include documented support from the Graduate Program Director and College Dean, and provide an explanation from the student describing how he or she will complete the degree program successfully, if reinstated.

2018-19[^] Tuition and Fees

DOCTORAL & GRADUATE FEES | DOVER

	IN-STATE	OUT-OF-STATE	DOCTORAL
Per Credit Hour	\$430.00	\$948.00	\$544.00
Registration Fee	\$60.00	\$60.00	\$60.00
Technology Fee	\$55.00	\$55.00	\$55.00
Student Activity Fee	\$60.00 (Pro-rated based on credit hours)	\$60.00 (Pro-rated based on credit hours)	\$60.00 (Pro-rated based on credit hours)

GRADUATE FEES | WILMINGTON

	MBA	Public Administration	Social Work, Sport Administration
Per Credit Hour	\$515.00	\$464.00	\$438.00
Registration Fee	\$60.00	\$60.00	\$60.00
Technology Fee	\$55.00	\$55.00	\$55.00
Student Activity Fee	\$60.00 (Pro-rated based on credit hours)	\$60.00 (Pro-rated based on credit hours)	\$60.00 (Pro-rated based on credit hours)

STUDENT HEALTH INSURANCE FEE**

FALL	SPRING	YEARLY TOTAL
\$377.00	\$377.00	\$754.00

** Students with adequate health insurance coverage may opt/waive out of this fee.

LAB FEES: Laboratory fees are assessed for some courses to cover the cost of supplies and special facilities. Labs may vary from \$10.00 to \$20,000.00. The Aviation labs vary from \$5,000.00 to \$20,000.00 per related course.

HOUSING AND MEAL PLANS

All students who reside in University housing are required to be enrolled in at least 12 credit hours per semester. Students who are enrolled in less than 12 credit hours per semester will be assessed a part-time boarder fee to adjust the student's account to reflect full-time charges.

HOUSING DEPOSIT: A \$200.00 housing deposit is required to secure your housing assignment for the academic year. Housing is available on a first-come, first-served basis. The housing deposit is non-refundable if not received by June 30.

SECURITY DEPOSIT: A \$300.00 security deposit and a \$100.00 application fee are required to secure your housing assignment in the University Courtyard or the University Village apartment complexes.

DSU Living and Learning Commons

	FALL	SPRING	YEARLY TOTAL
Double	\$3,995.00	\$3,995.00	\$7,990.00
Single	\$4,995.00	\$4,995.00	\$9,990.00

University Courtyard – 12-month lease

	PER MONTH	PER SEMESTER	PER YEAR
Two Bedrooms/Two Baths	\$874.00	\$5,244.00	\$10,488.00
Four Bedrooms/Two Baths	\$750.00	\$4,500.00	\$9,000.00

University Village Apartments – 12-month lease

	PER MONTH	PER SEMESTER	PER YEAR
One Bedroom/One Bath	\$1,064.00	\$6,384.00	\$12,768.00
Two Bedrooms/Two Baths	\$874.00	\$5,244.00	\$10,488.00
Two Bedrooms/One Bath	\$787.00	\$4,722.00	\$9,444.00
Four Bedrooms/Two Baths	\$757.00	\$4,542.00	\$9,084.00
Two Bedrooms/One Bath Suite	\$720.00	\$4,320.00	\$8,640.00

Student Meal Plan Options

Students MUST select one option from below or the Traditional 19 Meal Plan will be assigned.

	FALL	SPRING	YEARLY TOTAL
7 Day All-Access Meal Plan 150 Flex Dollars	\$2,182.00	\$2,182.00	\$4,364.00
5 Day All-Access Meal Plan 150 Flex Dollars	\$2,101.00	\$2,101.00	\$4,202.00
Traditional 19 PLUS 100 Flex Dollars	\$2,100.00	\$2,100.00	\$4,200.00
Traditional 15 PLUS 100 Flex Dollars	\$2,030.00	\$2,030.00	\$4,060.00
Traditional 10 PLUS 100 Flex Dollars	\$1,862.00	\$1,862.00	\$3,724.00
120 Block Plan * 150 Flex Dollars	\$1,049.00	\$1,049.00	\$2,098.00
75 Block Plan * 150 Flex Dollars	\$731.00	\$731.00	\$1,462.00
50 Block Plan * 150 Flex Dollars	\$546.00	\$546.00	\$1,092.00

Meal plan yearly totals do NOT include summer sessions.

Flex Dollars are funds that can be used at times that are not designated as meal times.

*Option available only for commuters and residents of Courtyard Apartments.

VOUCHERS:

- All computer labs require that a student has a print voucher. Unused print vouchers are refunded at the end of a semester. The cost to print is \$0.05 per page (black-and-white).
- A traditional residence hall and University Village apartment resident may require a laundry voucher, which is refunded at the end of each semester. Cost per load: washer \$1.25, dryer \$1.

ITEMIZED FEES FOR THE ACADEMIC YEAR

* Fees can be applied per semester

Application Fee (Graduate/Doctoral) — **\$50.00**
 Distance Education Fee (Per Course) — **\$35.00**
 Drop Fee (Per Drop Slip) — **\$10.00**
 Failure to Pre-Register* — **\$50.00**
 Graduate Activity Fees Full-time* (4 credits or more) — **\$60.00**
 Graduate Activity Fees Part-time* (Less than 4 credits) — **\$30.00**
 Graduate Sustaining Fee (Master's)* — Equivalent of one in-state credit hour of tuition per semester
 Graduate Sustaining Fee (Doctoral)* — Equivalent of one credit hour of enrollment per semester
 Graduation Fee — **\$175.00**
 Late Payment Fee* — **\$100.00**
 Late Registration Fee* — **\$50.00**
 Living and Learning Commons Deposit — **\$200.00**
 NBS Tuition Payment Plan Enrollment Fee* — **\$35.00**
 NBS Tuition Payment Plan Late Fee — **\$35.00**

NBS Tuition Payment Plan Return Payment Fee — **\$30.00**

Overdue Library Fee (Per Day) — **\$1.00**
 Registration Fee* (Doctoral and Graduate) — **\$60.00**
 Returned Check Fee — **\$35.00**
 SMARTCARD ID Damage Fee — **\$25.00**
 SMARTCARD ID Replacement Fee — **\$50.00**
 Student Health Insurance Fee* — **\$377.00**
 Student Teaching Fee* — **\$150.00**
 Technology Fee* — **\$55.00**
 Technology Fee* (Summer Sessions) — **\$35.00**
 Traditional Housing Deposit — **\$200.00**
 Transcript Fee — **\$10.00**
 University Courtyard Application Fee — **\$100.00**
 University Courtyard Deposit — **\$300.00**
 University Courtyard Late Fee (Monthly) — **\$35.00**
 University Village Application Fee — **\$100.00**
 University Village Deposit — **\$300.00**
 University Village Late Fee (Monthly) — **\$35.00**
 Vehicle Registration Fee (Per Semester) — **\$40.00**
 Vehicle Registration Fee (Per Year) — **\$70.00**
 Vehicle Registration Fee (Summer) — **\$30.00**

[^] Please note that these charges are subject to change. Typically, there is a modest increase to tuition and fees each year. See www.desu.edu/tuition for current pricing. Not responsible for typographical errors.

All of the fees and charges shown in this section are for the 2018-2019 academic year and are subject to change. New fees and charges may be established at any time by the action of the Board of Trustees. A notice of all changes in fees will be mailed to all persons who have applied for admission. Students may obtain a current schedule of fees from the Office of Student Accounts, which will include the current fees, tuition, room and board, and any special instructional fees. Visit [tuition and fees](#) to view the current fees online. This information is provided as a guide only and is not considered by the University to be a contract or binding.

PAYMENT OF FEES

Per the Graduate Calendar, all fees, tuition, and room and board charges must be **paid in full by the first week of classes**. Credits for scholarships, grants and loans will only be considered when the awards have been approved by the Financial Aid Office in advance or at registration. Applications for financial aid should be completed at least four months before registration each school year.

Payments made by Visa, MasterCard, debit card (including MAC) and check should be submitted online through the NelNet Enterprise Student Portal. Payments in cash, certified/cashier check or Discover card must be made in person to the University Cashier's Office. **DO NOT SEND CASH IN THE MAIL.**

Certified/cashier's check or money orders should be made payable and mailed to:

DELAWARE STATE UNIVERSITY
ATTN: Cashier
1200 North DuPont Highway, Dover, DE 19901

All payments sent by mail should include the student's name and student I.D. number. Checks drawn on out-of-state banks must be a cashier or certified check.

Make online payments in real time using the NelNet Enterprise Student Portal:

- Go to my.desu.edu
- Click "Banner Self Service" icon
- Enter User ID (With an Uppercase "D") & PIN number (First-time users enter your 6-digit mm/dd/yr birthdate. Forget your PIN? Please select "Forgot PIN")
- Click "Login"
- Click "Student Services" tab
- Click "NelNet Payment Portal" link
(First-time users must verify personal information and answer security questions.)
- Select "Make a Payment"

All authorized third-party documentation such as Military Tuition Assistance, Vocational Rehabilitation, Veterans Rehabilitation Assistance, Tuition Exchange and other programs must be submitted and approved by the manager of the Office of Student Accounts.

Boarding students must satisfy all financial obligations before returning for the fall and/or spring semester. All students who have not satisfied all financial obligations before the final billing date of the semester as listed in the school calendar will be assessed a **late payment fee of \$100.00**.

Students are officially registered for courses only when they have complied with all of the procedures applying to registration, including full payment of tuition and fees, or satisfactory financial arrangements through the Office of Student Accounts, and the validation of student I.D. cards.

TECHNOLOGY FEE

A fee is charged to all doctorate, graduate and undergraduate students. This is for the support of campus computing labs and technological equipment.

LABORATORY FEES

Laboratory fees are assessed for some courses to cover the cost of supplies and special facilities. Labs may vary from \$10.00 to \$20,000.00. Aviation labs range from \$5,000.00 to \$20,000.00 per related course*

Students are fully responsible for the use of laboratory equipment. Excessive breakage of equipment or items returned in an unacceptable condition will be charged to the student.

The University reserves the right to assess a special fee to cover the cost of using off-campus facilities when required in connection with any course offering.

**Additional fees will be paid to the Federal Aviation Association (FAA) Examiner for flight physicals, written examinations and all flight examinations.*

DROP FEE

To drop a course, students may obtain approval from their Advisor or Department Chair and go online to adjust their schedule or obtain a DROP/ADD form from the Department Chair. The form is to be turned into the Academic Department through the late registration period and to the Registrar's Office thereafter, bearing the required signatures. Students may drop courses as indicated on the Academic Calendar. **A drop fee of \$10 per course** will be assessed after late registration. Students who DROP courses which results in a credit on their student account will receive a refund in accordance with University and federal regulations/policies. **Students requesting to drop classes after the last day to drop or add courses must obtain the signature of the Academic Dean as well as their Instructor and Advisor/Chair.** The change in registration is effective on the date the form is submitted to the Office of Records and Registration.

NELNET BUSINESS SOLUTIONS® TUITION PAYMENT PLAN

Delaware State University is pleased to offer students the Tuition Payment Plan, administered by NelNet Business Solutions®. The Tuition Payment plan is an interest-free alternative to paying each semester's (Fall, Spring, Summer I or Summer II) tuition and expenses in full prior to each term. Per the Graduate Calendar, **payment is due in full by the first week of classes.**

Enroll in the Tuition Payment plan for each semester and get these great benefits:

- Manageable Payments - Spread your payments over 6, 5, 4, 3, or 2 months beginning May respectively, or over 5 payments beginning June for the fall semester or over 6 payments beginning in October for the spring term.
- No Interest Payments - The Tuition Payment plan is interest free. It can be used on its own or in conjunction with loans, grants and/or scholarships.

- MyFacts – The plan offers 24-hour access to manage your account via the Web.
- Convenient Online Statements – You will receive your statements via email each month
- Automatic reoccurring monthly payments via ACH or credit card (includes debit cards) processed on the 5th of every month.

To set up a Tuition Payment Plan:

- Go to my.desu.edu
- Click "Banner Self Service" icon
- Enter User ID (With an Uppercase "D") & PIN number (First-time users enter your 6-digit mm/dd/yr birthdate. Forget your PIN? Please select "Forgot PIN")
- Click "Login"
- Click "Student Services" tab
- Click "NelNet Payment Portal" link
(First-time users must verify personal information and answer security questions.)
- Select "Set Up a Payment Plan"

DELINQUENT ACCOUNTS

Delaware State University will not issue a degree, transcript or grade report to any student who has a delinquent account. A student with a delinquent account will not be readmitted to the University until all balances are paid.

Students who have not paid all financial obligations by the final billing due date of the semester will have a hold placed on their account and will not be permitted to pre-register for classes for the next term.

Past due accounts will be referred to the State Division of Revenue, one of the University's collection agencies, or attorneys, and will be reported to the credit bureau.

Each account will be charged an additional amount that approximates the administrative costs incurred in collecting the past due amount, any attorney fees and all collection costs.

BILLING

The University will send electronic monthly statements to students' Delaware State University-issued email address who have an outstanding balance or have activity on their accounts. The electronic statement will show the balance from the prior month, detail activity of the current month and the ending balance. Although the University regularly emails bills to students, it cannot assume responsibility for their receipt. Students are reminded that it is their responsibility to review their student account and email account for billing and its accuracy.

If a bill is not received on or before the beginning of each semester, it is the student's responsibility to obtain a copy of the bill from Banner Self Service by logging into my.desu.edu.

The first bill emailed prior to the beginning of the semester may not include deductions of grants, scholarships or loans.

Payments and financial aid awards applied to accounts will be listed in the credit column. Payments and financial aid awards in the anticipated credits column have not been physically applied to the accounts, but will reduce the outstanding balance. Questions pertaining to bills should be directed to the Office of Student Accounts at 302.857.6240.

Questions pertaining to financial aid credits or adjustments on monthly statements should be directed to the Financial Aid Office at 302.857. 6250.

CASHIER SERVICES

The Cashier's Office is located in the Administration Building, first floor. The hours of operation are 9 a.m.-4 p.m. Monday through Friday.

Students may make payments on their accounts at the Cashier's Office. The following services are available to students currently enrolled at Delaware State University:

- Payment can be made on a student's account by cash, certified/cashier's check or Discover card.
- All student paychecks can be obtained from the Cashier's Office between the hours of 10 a.m. and 4 p.m. on payday.
- All payments, except for cash and Discover card payments, can be made online at my.desu.edu through Banner Self Service.

The University recommends that students use one of the local banks for their banking needs. An automatic teller machine is located on the campus in the Martin Luther King Jr. Student Center and in the William C. Jason Library Building. Please note: Any check made payable to Delaware State University and the student must be applied to the student's account. Any amount that exceeds what the student owes may be refunded to the student.

ADVANCE ROOM DEPOSITS

All students must pay an Advance Room Deposit as designated and submit a Residence Hall Application and Contract to reside in the residential facilities as designated:

DSU Living and Learning Commons	\$200.00
Traditional Halls	\$200.00
University Village and Courtyard Apartments	\$400.00

Returning students must pay the Advance Room Deposit at the time that they pre-register for the fall semester no later than May 1. **Failure to submit the Residential Contract and pay the Advance Room Deposit by the deadline will result in the student being placed on a waiting list and receive rooms upon availability.**

Students with a room assignment who do not plan to reside on campus must cancel the space by August 1 for the fall semester and December 1 for the spring semester. Failure to cancel the reserved space may result in reservation charges being assessed for the room if the University is unable to fill the vacancy.

Students are urged to read the housing contract and/or lease for Terms and Conditions of Occupancy. The Advance Room Deposit is a **NON-REFUNDABLE FEE**, with the exception of when the University is unable to provide a room. The Advance Room Deposit will be credited to the student's account during the spring semester of the academic year. **This fee is non-refundable if the student decides not to attend the University.** An additional residence hall damage fee may be assessed at the end of each term.

The University cannot guarantee availability of campus housing, and it is recommended that you submit the application for housing early.

CONTRACTUAL OBLIGATION TO ROOM AND BOARD

A student's assigned housing in the traditional residence hall setting will be required to participate in a meal plan offered by the University. In order to provide boarding service for all students at the lowest possible cost, certain rules of conduct must be followed and will be strictly enforced. Those who wish to live at Delaware State University must have their bills paid by the published due dates or must have made satisfactory financial arrangements with the Office of Student Accounts (by enrolling in the Tuition Pay Plan).

Students who do not submit payments by the due date must obtain financial clearance by reporting to the Office of Student Accounts for their room key. Identification cards are validated for room and board after all financial obligations have been satisfied. Students must show their validated identification card to be admitted to the dining hall for all meals. Should any student be found guilty of breaking any rules in the Student Handbook, their privilege to room and board on campus will be terminated by the action of the Vice President for Student Affairs and charges paid in advance will be refunded in accordance with University policy for withdrawals. No credit is given for meals which a student fails to take while in a boarding status.

No adjustments in the charge for room and board will be made for late registration of 10 days or less, or for absences of less than 14 days. **Students must be enrolled at least full-time (12 or more credit hours) per semester in order to live in the residence halls.** Dropped courses or failure to attend class (no show), which reduces credit hours to less than full-time, may result in cancellation of the housing contract. The Office of Finance will notify all students who are classified as part-time in the residence halls. Students will be required to make necessary schedule adjustments and accounts will be adjusted to reflect full-time charges.

Commuter Meal Plans: Commuter meal plans are available for non-resident students who wish to eat meals in the dining hall or canteen. Commuter students may request a meal plan through the commuter meal plan website via my.desu.edu. Please refer to the Tuition and Fees sheet for an updated commuter fee schedule. Fees are subject to change.

- Go to my.desu.edu
- Click "Commuter Meal Plan"
- Click "Request"
- Select Correct Term
- Enter ID & PIN Number (Uppercase "D")
- Select the appropriate meal plan
- Click Login

REFUNDS OF CREDIT BALANCES

Refunds for overpayments or credit balances as a result of dropping a course will be processed 30 days after the end of late registration, or within 14 days during the semester. Refunds cannot be issued from credit card payments; credit balances will be transferred back to the credit card. All charges and payments must be stated on the account before a refund will be processed. After the refund is processed, students are liable for any additional charges that may result from reductions in financial aid awards and/or other adjustments to tuition and fees. Student refunds will be sent as direct deposit once the student successfully enrolls in direct deposit by following the steps below:

- Go to refundselection.com
- Enter your personal code; if you do not have a code, select "Need a Code."
- Select an option for how you would like your money to be deposited
- Select "Deposit to an Existing Account" to have the refund sent to your current bank account
- Select "Deposit to a Bank Mobile Vibe Account" if you would like to open an account with Bank Mobile
 - * Bank Mobile will mail you a debit card.
 - * Your refund will be deposited in 24 hours from the time the University makes the funds available.

Students who drop courses must obtain a Drop Slip and return the completed form to the Office of Records and Registration. The effective date of the change in registration is the date the Drop Slip(s) is filed in the Office of Records and Registration.

Students who officially change their enrollment from full-time to part-time (less than 6 hours) by dropping a course or courses will be eligible for a refund in accordance with the following policy:

Period from the First Day of Instruction for fall/spring semester(s)

Period from the First Day of Instruction	Refundable Tuition	Percentage Fees
Pre-registration to Last Day to Add Classes	100%	100%
Second Week	80%	0%
Third Week	60%	0%
After Three Weeks	0%	0%

Period from the First Day of Instruction for summer session(s)

Period from the First Day of Instruction	Refundable Tuition	Percentage Fees
Pre-registration to Last Day to Add Classes	100%	100%
Six Days or less	80%	0%
Nine Days or less	60%	0%
After Nine Days	0%	0%

WITHDRAWAL REFUNDS

Students should secure a Withdrawal Form from the Office of Records and Registration located on the first floor in the Administration Building. Recipients of Title IV funds must complete an exit interview. To withdraw from the University, students must follow the steps listed below:

Official Withdrawal from the University

- All withdrawals from the University are initiated in the Office of Records and Registration.
 - Students who are unable to physically obtain a *Withdrawal Form from the Office of Records and Registration* can send a written request via fax or email requesting a withdrawal for the current term.
- Once the student has completed the form in the Office of Records and Registration, the student has a 5-day grace period to stop the withdrawal process.
 - After the 5-day grace period, if the student has not requested to stop the withdrawal process, the registrar will remove all classes effective the date the withdrawal paperwork was submitted.
- Housing, Student Accounts and Financial Aid signs off on the withdrawal once they have reviewed the account.

Administrative Withdrawal from the University

If a student, for some compelling reason (such as a documented extreme personal difficulty or documented medical reason), requests to be administratively withdrawn from the University beyond the official withdrawal deadline for a given semester, then that student must follow the procedure listed below.

Administrative withdrawal from the University is rarely granted, but some students' circumstances may require it. The Provost and Vice President for Academic Affairs confirm the approval for administrative withdrawal from the University:

A student must submit in writing the request for administrative withdrawal from the University, along with documentation, to the appropriate Academic Dean. The request must state the reason(s) for the request and specify the semester to be withdrawn.

The Dean submits his or her recommendation to the Provost and Vice President for Academic Affairs. If the Provost and Vice President for Academic Affairs approves the request, then the student is reported to the Office of Records and Registration as "Administratively Withdrawn" and a grade of "WA" is assigned for all courses taken during that semester. The Provost and Vice President for Academic Affairs will also inform the student in writing of his or her decision.

A student who withdraws from the University on or prior to the last day to withdraw from the University will receive a grade of "W" in each course for which he or she is enrolled at that time. A student who officially withdraws from the University at any time after the last publicized date for withdrawal from the University will receive a "WA" grade in all courses for that semester.

Note: If a student has received financial aid, including a refund, from Title IV funds and completed less than 60% percent of the semester from which he or she wishes to withdraw, then that student must refund the percentage of financial aid corresponding to the percentage of the semester the student has not completed.

Please log on to [myDESU](#) and click on "Exit Interview." The student mailbox key and Smart Card (I.D.) must be returned to the Office of Student Accounts. Students who do not adhere to the withdrawal process will forfeit their right to a refund. Stop payment on a check, failure to pay the semester bill, or failure to attend classes does not constitute official withdrawal from the University.

Students withdrawing from the University will be credited for tuition only, if applicable. Other fees, with the exception of application fees and advance deposit, are to be credited in accordance with the following schedule:

Period from the First Day of Instruction for fall/spring semester(s)

Period from the First Day of Instruction	Refundable Tuition	Percentage Fees
Pre-registration to Last Day to Add Classes	100%	100%
Second Week	80%	0%
Third Week	60%	0%
After Three Weeks	0%	0%

Period from the First Day of Instruction for summer session(s)

Period from the First Day of Instruction	Refundable Tuition	Percentage Fees
Pre-registration to Last Day to Add Classes	100%	100%
Six Days or less	80%	0%
Nine Days or less	60%	0%
After Nine Days	0%	0%

*Student accident and health insurance will be canceled retroactively and any claim filed will not be honored.

Room and boarding charges are refunded on a prorated weekly basis when student withdraws from the University or from residence halls after classes begin.

TITLE IV RECIPIENTS

The 1998 Reauthorization of the Higher Education Act requires Delaware State University to calculate the Return of Title IV funds on all federal financial aid recipients who withdraw (OFFICIALLY OR UNOFFICIALLY) from classes on or before the 60 percent attendance point in the semester.

The federal formula requires a return of Title IV Aid, if the student received federal financial assistance in the form of a Pell Grant, Supplemental Educational Opportunity Grant (SEOG), Federal Plus Loan, Perkins Loan, Direct Subsidized Stafford Loan, or a Direct Unsubsidized Stafford Loan, if a student withdraws on or before completing 60 percent of the semester. The percentage of Title IV Aid to be returned is equal to the number of calendar days remaining in the semester divided by the number of calendar days in the semester. Scheduled breaks of more than five consecutive days are excluded.

If funds are to be returned after completing the return of Title IV Aid calculation, Delaware State University is required to return its portion of unearned Title IV Aid to the appropriate federal programs within 30 days from the date the student withdraws from classes. A hold will be placed on the account and all University services will be withheld if the account reflects a balance. Delaware State University will not return any funds required by the student.

STUDENTS WHO STOP ATTENDING CLASSES WITHOUT OFFICIALLY WITHDRAWING WILL BE SUBJECT TO THE RETURN OF TITLE IV FUNDS AT THE END OF THE SEMESTER, BASED ON WITHDRAWAL DATES/LAST DOCUMENTED DATE OF ATTENDANCE AS DETERMINED BY DELAWARE STATE UNIVERSITY.

FINANCIAL AID AND SCHOLARSHIPS

Delaware State University applicants for financial aid must complete the Free Application for Federal Student Aid (FAFSA). The FAFSA is used to determine the need for financial assistance. The FAFSA is filed online at www.fafsa.gov beginning October 1 for the following academic year. The FAFSA priority filing deadline is March 15 of each year. Applicants must include Delaware State University's school code 001428 when completing the FAFSA.

Financial assistance at the University is made available through scholarships, loans, and part-time employment opportunities. A limited number of research fellowships or teaching assistantships are awarded through the graduate programs. Part-time employment opportunities are managed through the Career Services Office.

WILLIAM D. FORD FEDERAL DIRECT LOAN PROGRAM

Graduate students are eligible to apply to the Unsubsidized Stafford Federal Loan Program.

- Unlike the Subsidized Stafford Loan, interest begins to accrue immediately after the first disbursement until it is paid in full;
- You must be enrolled at least ½ time (3 credit hours);
- A financial need as determined by your FAFSA application is not a requirement. However, the borrower must have a completed FAFSA on file. Graduate student debt includes loans accrued as an undergraduate in addition to those accrued while pursuing graduate studies. Graduate students may request up to \$20,500 in unsubsidized loans annually; however, graduate students may not receive more than \$138,500 throughout the entire graduate matriculation. Of this total, no more than \$65,000 may be in subsidized loans received while enrolled as an undergraduate student. For an in-depth explanation of financial aid awards and the financial aid process, please visit www.desu.edu/financialaid.

To apply for a Federal Direct loan, students should submit a Free Application for Federal Student Aid (FAFSA) to the U.S. Department of Education at www.fafsa.gov by March 15 for the fall semester and by October 1 for the spring semester. Once the response from the FAFSA is reviewed by both the student and the University and all required documents have been received and reviewed, the student completes the Entrance Counseling and the Master Promissory Note for the William D. Ford Federal Direct Loan at www.studentloans.gov.

Financial aid award announcements will begin in March for new applicants and June for returning students.

FEDERAL COLLEGE WORK STUDY PROGRAM (FWS)

A work-study job can be a source of valuable work experience as well as financial aid. Under the work-study program, the employer pays a small part of the student's wages, and the government pays the rest. Work-study positions are on campus. Students can work part-time while they are in school, and they can work up to 35 hours a week during the summer and other vacation periods. However, the student must be enrolled at least half time and meet GPA requirements in order to participate in any work study program. The basic pay rate is usually the current minimum wage. This may vary, depending on the skill and experience needed for the job.

FELLOWSHIP/SCHOLARSHIP OPPORTUNITIES

Information on scholarships may be obtained through the Delaware State website, or if majoring in a specific field, from the Dean of the College.

SATISFACTORY ACADEMIC PROGRESS (SAP)

Students receiving financial aid must meet the requirements established by the Department of Education and must meet Satisfactory Academic Progress (SAP) determined by Delaware State University. Satisfactory Academic Progress, SAP, is a process to review a federal aid recipient's academic record and compare it to defined criteria.

SAP GPA Criteria

Graduate students must meet the minimum cumulative DSU grade point average (excludes transfer work) requirement of 3.00 by the end of their second full semester. **In addition, all graduate students must earn 67% of their hours attempted, and must not exceed 150% of the hours required for degree completion.** There is a one-time only appeal procedure for the graduate student. Graduate students must attain a 3.0 at the end of that semester to remain eligible to receive Federal Financial Aid preceding the appeal. The following types of grades **cannot** be used to fulfill financial aid probation, suspension, or re-matriculation requirements: credits by audit or special examination, grades earned from advanced placement or CLEP exams for which prior approval was not obtained; withdrawal or incomplete grades; and grades earned with zero credit.

SAP Appeal Procedure

Students may appeal the SAP decision regarding financial aid probation or suspension status by submitting a completed Petition for Reinstatement of Financial Aid Eligibility to the Office of Financial Aid. Graduate students may appeal once during the course of completing their degree.

Students placed on financial aid suspension must submit the Petition for Reinstatement of Financial Aid Eligibility form. The Petition for Reinstatement of Financial Aid Eligibility form should contain an explanation of what caused the progress issue, an outline of future goals and any supporting documentation of extenuating circumstances attached**.

This form (along with all supporting documentation and a revised plan of study form) must be submitted by the deadline contained in the denial letter to the Office of Financial Aid. Late appeals will be reviewed on a case-by-case basis and may be held until the next semester for approval. The Petition for Reinstatement of Financial Aid Eligibility form can be found by accessing the DSU Office of Financial Aid website: www.desu.edu/financialaid or in the DSU Graduate Handbook located at <https://sgsr.desu.edu/sites/sgsr/files/document/6/qshandbook.pdf>.

**Extenuating circumstances would include extreme illness or injury, family crisis or additional credits earned from incomplete courses.

STUDENT ACCESSIBILITY SERVICES

Delaware State University offers a variety of support services to students with disabilities. These services are provided to help students make the best possible use of the University's comprehensive academic resources. Students are not enrolled in separate programs or courses, but are mainstreamed into the existing University structure.

Student Accessibility Services (SAS) (currently part of the Office of Student Success) is committed to helping each student pursue a chosen field of study to the full measure of his or her ability. SAS works to ensure that students with disabilities have an equal opportunity to pursue an education. Students with disabilities are encouraged to become active participants in the University community and to develop a sense of independence that will help them gain the leading edge when entering the job market.

Students with disabilities are admitted through the same application process as students without disabilities. There are no separate admissions standards or procedures. Admissions counselors are available to answer questions and provide recommendations.

Students with disabilities must submit appropriate documentation to the Student Accessibility Services Coordinator before requesting accommodations. Documentation with supporting recommendations from a physician, clinical/school psychologist, Individualized Educational Program (IEP), or 504 Plan is required.

Students with documented disabilities may receive reasonable accommodations to address their particular needs.

These accommodations may include, but are not limited to, reading, writing, and note-taking services, arrangements for testing accommodations, removal of structural barriers, assistance with obtaining tutorial services and time management and organizational skills training.

Further information regarding support services for students with disabilities and documentation requirements may be obtained by consulting <https://www.desu.edu/academics/university-college/uc-services/student-accessibility-services> or calling 302.857.6898.

TESTING SERVICES AND PROGRAMS

Testing Services and Programs provides testing services to DSU students, local colleges and universities, distance education online programs, local and national businesses and organizations in the surrounding communities (Kent, Sussex and New Castle) and states (Delaware, Maryland, Eastern Shore Virginia, Pennsylvania, New Jersey, New York and D.C.).

The office administers exams that assess customers' knowledge, skills and abilities as they relate to higher education requirements and professional certifications by providing a variety of local and national testing opportunities. An example of services offered: Federal Aviation Administration exams (FAA), PSI State Licensure Exams Praxis I & II exams, Graduate Record Exam (GRE), National Board Certified Counselors, MPRE, PearsonVUE Credentialing Exams, Law School Admission Test (LSAT), Miller Analogies Test (MAT) and many more.

Testing Services and Programs maintains a comprehensive set of standards for administering paper-based and computer based examinations (IBT/CBT), as well as a compilation of useful operational guidelines outlined by the National College Testing Association (NCTA) and Consortium of College Testing Centers (CCTC). The office is the University's coordinating agent for establishing and implementing guidelines for awarding credit-by-examination (CBE) such as CLEP and DANTES (DSST). Challenge Exams are also available.

Testing Services and Programs is committed to strive for excellence and quality service. The ultimate goal for the office is to be the premium testing location in the Tri-State area and the Atlantic Region.

<https://www.desu.edu/academics/university-college/uc-services/testing-services-programs>.

COUNSELING CENTER SERVICES

**Individual and Group Counseling Personal Development Workshops Crisis Intervention
Substance Abuse Counseling (Personal issues support)
Sexual Assault Support Service program
Peer Counseling Program
Career Interest Inventories Veterans Affairs Services**

The University Counseling Center is designed to support the retention and graduation goals of the University. It functions to aid students in eliminating the non-academic barriers, which tend to interfere with the attainment of academic aspirations. The Counseling Center also educates the student population about the various resources offered by the institution that maximize their educational opportunities.

The University Counseling Center supports student success in college by offering students the opportunity to work with Professional Counselors to explore and resolve problems and situations that tend to impede their academic, personal, social, and/or vocational adjustment to college.

The University Counseling Center is located in Cottage 504 and is open from 8:30 a.m. to 4:30 p.m., Monday-Friday. Students are typically seen by appointment; however, students in crisis are seen as needed (walk-in). For appointments, please contact the Office of Counseling Services at 302.857.7381 or by walking into the offices located in Cottage 504.

CAREER SERVICES AND STUDENT EMPLOYMENT

Career Services Student Employment

Career Services supports the mission and advancement of Delaware State University as a premier institution of higher learning. The office creatively coordinates career-related programs and services to connect students to internship and employment opportunities, including on-campus jobs.

Our staff of career development professionals shares knowledge of labor market trends and employment requirements using technological and practical resources to provide students with the talent to conduct job searches, become proficient in effective interviewing and presentation, and understand the fit between their competencies and occupational requirements.

During the academic year, we bring in hundreds of representatives from business and industry, government, not-for-profit organizations, graduate schools, and public/private school systems to interview prospective graduates and underclassmen for permanent and seasonal positions. Career Services also maintains many online resources with the necessary tools to conduct job searches, explore career options, and much more.

Normal hours of operation are Monday through Friday 8:30 a.m. to 4:30 p.m. However, office hours are flexible to meet the needs of Delaware State University customers. Career Services and Student Employment are located in the MLK Student Center, Suite 333. Career Services' contact number is 302.857.6120. Student Employment's contact number is 302.857.6138. The fax for both offices is 302.857.6123; General email: careerplanning@desu.edu & studentemployment@desu.edu. Director, Dr. Bill Means (bmeans@desu.edu); Career Coach, Ryane Cheatham (rcheatham@desu.edu); Student Employment Coordinator, Adrienne Clarke (acl Clarke@desu.edu).

OFFICE OF VETERANS AFFAIRS

The Office of Veterans Affairs is designed to provide the veteran student and military dependent with educational, personal, psychosocial, and all other administrative services and counseling assistance as needed, including case management and files maintenance. Our office is the infrastructure on campus to support the active duty service members, student veterans and their eligible student dependents. We intervene in their key areas of life functioning to ensure positive social interaction, academic success, and overall enhancement of each student's University experience. We advocate on and off campus for our military students and assist the University in providing necessary resources, referrals and services in compliance with specific Veterans Affairs and related state and federal statutes. We are the liaison with the Department of Veterans Affairs (DVA), Department of Higher Education (DHEC), and the State Approval Agency (SAA), Department of Education, and military units as it relates to our military students' approved academic programs and related affairs. Vocational, educational and professional counseling, evaluation of abilities and aptitudes, tutoring and rehabilitative services, and VA Work-Study are available to our eligible military students and/or their dependents from the Department of Veterans Affairs.

NEW CASTLE COUNTY LOCATION

Delaware State University @ Wilmington – 3931 Kirkwood Highway

Since 1990, Delaware State University has provided adult learners with career-enhancing programs in New Castle County. The Wilmington location offers evening and accelerated graduate degree programs in collaboration with the following academic colleges:

- Master of Business Administration – College of Business
- Master of Sport Administration – College of Business
- Master of Public Administration – College of Humanities, Education and Social Sciences
- Master of Social Work – College of Health and Behavioral Sciences

** The Master of Social Work is offered in the evenings in a full-term format. Students admitted to the Master of Social Work program that hold a Bachelor of Social Work degree from an accredited institution and a grade point average of 3.0 or greater may apply for advanced standing and complete the program in one year.*

Program information including Admission Requirements, Plans of Study, and matriculation requirements may be found via the College section.

Contact Information

Dr. Patrice Gilliam-Johnson
Dean of Graduate, Adult and Extended Studies
302.857.8200
pgjohnson@desu.edu

Stacey Wilkerson
Administrative Secretary
302.857.8200
swilkerson@desu.edu

April Chen
Admissions and
Academic Advisor
achen@desu.edu
302.857.8004

Cheryl Lolley
Director of Support Services
302.857.8007
clolley@desu.edu

Terry Jeffries
Executive Director of Distance Learning
and Technologies
302.857.8005
tjeffries@desu.edu

CENTER FOR TEACHING & LEARNING

Linking Professional Development to University Improvement

The Center for Teaching & Learning (CTL) mission, adopted and reviewed October 1, 2008, is to provide ongoing faculty support services in an effort to strengthen and support academic programs.

Goal 1: Provide opportunities for Delaware State University faculty to strengthen teaching efforts through research based methodologies, professional development experiences, advanced studies and assessment practices that lead to improved student learning.

Goal 2: Improve outreach efforts and collaboration with local, K-12 agencies and schools.

Services offered:

- Conference/Professional Meeting Travel Funding
- Mini Grant Research Competition for Faculty
- Classroom Observations and Consultation Services
- Workshops and professional development forums on a variety of topics related to teaching and learning
- Collaboration, support and participation in local educational agencies' priorities and efforts.

Services of the CTL are supported by Title III federal funding.

OFFICE OF INTERNATIONAL AFFAIRS

As the central office responsible for coordinating the University's international activity, the Office of International Affairs (OIA) has the mission of integrating a global perspective into the teaching, research, and service programs of the institution. A critical part of the mission is to forge mutually beneficial international partnerships with higher education institutions, including a wide-range of public and private sector agencies and organizations.

The Office of International Affairs coordinates the Exchange Visitors Program to assist Academic Deans' respective Departmental goals and objectives to build and strengthen niche teaching and research capability in highly specialized areas that are globally significant. The University officially invites J1 Visa research professors, postdoctoral fellows, research scholars, student non-degree and short-term scholars from our international partnering institutions. At the request of the Academic Deans, the Office of International Affairs facilitates, in part, and coordinates Fulbright Programs and other international activities that strengthen the University's research infrastructure and intellectual posture.

The University welcomes international students on F-1 student visas from around the world to our learning community each academic year. The OIA provides information and programs to F-1 international students about the campus and community and provides support, updates, and assistance concerning F-1 visas and related F-1 immigration issues. The OIA is committed to ensuring that international students have a rewarding academic and personal experience as they pursue their degree at Delaware State University. We help international students adapt to DSU and the USA; we are their home away from home.

Some of the services the OIA provides are:

- Assistance with financial, academic, social, and personal matters
- Campus and community activities
- Cultural concerns
- Orientation for new international students

- Assist faculty, staff, and student organizations to plan programs, events and forums that speak to international experiences
- Refer students to counseling services, if requested
- Assist students who have difficulties with the U.S. education system
- Disseminate important information pertaining to international student life
- Co-sponsor programming, events and forums with the International Students Club
- Assist students who plan to study abroad with selection and application procedures; coordinate study abroad programs; and work closely with affiliated study abroad and service-learning providers to ensure that students who seek an international experience at the undergraduate and graduate levels are provided with options to meet their financial, academic and professional goals and objectives. Students who spend time and study in another country are better prepared for graduate school and have gainful employment in the global economy.

Some of the study abroad programs at DSU are:

- Ghana
- China
- South Korea
- Costa Rica
- Canada
- Paris
- Spain
- Greece
- Italy

Delaware State University has joint education programs with Changchun University of Technology, Ningbo University of Technology and Sanming University, and the following formal international partnerships:

- Bihua University, China
- University of Caen, France
- Changchun University of Sciences and Technology, China
- University of Cheikh, West Africa
- Chonnam National University, Korea
- Chungbuk National University, Korea
- Groupe Sup de Co la Rochelle, la Rochelle Business School, France
- Hunan Normal University, China
- International University of Business Agriculture and Technology, Bangladesh
- Jeju National University, China
- College of Jilin Business and Technology, China
- Jilin Huaqiao Foreign Languages Institute, China
- Jilin University, China
- Loyola College, India
- Jishou University, China
- Kyung Kee University, Korea
- Ningbo University, China
- Ningbo University of Technology, China
- North-West University, Mafikeng Campus, South Africa
- Sanming University, China
- Université de Versailles, Saint-Quentin-en-Yvelines, France
- Vietnam National University, Vietnam
- Zhaoqing University, China

Staff

Dr. Fengshan Liu, Assistant Vice President for International Affairs | 302.857.6421, fliu@desu.edu

Mrs. Candace Alphonso-Moore, Director of International Student Services & Study Abroad Coordinator
302.857.6474, cmoore@desu.edu

Mrs. Latasha Wilson Daniels, Manager | 302.857.6421, ldaniels@desu.edu

MEMBERS OF THE BOARD OF TRUSTEES

OFFICERS OF THE BOARD

Dr. Devona E. Williams, Chair
Mr. John Ridgeway, Vice Chair
Ms. Robert Schrof, Treasurer
Ms. Tamara Stoner, Board Secretary

MEMBERS APPOINTED BY THE GOVERNOR

The Honorable Michael N. Castle	New Castle
Ms. Lois M. Hobbs	Sussex
Ms. Kathy McGuinness	Sussex
Leroy A. Tice, Esq.	New Castle
Dr. Devona E. Williams	New Castle
Norman Griffiths, Esq.	New Castle
Ms. Jocelyn Stewart	New Castle

MEMBERS ELECTED BY THE BOARD

Mr. John J. Allen, Jr.	Sussex
Dr. Debbie Harrington	New Castle
Charles McDowell, Esq.	New Castle
Mr. John Ridgeway	
Mr. Harold Stafford	Kent
Ms. Bernadette Dorsey Whatley	New Castle
The Honorable Jack Markell *	New Castle
Margie Lopez-Waite *	New Castle

* To be sworn in

EX OFFICIO MEMBERS

The Honorable John Carney
Governor of the State of Delaware

Dr Wilma Mishoe
President of the University

TRUSTEE EMERITI

Dr. Richard Barros
Dr. Cora Norwood Selby
Dr. Claibourne D. Smith

COLLEGE OF AGRICULTURE, SCIENCE AND TECHNOLOGY



Department of Agriculture and Natural Resources

Master of Science in Agriculture
Concentration in Animal Science
Concentration in Plant Science
Master of Science in Natural Resources

Department of Biological Sciences

Master of Science in Biological Sciences
Master of Science in Molecular and Cellular Neuroscience
Doctor of Philosophy in Neuroscience

Department of Chemistry

Master of Science in Applied Chemistry
Doctor of Philosophy in Applied Chemistry

Department of Human Ecology

Master of Science in Food Science and Biotechnology

Division of Physical and Computational Sciences

Master of Science in Computer Science
Master of Science in Mathematics
Concentration in Pure Mathematics
Concentration in Applied Mathematics
Doctor of Philosophy in Interdisciplinary Applied Mathematics & Mathematical Physics
Master of Science in Applied Optics
Master of Science in Physics
Doctor of Philosophy in Optics

DEPARTMENT OF AGRICULTURE AND NATURAL RESOURCES

MASTER OF SCIENCE IN AGRICULTURE

PROGRAM OBJECTIVES

The Department of Agriculture and Natural Resources' Graduate Program prepares students for career opportunities and cooperative ventures with federal and state agencies, private industry, and nearby agricultural institutions. The program strives to generate research designed to solve problems encountered in the study, production and manipulation of plant and animal science and in evaluating various aspects of the plant and animal sciences.

PROGRAM GOALS

The goal of the Agricultural Science program is to educate, train, and prepare students as the next generation of plant and animal scientists for career opportunities in the agricultural industries, or for further studies in graduate or professional programs. To achieve this goal, DSU's Agriculture Science graduate program focuses on two signature areas: 1) Plant Science and 2) Animal Science.

STUDENT LEARNING OUTCOMES

Students will demonstrate an advanced knowledge and understanding in an area of emphasis offered by the Agriculture program.

Students will design an experiment, collect, analyze, interpret data and report findings.

Students will demonstrate competency in scholarly writing and oral communication by writing a M.S. thesis and presenting it to a committee of professors in their field.

ADMISSION DEADLINES AND DEGREE REQUIREMENTS

Application Deadlines:

Fall – June 15

Spring – Nov. 15

Summer – April 15

International Admission Deadlines:

Fall – May 1

Spring – Nov. 1

Summer – April 1

All applicants are required to submit evidence of the following for consideration of unconditional admission:

- An earned baccalaureate degree in Plant or Animal Science, Biology, Chemistry, Nutrition, or a closely related field with a minimum undergraduate cumulative grade point average of 2.8.
- An online application for admission.
- Official transcript(s) of all academic work completed.
- GRE scores.
- A resume.
- Three letters of recommendation via the online application process.
- A statement of intent to include the following: (a) your objectives in obtaining the degree, (b) area(s) of research interest, and (c) your interest in the Agricultural Science area (maximum two pages).

The Department of Agriculture and Natural Resources faculty will review students' application materials and make recommendation for acceptance into the Agricultural Science program to the Dean, Graduate Studies and Research, who extends an offer of admission to the applicant.

DEGREE REQUIREMENTS

The Master of Science in Agriculture is designed to prepare students for advanced study in plant or animal science. The degree requires a supervised research program and a thesis. A total of 31 credit hours are required for the degree, including 25 hours of course work and 6 credit hours of research.

Foundation Courses are noted below:

Depending on the area of study chosen, students entering the program are expected to have 30 credits from the following list of courses:

General Botany, Horticultural Plant Materials, Field Crops, Forage Crops Biology, Organic Chemistry, Molecular Biology and Biochemistry, Animal Science, Animal Nutrition, Livestock Production, Dairy Science, Poultry Science Anatomy, Physiology, Animal Breeding, Immunology, Parasitology, Biometrics or Statistics Plant Physiology, Plant Pathology, Genetics, Entomology, Ecology Soil Science, Plant Propagation, Horticulture, Plant Systematics

M.S. Thesis:

Students in the program are expected to conduct independent research and write a thesis. Candidacy requires the development of a thesis topic and preparation of a research proposal which is subject to the approval of the Thesis Committee. All students must develop their research thesis proposal into a full research project consisting of collection and analysis of data and documented in an original research project that includes the collection, analysis and interpretation of data which will be presented in a format that meets the standards by the College of Agriculture, Science and Technology and Graduate Studies and Research. The completed thesis will be submitted to the Thesis Committee for review and if deemed acceptable, an oral examination, consisting principally of a defense of the thesis, will be scheduled. Upon final approval by the Thesis Committee, the thesis shall be submitted to the Dean of the College and finally to the Dean, Graduate Studies and Research. A

majority of the student's Thesis Committee must approve the thesis and its defense. If approval is denied, the candidate will not be recommended for graduation. In this event, the student may be re-examined at a later period as determined by the Thesis Committee.

Required Course Work:

Students enrolled in the Agricultural Science graduate program are required to complete at least 31 credit hours of graduate-level course work which includes 6 credits of thesis work.

Required courses include:

AGRI 551 – Experimental Design (3 hours)

AGRI 572 –Departmental Seminar (1 hour)

AGRI 560 – Research Problem in area of Specialization (3 hours)

AGRI 561 – Thesis Research (6 hours)

The remaining courses (18 hours) are elective courses that can be chosen by the student in collaboration with his or her academic Advisor and Thesis Committee. Courses selected can be from departmental offerings, or offerings within other departments on campus.

Student registration in graduate-level course work is subject to the approval of an assigned Advisor.

Transfer Credits: A maximum of 9 graduate credits may be transferred into the program from another accredited institution of higher learning provided that the following conditions apply:

The course curriculum must have covered material equivalent to that of the substituted course within the program, the student must have earned a minimum grade of "B" for the course, the credit cannot have been used toward a prior degree, and the course must be approved by the student's Advisory Committee.

FACULTY

The faculty members in the Agricultural Science Program are dedicated to their respective fields of study and have a diverse background. Specific areas of research interest of the faculty include Plant Biotechnology, Plant Genomics, Plant Physiology, Plant Systematics, Minor Crop Production, Small Ruminant Production, Sustainable Poultry Production and Parasite Control. Active research projects exist within these areas and offer graduate students many opportunities for active learning and discovery.

PROGRAM FACULTY

Richard Barczewski Ph.D., Professor, Animal Sciences

Cyril Broderick Ph.D., Professor, Plant Science

Sathya Elavarthi Ph.D., Associate Professor, Plant Sciences

Dewayne Fox Ph.D., Professor, Zoology

Mingxin Guo Ph.D., Professor, Soil Sciences

Christopher Heckscher Ph.D., Associate Professor, Entymology & Wildlife Ecology

Venugopal Kalavacharla Ph.D., Professor, Plant Science

Dennis McIntosh Ph.D., Professor, Soil, Water & Environmental Science

Gulnihal Ozbay Ph.D., Professor, Fisheries & Allied Aquacultures

Kevina Vulinec Ph.D., Professor, Wildlife Ecology
Arthur Tucker, Professor Emeritus, Plant Systematics
Sigrid Smith Ph.D., Assistant Professor, Statistics/Ecology
Kwame Matthews Ph.D., Assistant Professor, Animal Science
Kalpatha Melmaiee Ph.D., Assistant Professor, Plant Breeding

FACILITIES

W.W. Baker Building
Agricultural Annex
Claude E. Phillips Herbarium
Research Greenhouse
Aquaculture Facilities
Hickory Hill Forage and Livestock Farm
Smyrna Outreach and Research Farm

COURSE DESCRIPTIONS

(Note: Additional Course Descriptions can be found under Food Science, Natural Resources, Biology and Chemistry).

AGRICULTURE (AGRI)

AGRI-504. ADVANCED AQUACULTURE

Advanced aquaculture will include environmental, social and legal considerations; various culture systems; water quality management (as related to organism cultured and system type); feeds and nutrition; health management; and economics and marketing. The course will include literature research and research projects as well as assigned laboratory work. Three (3) hours lecture and one (1) two-hour laboratory per week. Credit, three hours.

AGRI-505. AQUATIC ANIMAL PHYSIOLOGY

A study of the basic physiological systems in fishes and crustaceans and their relationships to development, growth and reproduction. Three (3) hours lecture and one (1) two-hour laboratory per week. Credit, four hours.

AGRI-507. SOILS AND SOIL FERTILITY

The study of soil properties, processes, nutrients, fertility, and management practices related to crop production and environmental protection. Two (2) hours lecture and one (1) two-hour laboratory. Credit, three hours.

AGRI-511. PLANT BREEDING

An introduction to and application of plant breeding methodology and selection. Various methods utilized in plant breeding programs, and an understanding of heredity, hybridization and selection of various plant species will be discussed. Prerequisites: AGRI-317. Credit, three hours.

AGRI-516. PLANT GENETICS AND BREEDING

An introduction to and application of plant breeding methodology and selection. Various methods utilized in plant breeding programs, and an understanding of heredity, hybridization and selection of various plant species will be discussed. Prerequisites: AGRI-317. Credit, three hours.

AGRI-531. CROP BIOCHEMISTRY, PHYSIOLOGY AND ECOLOGY

An advanced study of the physiology and ecological factors affecting the productivity of crop plants and their response to environmental stress.

Prerequisites: AGRI-317, BIOL-205. Credit, three hours.

AGRI-541. PLANT ANATOMY AND MORPHOLOGY

A study of the structure and function of major plant cells and tissues and the morphology of organs of vascular and nonvascular plants. Laboratories will focus upon comparisons among taxa and the characteristics of major plant groups.

Prerequisites: BIOL 101, 102, 205. Credit, three hours.

AGRI-551. EXPERIMENTAL DESIGN

A study of the use of advanced experimental designs in planning, analyzing, and interpreting experimental data. Three (3) one-hour class periods per week.

Prerequisites: Three (3) credits in Statistics/Biometrics. Credit, three hours.

AGRI-560. RESEARCH PROBLEMS

A special problems course designed to provide research training in the area of the student's field of study and specifically related to the needs of their research program. Credit, one to three hours.

AGRI-561. THESIS RESEARCH

An in-depth individualized investigation of a research problem conducted under close supervision of the thesis advisor. This involves experimental design, data collection, data analysis and the preparation of the thesis. A grade of "Q" is given until the thesis is completed. Credit, 0 to six hours.

AGRI-572. GRADUATE SEMINAR

A seminar, meeting once per week with faculty and student presentations on their research and/or other relative scientific topics. Credit, one hour.

AGRI-575. MOLECULAR GENETICS AND GENOMICS

An in-depth discussion of molecular genetic principles and genomic methods as applied to model and commercially relevant biological organisms. Review of cutting edge technology, literature, and methods applied on a genomic scale; this course will also investigate evolutionary relationships between various organisms and utilization of tools from the genomic era to better elucidate similarities and differences.

Credit, three hours.

AGRI-581. ADVANCED FORAGE & MINOR CROP PRODUCTION & UTILIZATION

An advanced application of forage and minor crop production and utilization. The course will include visits to and analysis of various forage and minor crop operations in the Delmarva area.

Credit, three hours.

AGRI-601. ADVANCED FIELD BOTANY

Through field work, lectures, study of herbarium specimens, and readings, this course provides experience with identifications, habitats, and geographic distributions of native and naturalized plants of eastern North America, concentrating on the Delmarva Peninsula. Principles of plant systematics and phytogeography are illustrated through direct study of plants in the field. Primary and secondary literature of plant identification and distribution are used in the field, herbarium, library, and classroom. In addition, collection, preparation, and labeling of plant specimens are covered in this course.

Credit, three hours.

AGRI-609. ADVANCED WEED SCIENCE

An advanced study of weeds and their control. Principles involving weed plant classification, weed biology and ecology, and plant and herbicide chemistry will be presented. Practices which prevent, eliminate, and control weeds in grain crops, legumes, vegetables, fruit, pasture and other crop ecologies will be discussed. Herbicide formulations and safe herbicide use will be taught. Two (2) one-hour lectures and one (1) two-hour laboratory per week.

Prerequisites: AGRI-102, AGRI-317 or AGRI 219 or permission of instructor. Credit, three hours.

AGRI-641 EVOLUTION OF VASCULAR PLANTS

Advanced study of the evolution and classification of Tracheophyta, including traditional and experimental evidence of phylogenetic diversity. Two (2) lectures and one (1) two-hour laboratory per week.

Credit, 3 hours

AGRI-695. AG AND NATURAL RESOURCES SUSTAINING GRADUATE STUDENT

A continuation courses to allow students who have completed their research and their course work the additional time necessary to complete their thesis. A fee is assigned to this course; however, no credit is awarded.

Credit, none.

PROGRAM: MASTER OF SCIENCE IN AGRICULTURE
CONCENTRATION: PLANT OR ANIMAL SCIENCE

(Even year Fall Semester)			(Odd year Spring Semester)		
Course	Course Name	Cr	Course	Course Name	Cr
AGRI 551	Experimental Design	3	AGRI 560	Research Problems	3
	Elective	3	AGRI 572	Graduate Seminar	1
				Elective	3
	Total	6		Total	7

(Odd Year Fall Semester)			(Even Year Spring Semester)		
Course	Course Name	Cr	Course	Course Name	Cr
	Elective	3		Elective	3
	Elective	3	AGRI 561	Thesis Research	3
	Total	6		Total	6

(5 th semester of attendance or Summer)			(Insert Year and Semester and/or Term)		
Course	Course Name	Cr	Course	Course Name	Cr
	Elective	2-3			
AGRI 561	Thesis Research	3			
	Total	6		Total	

(Insert Year and Semester and/or Term)			(Insert Year and Semester and/or Term)		
Course	Course Name	Cr	Course	Course Name	Cr
	Total			Total	
			Total Credits: 30-31		

- *Denotes a Core Requirement
- +Denotes an elective
- Total Core Credits = 13
- Total Elective Credits = 17-18
- Candidacy Requirement: Completion of Core Courses
- Submission of Research Plan with Candidacy Application to Graduate Studies and Research
- Capstone or Culminating Experience: Thesis Defense and Submission of Thesis

MASTER OF SCIENCE IN NATURAL RESOURCES

PROGRAM OBJECTIVES

The Department of Agriculture and Natural Resources' Master of Science in Natural Resources program was developed: to provide a research and graduate course work-based program focused on the study, management and/or the manipulation of natural resources; to provide opportunities for advanced study in disciplines in natural resource studies that are not readily available at other local colleges and universities; and to provide the opportunity for cooperative ventures with federal and state government agencies, nonprofit groups, private industry, and other interested organizations (i.e. grant proposals, internships, service learning relationships).

PROGRAM GOALS

The goal of the Natural Resources program is to educate, train, and prepare students as the next generation of scientists for career opportunities in Natural Resources or for further studies in graduate or professional programs.

STUDENT LEARNING OUTCOMES

Students will demonstrate an advanced knowledge and understanding in an area of emphasis offered by the Natural Resources program.

Students will design an experiment, collect, analyze, interpret data and report on and publish findings

Students will demonstrate competency in scholarly writing and oral communication by writing a M.S. thesis and presenting it to a committee of professors in their field.

ADMISSION DEADLINES AND DEGREE REQUIREMENTS

Application Deadlines:

Fall – June 15
Spring – Nov. 15
Summer – April 15

International Admission Deadlines:

Fall – May 1
Spring – Nov. 1
Summer – April 1

All applicants are required to submit evidence of the following for consideration of unconditional admission:

- An earned baccalaureate degree in Fisheries Science, Wildlife Science, Environmental Science, Ecology, Biology, or a closely related field with a minimum undergraduate cumulative grade point average of 2.8.
- An online application for admission.
- Official transcript(s) of all academic work completed.
- GRE scores.
- A resume.
- Three letters of recommendation via the online application process (letters are requested in addition to filling out the evaluation form).
- A statement of intent to include the following: (a) your objectives in obtaining the degree, (b) area(s) of research interest, and (c) your interest in Natural Resources (maximum two pages).

The Department of Agriculture and Natural Resources faculty will review students' application materials and make recommendation for acceptance into the Natural Resources program to the Dean, Graduate Studies and Research, who extends an offer of admission to the applicant.

DEGREE REQUIREMENTS

The Master of Science in Natural Resources is designed to prepare students for advanced study. The degree requires a supervised research program and a thesis. A minimum of 31 credit hours are required for the degree, including 24 hours of course work and 6 credit hours of research.

Foundation Courses are noted below:

Depending on the area of study chosen, students entering the program are expected to have 30 credits from the following list of courses:

Aquaculture, Biometrics, Botany, Ecology, Ecosystems, Entomology, Environmental Law/Policy, Herpetology, Fisheries Science, Ichthyology, Forestry, Land Use Planning, Limnology, Mammalogy, Marine Science, Ornithology, Population Biology, Resource Management, Soils, Wildlife Sciences and Zoology. Any deficiencies in course background identified by a student's advisory committee can be made up, although courses taken to fill deficiencies cannot be applied to the graduate program for credit.

M.S. Thesis:

Students in the program are expected to conduct independent research and write a thesis. Candidacy requires the development of a thesis topic and preparation of a research proposal which is subject to the approval of the Thesis Committee. All students must develop their research thesis proposal into a full research project consisting of collection and analysis of data and documented in an original research project that includes the collection, analysis and interpretation of data which will be presented in a format that meets the standards by the College of Agriculture, Science and Technology and Graduate Studies and Research. The completed thesis will be submitted to the Thesis Committee for review and if deemed acceptable, an oral examination, consisting principally of a defense of the thesis, will be scheduled. Upon final approval by the Thesis Committee, the thesis shall be submitted to the Dean of the College and finally to the Dean, Graduate Studies and Research. A majority of the student's Thesis Committee must approve the thesis and its defense. If approval is denied, the candidate will not be recommended for graduation. In this event, the student may be re-examined at a later period as determined by the Thesis Committee.

Required Course Work:

Students enrolled in the Natural Resources graduate program are required to complete at least 30 credit hours of graduate-level course work which includes 6 credits of thesis work.

Required courses include:

NTRS 502 – Habitat Management and Restoration Theory (3 hours)

NTRS 503 – Conservation and Restoration Biology (3 hours)

NTRS 504 – Population Biology (3 hours)

AGRI 551 – Experimental Design (3 hours)

AGRI 572 – Departmental Seminar (1 hour)

AGRI 561 – Thesis Research (6 hours)

The remaining courses (11 hours) shall be comprised of electives chosen by the student in collaboration with their academic Advisor and Thesis Committee. Courses selected can be from departmental offerings, or offerings within other departments.

Student registration in graduate-level course work is subject to the approval of an assigned Advisor.

Transfer Credits: A maximum of 9 graduate credits may be transferred into the program from another accredited institution of higher learning provided that the following conditions apply:

The course curriculum must have covered material equivalent to that of the substituted course within the program, the student must have earned a minimum grade of "B" for the course, the credit cannot have been counted toward a prior degree, and the course must be approved by the student's Thesis Committee.

FACULTY

The faculty members in the Natural Resources Program are dedicated to their respective fields of study and have a diverse background. Specific areas of research interest of the faculty include: Aquaculture, Environmental Science, Fisheries and Wildlife Science. Active research projects exist within these areas and offer graduate students many opportunities for active learning and discovery.

PROGRAM FACULTY

Richard Barczewski Ph.D., Professor, Animal Sciences
Cyril Broderick Ph.D., Professor, Plant Science
Sathya Elavarthi Ph.D., Associate Professor, Plant Sciences
Dewayne Fox Ph.D., Professor, Zoology
Mingxin Guo Ph.D., Professor, Soil Sciences
Christopher Heckscher Ph.D., Associate Professor, Entymology & Wildlife Ecology
Venugopal Kalavacharla Ph.D., Professor, Plant Science
Dennis McIntosh Ph.D., Professor, Soil, Water & Environmental Science
Gulnihal Ozbay Ph.D., Professor, Fisheries & Allied Aquacultures
Kevina Vulinec Ph.D., Professor, Wildlife Ecology
Arthur Tucker, Professor Emeritus, Plant Systematics
Sigrid Smith Ph.D., Assistant Professor, Statistics/Ecology
Kwame Matthews Ph.D., Assistant Professor, Animal Science
Kalpatha Melmaiee Ph.D., Assistant Professor, Plant Breeding

FACILITIES

W.W. Baker Building Agricultural Annex
Claude E. Phillips Herbarium Research Greenhouse Aquaculture Facilities
Hickory Hill Forage and Livestock Farm Smyrna Outreach and Research Farm

COURSE DESCRIPTIONS

(Note: Additional Course Descriptions can be found under Agriculture, Food Science, Biology and Chemistry).

NATURAL RESOURCES (NTRS)

NTRS-501. POPULATION BIOLOGY

A study of biology above the level of the individual with emphasis on ecology and evolution. Two (2) hours of lecture and one (1) two-hour laboratory. Credit, three hours.

NTRS-502. HABITAT MANAGEMENT AND RESTORATION: THEORY

An exploration of advanced theory and methodology for the establishment, maintenance and restoration of aquatic and terrestrial habitats. Credit, three hours.

NTRS-503. CONSERVATION AND RESTORATION BIOLOGY, APPLICATIONS

Application of theory and methodology presented in the theory course to field projects involving data collection and interpretation. Credit, three hours.

NTRS-504. ENVIRONMENTAL MODELING

An introduction to the major types of environmental models, including modeling theory and various methodologies used for modeling environmental systems. Two (2) hours lecture and two (2) hours laboratory/project work per week. Credit, three hours.

NTRS-531. ADVANCED ECOSYSTEMS

A philosophical course, integrating concepts in social, physical, and biological sciences with an introduction to the quantitative synthesis of ecological systems. The course is designed to provide the specialist with a total view of resource use and management.

Prerequisites: 23-205, NTRS-321 or the consent of the Instructor. Students who have taken NTRS-451 are not eligible to take NTRS-531 for graduate credit. Credit, three hours.

NTRS-551. EXPERIMENTAL DESIGN

A study of the use of advanced experimental designs in planning, analyzing, and interpreting experimental data. Three (3) one-hour class periods per week.

Prerequisites: Three (3) credits in Statistics/Biometrics. Credit, three hours.

NTRS-604. GIS APPLICATION IN NATURAL RESOURCES

This course is an introduction to the design, development, and application of Geographic Information System technologies for students in natural resources, environmental management, or similar disciplines that could benefit from a professional GIS curriculum. Two (2) hours lecture and two (2) hours laboratory/project work per week. Credit, three hours.

NTRS-643. MARINE BIOLOGY

A broad overview of the biota of marine environments, examining the ecological structure and function of oceanic, coastal, and estuarine habitats. Aspects of physical, chemical, and geological oceanography will also be covered pertinent to biological communities and adaptations. Lectures, demonstrations, laboratories.

Prerequisites: 23-205 or consent of the Instructor. Credit, three hours.

NTRS-644. WETLANDS BIOLOGY

A broad overview of the ecological structure and function of wetlands environments, emphasizing comparisons of different wetland types in terms of hydrology, soils, biogeochemistry, biota, and ecological processes. Human interactions with wetlands will be examined in terms of wetlands values and functions, delineation, classification, inventory, regulations, mitigation, compensation, and management. Lectures, demonstrations, laboratories.

Prerequisites: 23-205 or consent of the Instructor. Credit, three hours.

NTRS-675. ADVANCED ENVIRONMENTAL POLICY AND LAW

A study of the development and enforcement of environmental law. Emphasis on the history of the molding of national and regional environmental policy concerns. Synoptic review of major international, national, regional, state, and local environmental laws.

Prerequisites: 23-205 or permission of the Instructor. Students who have taken NTRS-475 are not eligible to take NTRS-675 for graduate credit. Credit, three hours.

NTRS-684. ADVANCED WILDLIFE BIOLOGY

Advanced study of wildlife populations including the application of computers to field data analysis and theoretical models. Research techniques of project planning, record keeping, wildlife literature review, and scientific writing. Environmental management using remote sensing and reconnaissance field mapping, habitat analysis and evaluation, sustained yield, and wildlife damage control.

Prerequisites: NTRS-403. Credit, three hours.

AGRI-560. RESEARCH PROBLEMS

A special problems course designed to provide research training in the area of the student's field of study and specifically related to the needs of their research program. Credit, one to three hours.

AGRI-561. THESIS RESEARCH

An in-depth individualized investigation of a research problem conducted under close supervision of the thesis advisor. This involves experimental design, data collection, data analysis and the preparation of the thesis. A grade of "Q" is given until the thesis is completed. Credit, 0 to six hours.

AGRI-572. GRADUATE SEMINAR

A seminar, meeting once per week with faculty and student presentations on their research and/or other relative scientific topics.

Credit, one hour.

AGRI-695. AG AND NATURAL RESOURCES SUSTAINING GRADUATE STUDENT

A continuation courses to allow students who have completed their research and their course work the additional time necessary to complete their thesis. A fee is assigned to this course; however, no credit is awarded. Credit, none.

PROGRAM: MASTER OF SCIENCE IN NATURAL RESOURCES

(Even Year Fall Semester)			(Odd Year Spring Semester)		
Course	Course Name	Cr	Course	Course Name	Cr
NTRS 502	Habitat Mgt. & Restoration Theory	3	NTRS 501	Population Biology	3
NTRS 551	Experimental Design	3	AGRI 503	Conservation & Restoration Biology Application	3
	Total	6		Total	6

(Odd Year Fall Semester)			(Even Year Spring Semester)		
Course	Course Name	Cr	Course	Course Name	Cr
	Elective	3	AGRI 572	Graduate Seminar	1
AGRI 561	Thesis Research	3	AGRI 561	Thesis Research	3
				Elective	3
	Total	6		Total	7

(5 th semester of attendance or Summer)			(Insert Year and Semester and/or Term)		
Course	Course Name	Cr	Course	Course Name	Cr
	Elective	3			
	Elective	3			
	Total	6		Total	

(Insert Year and Semester and/or Term)			(Insert Year and Semester and/or Term)		
Course	Course Name	Cr	Course	Course Name	Cr
	Total			Total	
			Total Credits: 31		

- *Denotes a Core Requirement
- +Denotes an elective
- Total Core Credits = 19
- Total Elective Credits = 12
- Candidacy Requirement: Completion of Core Courses
- Thesis Students - Submission of Research Plan with Candidacy Application to Graduate Studies and Research
- Capstone or Culminating Experience: Thesis Defense and Submission of Thesis

DEPARTMENT OF BIOLOGICAL SCIENCES

MASTER OF SCIENCE IN BIOLOGICAL SCIENCES

PROGRAM OBJECTIVES

The Department of Biological Sciences prepares students for career opportunities in professional studies and further graduate studies in areas related to biological sciences and neuroscience. Many graduates pursue careers in state and federal agencies, health care, private industry, research, and teaching. The program strives to develop a clear and unbiased method of critical and logistic thinking, an appreciation and understanding of the natural world, and knowledge of biological principles required to make intelligent and effective decisions.

PROGRAM GOALS

Students in the Biological Sciences Program will have broadened knowledge in the fields of biology and/or neuroscience. Our programs aim to enhance student research skills and the ability to apply classroom and laboratory knowledge to real-world situations. Additionally, the student will be informed of recent trends in research and engineering practices. Students are required to complete a research project directed by faculty mentor and submit a thesis, which will be defended before their committee.

STUDENT LEARNING OUTCOMES

Expanded knowledge of biological concepts
Proficiency in experimental design and laboratory research experiments and techniques;
Familiarity with current research topics in the field
Enriched skills in data analysis and interpretation
Enhanced experience with scientific writing and oral presentation of research findings

ADMISSION AND DEGREE REQUIREMENTS

Application Deadlines:

- Fall enrollment – April 15
- Spring enrollment – October 15

International Admission Deadlines:

- Fall enrollment – April 15
- Spring enrollment – October 15

All applicants are required to:

- Have earned a Baccalaureate degree in Biological Sciences or a related field.
- Have earned a cumulative grade point average of at least 2.75 with 3.00 minimum in the major.
- Provide official scores on the Graduate Record Examination (GRE). Testing must be within five years of application.
- Complete an application for admission.
- Submit official transcript(s).
- Submit a resume.

- Submit three letters of recommendation.
- Submit a personal statement that addresses prior research, professional, and academic experiences as related to your objectives in obtaining the degree, and your research areas of interest pursuant to the degree within the Department of Biological Sciences.
- International applicants must meet all requirements.

The Department of Biological Sciences Graduate Program Committee will review students' application materials (Priority Review to commence on March 15) and make a recommendation for acceptance into the Graduate Program to the Dean, Graduate Studies and Research, who extends an offer of admission to the applicant. Funding (i.e. a stipend and tuition waiver supported through a teaching or research assistantship) is not guaranteed to any student upon his or her recommendation for admission; funding status is assessed on an individual basis and depends on availability of funds along with evaluation of the student during his or her progression through the program.

DEGREE REQUIREMENTS

The M.S. Degree Program in Biological Sciences is a traditional degree program designed to prepare students for further graduate studies in areas related to biological sciences, and pursuit of careers in state and federal agencies, health care, private industry, and research technical positions. The program capitalizes on the expertise of a number of faculty across campus who are active in various areas of research. The degree requirements include and emphasize a research thesis based on mentored research. The program requires 30 graduate credits and is designed to allow completion over a two-year period on a full-time basis.

FACULTY

The Department of Biological Sciences is comprised of dedicated and well-prepared faculty with diverse educational backgrounds and areas of research specialization. Small class sizes for graduate courses ensure that students interact closely with faculty in the learning experience. All faculty have published in their respective fields, and they maintain active research involvement. Scholarly involvement and continuous professional development in research keeps the faculty current and able to offer exciting research opportunities to the students in a variety of areas. The Department's faculty is involved not only with individual research projects but also participate in joint collaborative research themes, for example in neuroscience. The students have the opportunity to select their projects from these various arenas.

PROGRAM FACULTY

Faculty in the Department of Biological Sciences are dedicated both to research and teaching. Their areas of expertise are diverse, including biotechnology, microbiology, cancer biology, and a range of neuroscience disciplines. Active members of the research faculty are below.

Dr. Melissa Harrington, Professor – Neuroscience
 Dr. Vincent Fondong, Associate Professor – Epidemiology
 Dr. Harbinder Dhillon, Associate Professor – Biochemistry
 Dr. Anthea Aikins, Assistant Professor – Microbiology
 Dr. Michael Gitcho, Assistant Professor – Cellular & Molecular Pharmacology
 Dr. Y. Hwan Kim, Associate Professor – Physiological Science
 Dr. Hakeem Lawal, Assistant Professor – Biology
 Dr. Karl Milette, Assistant Professor – Microbiology & Molecular Genetics
 Dr. Theresa Szabo-Maas, Assistant Professor – Zoology
 Dr. Murali Temburni, Associate Professor – Life Sciences
 Dr. Andrew Lloyd, Professor – Microbiology
 Dr. Sabrina McGary, Associate Professor – Animal and Avian Sciences

Dr. Derrick Scott, Visiting Assistant Professor – Biological Sciences
Dr. Cynthia VanGolen, Associate Professor – Neuroscience
Dr. Clytrice Watson, Professor – Food Science & Technology
Dr. Charlie Wilson, Associate Professor – Biological Sciences

FACILITIES

The Department of Biological Sciences is housed in the Mishoe Science Center. The Department consists of 11 active research laboratories, a common biotechnology-equipped laboratory, six laboratory classrooms with prep room, faculty offices, a science reading room, an animal room, and a research greenhouse. These facilities provide strong support capabilities in teaching and research areas of modern biology. The faculty has active research programs that are funded by research grants in various areas of biology but especially in plant biotechnology, cancer, and neuroscience.

In addition, the Department is a cosponsor of the Claude E. Phillips Herbarium. The Herbarium is the largest collection of preserved plant materials at any historically black institution in the country and the only such collection on the Delmarva Peninsula.

COURSE DESCRIPTIONS

All courses require that students have, as minimal prerequisites, one year of Biology courses on the undergraduate level. Additional prerequisites are noted in each course description. While a degree in Biological Sciences or its equivalent is an admission requirement for the graduate degree programs in Biology, not all courses require this extensive background. Certain courses will thus also be appropriate for graduate students in other fields who may not have undergraduate degrees in Biology.

BIOLOGICAL SCIENCES (BIOL)

BIOL-503. INTRODUCTION TO NEUROSCIENCE

The course is a broad overview of the field of neuroscience covering three levels of analysis: 1.) molecular and cellular; 2.) systems neuroscience; and 3.) behavioral neuroscience. The course provides a common foundation in neuroscience for students planning further study or for those interested in learning about the area. Credit, three hours.

BIOL-505. EXPERIMENTAL DESIGN AND BIO-STATISTICS

A survey of statistical methods used in biological research. Topics include parametric and nonparametric statistics, aspects of experimental design, and use of the computer in statistical analysis. Credit, three hours.

BIOL-511. PHARMACOLOGY

A study of how drugs are used to achieve therapeutic benefits. The mechanism of action of various drug types at the molecular, cellular, and interactive-system levels will be addressed. Topics will include the basis for rationale uses of medically-relevant drugs in biological systems and detailing their effectiveness in various diseases and disorders. Focus will be on understanding the balance between pharmacodynamics, pharmacokinetic, and toxicological side-effects that underlies effective treatments. Credit, three hours.

BIOL-515. MOLECULAR FOUNDATIONS OF BEHAVIOR

The course explores the broad and diverse spectrum of behaviors demonstrated by living things. The scope of the course is, taxonomically speaking, broad-based, although most of attention will be directed within the animal kingdom. The course will examine behaviors in both proximate and ultimate contexts and will include analysis of their mechanisms, origins, transmission, development, and significance. Thus it is clear that the study of behavior is multidimensional and embraces many primary biological arenas including anatomy, physiology, heredity, ontogeny, ecology, and evolution. Many approaches have been employed in the study of behavior. These include comparative and physiological psychology, neurobiology, ethology, behavioral ecology, and sociobiology. In the course our study will consider all of these elements, but the focus will concentrate on the ethological and ecological perspectives. Credit, three hours.

BIOL-520. CELL BIOLOGY

The course offers a study of cellular and subcellular biology. Credit, three hours.

BIOL-521. MOLECULAR BIOLOGY

The molecular biology course is rooted in the most basic understanding of life, at the molecular level. Credit, three hours.

BIOL-535. CURRENT TECHNIQUES IN BIOLOGY

The purpose of this course is to expose the new graduate student to various key biological techniques within various laboratories in the department and college. The course will be team taught with the student spending about two weeks in each faculty lab. It will also acquaint the student with the various research options for their thesis. Credit, three hours.

BIOL-575. MOLECULAR GENETICS AND GENOMICS

An in-depth discussion of molecular genetic principles and genomic methods as applied to model and commercially relevant biological organisms. Review of cutting-edge technology, literature, and methods applied on a genomic scale; this course will also investigate evolutionary relationships between various organisms and utilization of tools from the genomic era to better elucidate similarities and differences. Equivalent to AGRI-575. Credit, three hours.

BIOL-590. PROFESSIONAL DEVELOPMENT WORKSHOP I

The course focuses on developing professional skills and experiences by participation and presentation in workshops, seminars, grant writing, and research reviews. Credit, two hours.

BIOL-591. PROFESSIONAL DEVELOPMENT WORKSHOP II

The course assigns credit for continued participation as described in 23-590 and for the student to identify a research advisor to initiate a faculty-supervised research leading to development and writing of a thesis project proposal. Credit, one hour.

BIOL-595. CAREERS SEMINAR IN BIOTECHNOLOGY/PHARMACOLOGY

This course will introduce students to leaders in industrial research companies and government regulatory agencies that hire large numbers of biologists. Each week a speaker from industry or government will present about their industry or agency and will present a case study of a related issue or problem. Prerequisites: MA graduate student in Department of Biological Sciences or related area; Bioscience major. Credit, one hour.

BIOL-599. SPECIAL PROJECTS

The course is for continued participation in research, or other special needs. Prerequisites: Consent of the Chair. Credit, three hours.

BIOL-600. MOLECULAR ENDOCRINOLOGY

The graduate-level course is designed to: 1.) engage students in mastering a working knowledge of advanced principles in endocrinology, 2.) broaden student comprehension and discussion of current topics in endocrinology, in particular current journal articles, and 3.) develop experimental design / grant writing techniques relevant to endocrinology. Credit, three hours.

BIOL-603. STRATEGIES FOR EFFECTIVE TEACHING IN BIOLOGY

The course provides an introduction to the principles and techniques of effective pedagogy as it applies to teaching in the life sciences. While the course is focused on college-level instruction, secondary school teaching will be considered. This course is required for graduate students planning to teach in DSU's Biology Department.

Prerequisites: Second year biology graduate student status. Credit, three hours.

BIOL-604. SCIENTIFIC INTEGRITY

The course provides an introduction to the principles of ethical conduct of research including scientific integrity and relevant human subjects and animal use regulations. The course will be taught using a case-study method where students will read and discuss situations that they might encounter in the practice of research. Prerequisites: Second year graduate student status.

Credit, three hours.

BIOL-605. CELL MORPHOGENESIS

Current topics related to basic processes of molecular aspects of differentiation and development in living cells. Credit, three hours.

BIOL-607. CANCER BIOLOGY

This course is designed to extend the concepts introduced in Cell Biology and Genetics and apply them to a well-known human disease. Cancer Biology covers current concepts and knowledge of cancer, including cancer research and cancer treatment. This course will explore the cellular and molecular mechanisms underlying cancer development with the aim of understanding how changes in the normal growth and division processes lead to the formation of tumors. Lecture topics include the natural history of cancer, oncogenes, tumor suppressors, cancer-causing viruses, signal transduction, other genetic alternations in cancer, epidemiology, health care policy and current therapeutic approaches to cancer treatment. Prerequisites: Graduate student in Department of Biological Sciences or related area. Credit, three hours.

BIOL-608. PATHOPHYSIOLOGY

Pathophysiology is the study of abnormal function in living tissue. This course describes the basic biology of various disease processes, building upon the knowledge gained in Genetics, Cell Biology, and Principles of Physiology.

Physiological principles underlying the causes, signs, symptoms, and pattern of development of human disease will be examined. Building upon a basic background in human biology, the manifestations of various human diseases will be explained by the way these diseases disrupt normal physiology, anatomy, and biochemistry. Knowing how diseases disrupt normal physiology will also help in understanding the rationale behind many types of treatment. Health disparities will also be addressed.

Prerequisites: Graduate student in Department of Biological Sciences or related area. Credit, three hours.

BIOL-610. FUNCTIONAL NEUROANATOMY

The course is designed for graduate students in the life sciences who are interested in becoming familiar with the structure and function of the vertebrate nervous system at both the gross and microstructure levels. The course will include computer exercises and microscopic examinations.

Credit, three hours.

BIOL-611. ADVANCED GENETICS

The course offers an in depth exploration of principles of modern genetics as they apply to plants, animals, and micro-organisms ranging from the molecular to the population level. Four (4) hours lecture/laboratory. Credit, three hours.

BIOL-612. EDUC. NEUROCHEMISTRY

The course is designed for graduate students in the life sciences who are interested in learning the current state of scientific knowledge about neurotransmitters, their receptors and cellular effectors, and their relationship to disease. The course will help students understand the history and development of the current understanding of the chemistry of the nervous system by presenting some of the experimental evidence on which the knowledge is based. Credit, three hours.

BIOL-621. ADVANCED MICROBIOLOGY

The course will emphasize the role of micro-organisms in the diseases of man. The history of microbiology and the anatomy, physiology, ecology, and applications of bacteria will be emphasized. Credit, three hours.

BIOL-622. THE PHYSIOLOGY OF EXCITABLE CELLS

The course is designed for graduate students in the life sciences who are interested in learning the current state of scientific knowledge of the physiology of nerve, muscle, and sensory cells. The course will help students understand the history and development of the current understanding of excitable cell physiology by presenting some of the experimental evidence on which the knowledge is based.

Credit, three hours.

BIOL-625. IMMUNOLOGY

The course offers a study of cellular, humoral, and molecular aspects of immune reactions. There will be an introduction to immunobiology and immunochemistry. The use of antigen-antibody reactions will be emphasized. Credit, three hours.

BIOL-631. CELL BIOCHEMISTRY/HISTOCHEMISTRY

The course offers a comparative and correlative study of cellular chemistry as related to the physiological functions and metabolism of various tissues and organs from a diverse range of vertebrates. Some human biomedical correlations will be included. Demonstrations and laboratory exercises are included. Two lecture hours and one two-hour lab each week.

Credit, three hours.

BIOL-650. BIOLOGICAL MECHANISMS

The course provides an integration of the molecular and cellular functions within a cell and how these relate to overall system operations. The course will emphasize regulatory, homeostatic, and biochemical approaches to understanding cell function. Credit, three hours.

BIOL-651. PROTEINS: STRUCTURES AND MOLECULAR PROPERTIES

The course will examine the chronological events in the life of a protein. These events include protein composition, biosynthesis, and molecular dynamics. Evolutionary aspects of ancestral proteins will be used to explore the origins of contemporary primary structures. A laboratory will be included to examine the various protein separation schema that are currently used in modern molecular labs. Background in genetics, molecular, and cell biology required. Credit, three hours.

BIOL-653. DISEASES OF THE NERVOUS SYSTEM

With the dramatic advances in neuroscience and psychiatry, we are able to identify the anatomical, chemical, and psychological anomalies underlying many mental and nervous system disorders. These advances may help us find better treatment options as well as potential preventative measures. Using several different reading sources, the present course will cover epidemiology, symptoms, known causes, neurobiology and treatment of nervous system disorders that include Schizophrenia, addiction, autism, depression, bipolar disorder, anxiety disorder, Alzheimer's, Parkinson's and Huntington's diseases.

Prerequisites: Graduate student in Department of Biological Sciences or related area. Credit, three hours.

BIOL-666. BIOTECHNOLOGY

The course provides a series of lecture presentations featuring speakers from academics and industry in the expanding field of Biotechnology. An extensive research paper will be required of each student. Credit, three hours.

BIOL-689. PROBLEMS IN BIOLOGY

The course offers an in-depth individualized literature investigation of a research problem conducted under supervision of advisor. The course includes use of library, integrating data from various sources, and conceptual thinking to produce a final Review paper. The outcome will be reviewed by faculty, and the student must defend to a committee in a seminar.

Prerequisites: Graduate Biology student in M.A. program. Credit, typically three hours but may be one hour.

BIOL-690. THESIS RESEARCH I

An in-depth individualized investigation of a research problem conducted under close supervision of the thesis advisor. Includes training in experimental techniques, problem design, testing, data collection, data analysis, and preparation of thesis. University and departmental guidelines are to be followed in preparing and defending the thesis. It is expected that the research will be of sufficient quality to be published as a scholarly paper coauthored by the thesis advisor in an appropriate refereed journal.

Credit, typically three hours each, but may be taken for one to six.

BIOL-691. THESIS RESEARCH II

An in-depth individualized investigation of a research problem conducted under close supervision of the thesis advisor. Includes training in experimental techniques, problem design, testing, data collection, data analysis, and preparation of thesis. University and departmental guidelines are to be followed in preparing and defending the thesis. It is expected that the research will be of sufficient quality to be published as a scholarly paper coauthored by the thesis advisor in an appropriate refereed journal.

Credit, typically three hours each, but may be taken for one to six.

BIOL-692. THESIS RESEARCH III

An in-depth individualized investigation of a research problem conducted under close supervision of the thesis advisor. Includes training in experimental techniques, problem design, testing, data collection, data analysis, and preparation of thesis. University and departmental guidelines are to be followed in preparing and defending the thesis. It is expected that the research will be of sufficient quality to be published as a scholarly paper coauthored by the thesis advisor in an appropriate refereed journal.

Credit, typically three hours each, but may be taken for one to six.

BIOL-698. THESIS SUSTAINING – BIOLOGY

Upon completion of all courses and research, this course is used to maintain registration until graduation. Credit, none.

PROGRAM: MS BIOLOGICAL SCIENCES –
GENERAL BIOLOGY CONCENTRATION (MAGB)



Year 1 Fall Semester			Year 1 Spring Semester		
Course	Course Name	Cr	Course	Course Name	Cr
BIOL 505*	Experimental Design and Biostatistics	3	BIOL 521*+	Molecular Biology	3
BIOL 520*	Cell Biology	3	BIOL xxx+	Biology Elective	3
BIOL xxx+	Biology Elective	3			
BIOL 590*	Professional Development I	2	BIOL xxx*	Professional Development II	1
	Total Credits	11		Total Credits	7

Year 2 Fall Semester			Year 2 Spring Semester		
Course	Course Name	Cr	Course	Course Name	Cr
BIOL 650 or*	Biological Mechanisms or	3	BIOL xxx+	Biology Elective	3
CHEM 521 or 671	Adv. Biochemistry or Bioorganic Chemistry		BIOL xxx+	Biology Elective	3
BIOL 689*	Literature Thesis	3			
	Total Credits	6		Total Credits	6

			Total Credits: 30
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*Denotes a Core Requirement

+Denotes an elective

Total Core Credits = 18

Total Elective Credits = 12

Candidacy Requirement: Proposal Defense with Thesis Committee and submission with candidacy application to Graduate Studies and Research

Capstone or Culminating Experience: Public Thesis Presentation and Oral Defense of Research Thesis

MASTER OF SCIENCE IN MOLECULAR AND CELLULAR NEUROSCIENCE

PROGRAM OBJECTIVES

The Department of Biological Sciences prepares students for career opportunities in professional studies and further graduate studies in areas related to biological sciences and neuroscience. Many graduates pursue careers in state and federal agencies, health care, private industry, research, and teaching. The program strives to develop a clear and unbiased method of critical and logistic thinking, an appreciation and understanding of the natural world, and knowledge of biological principles required to make intelligent and effective decisions.

PROGRAM GOALS

Students in the Cellular and Molecular Neuroscience Program will have broadened knowledge in the fields of biology and/or neuroscience. Our programs aim to enhance student research skills and the ability to apply classroom and laboratory knowledge to real-world situations. Additionally, the student will be informed of recent trends in research and engineering practices. Students are required to complete a research project directed by faculty mentor and submit a thesis, which will be defended before their committee.

STUDENT LEARNING OUTCOMES

Expanded knowledge of biological concepts
Proficiency in experimental design and laboratory research experiments and techniques
Familiarity with current research topics in the field
Enriched skills in data analysis and interpretation
Enhanced experience with scientific writing and oral presentation of research findings

ADMISSION AND DEGREE REQUIREMENTS

Application Deadlines:

- Fall enrollment – April 15
- Spring enrollment – October 15

International Admission Deadlines:

- Fall enrollment – April 15
- Spring enrollment – October 15

All applicants are required to:

- Have earned a Baccalaureate degree in Biological Sciences or a related field.
- Have earned a cumulative grade point average of at least 2.75 with 3.00 minimum in the major.
- Provide official scores on the Graduate Record Examination (GRE). Testing must be within five years of application.
- Complete an application for admission.

- Submit official transcripts.
- Submit two professional letters of recommendation.
- Submit a personal statement that addresses prior research, professional, and academic experiences as related to your objectives in obtaining the degree, and your research areas of interest pursuant to the degree within the Department of Biological Sciences.
- International applicants must meet all requirements.

NOTE: Only complete applications will be considered for admission.

The Department of Biological Sciences Graduate Program Committee will review students' application materials (Priority Review to commence on March 15) and make a recommendation for acceptance into the Graduate Program to the Dean, Graduate Studies and Research, who extends an offer of admission to the applicant. Funding (i.e. a stipend and tuition waiver supported through a teaching or research assistantship) is not guaranteed to any student upon his or her recommendation for admission; funding status is assessed on an individual basis and depends on availability of funds along with evaluation of the student during his or her progression through the program.

DEGREE REQUIREMENTS

The degree program in Molecular and Cellular Neuroscience is a specialty degree program designed to prepare students for advanced study in the area of neuroscience. The program capitalizes on the neuroscience expertise of a number of faculty who are active in this area of research. The degree requirements include and emphasize a neuroscience-based research thesis based on mentored research conducted in our neuroscience research laboratories. The program is supplemented by a partnership with local universities. The program requires 33 graduate credits and is designed to allow completion over a two-year period on a full-time basis.

FACULTY

The Department of Biological Sciences is comprised of dedicated and well-prepared faculty with diverse educational backgrounds and areas of research specialization. Small class sizes for graduate courses ensure that students interact closely with faculty in the learning experience. All faculty have published in their respective fields, and they maintain active research involvement. Scholarly involvement and continuous professional development in research keeps the faculty current and able to offer exciting research opportunities to the students in a variety of areas. The Department's faculty is involved not only with individual research projects but also participate in joint collaborative research themes, for example in neuroscience. The students have the opportunity to select their projects from these various arenas.

BIOLOGICAL SCIENCES RESEARCH FACULTY

Faculty in the Department of Biological Sciences are dedicated both to research and teaching. Their areas of expertise are diverse, including biotechnology, microbiology, cancer biology, and a range of neuroscience disciplines. Active members of the research faculty are below.

Dr. Melissa Harrington, Professor – Neuroscience
 Dr. Vincent Fondong, Professor – Plant Virology
 Dr. Harbinder Dhillon, Professor – Biochemistry
 Dr. Anthea Aikins, Assistant Professor – Microbiology
 Dr. Michael Gitcho, Associate Professor – Cellular & Molecular Pharmacology
 Dr. Y. Hwan Kim, Associate Professor – Neuroscience
 Dr. Hakeem Lawal, Associate Professor – Neuroscience
 Dr. Karl Milette, Associate Professor – Cancer Biology & Molecular Genetics

Dr. Murali Temburni, Associate Professor – Molecular Cellular Neuroscience
Dr. Derrick Scott, Assistant Professor – Bioinformatics & Genetics
Dr. Cynthia VanGolen, Associate Professor – Neuroscience
Dr. Krystal Hans, Assistant Professor – Forensic Biology
Dr. Clytrice Watson, Professor – Food Science & Technology
Dr. Charlie Wilson, Associate Professor – Biological Sciences

FACILITIES

The Department of Biological Sciences is housed in the Mishoe Science Center. The Department consists of 11 active research laboratories, a common biotechnology- equipped laboratory, six laboratory classrooms with prep rooms, faculty offices, a science reading room, an animal room, and a research greenhouse. These facilities provide strong support capabilities in teaching and research areas of modern biology. The faculty has active research programs that are funded by research grants in various areas of biology but especially in plant biotechnology, cancer, and neuroscience.

In addition, the Department is a cosponsor of the Claude E. Phillips Herbarium. The Herbarium is the largest collection of preserved plant materials at any historically black institution in the country and the only such collection on the Delmarva Peninsula.

MASTER OF SCIENCE IN MOLECULAR AND CELLULAR NEUROSCIENCE

Required Core Courses: (required for all students pursuing MS degrees):

Molecular Biology (BIOL-521)

Experimental Design and Biostatistics (BIOL -505) Current Techniques in Biology (BIOL -535)

Thesis / Dissertation Writing Workshop (BIOL - 695)

Additional Required Courses:

Introduction to Neuroscience (BIOL -503) Functional Neuroanatomy (BIOL -610) Neurochemistry (BIOL -612)
The Physiology of Excitable Cells (BIOL -622)

Open Neuroscience Elective (see below)

Total credit hours for graduation: 33 (27 course credits + 6 research credits)

Open Neuroscience Electives:

BIOL-520 Cell Biology

BIOL -511 Pharmacology

BIOL -515 Behavior

CHEM-521 Biochemistry

BIOL -600 Molecular Endocrinology

BIOL -605 Cell Morphogenesis

BIOL -625 Immunology

BIOL -650 Biological Mechanisms

BIOL -651 Proteins: Structure and Function

BIOL -653 Nervous System Disorders

or, any other graduate-level 'biological' courses approved by the student's Research Advisor and Department Chair

COURSE DESCRIPTIONS

All courses require that students have, as minimal prerequisites, one year of Biology courses on the undergraduate level. Additional prerequisites are noted in each course description. While a degree in Biological Sciences or its equivalent is an admission requirement for the graduate degree programs in Biology, not all courses require this extensive background. Certain courses will thus also be appropriate for graduate students in other fields who may not have undergraduate degrees in Biology.

BIOLOGICAL SCIENCES (BIOL)

BIOL-503. INTRODUCTION TO NEUROSCIENCE

The course is a broad overview of the field of neuroscience covering three levels of analysis: 1.) molecular and cellular; 2.) systems neuroscience; and 3.) behavioral neuroscience. The course provides a common foundation in neuroscience for students planning further study or for those interested in learning about the area. Credit, three hours.

BIOL-505. EXPERIMENTAL DESIGN AND BIO-STATISTICS

A survey of statistical methods used in biological research. Topics include parametric and nonparametric statistics, aspects of experimental design, and use of the computer in statistical analysis. Credit, three hours.

BIOL-511. PHARMACOLOGY

A study of how drugs are used to achieve therapeutic benefits. The mechanism of action of various drug types at the molecular, cellular, and interactive-system levels will be addressed. Topics will include the basis for rationale uses of medically-relevant drugs in biological systems and detailing their effectiveness in various diseases and disorders. Focus will be on understanding the balance between pharmacodynamics, pharmacokinetic, and toxicological side effects that underlies effective treatments. Credit, three hours.

BIOL-515. MOLECULAR FOUNDATIONS OF BEHAVIOR

The course explores the broad and diverse spectrum of behaviors demonstrated by living things. The scope of the course is, taxonomically speaking, broad-based, although most of attention will be directed within the animal kingdom. The course will examine behaviors in both proximate and ultimate contexts and will include analysis of their mechanisms, origins, transmission, development, and significance. Thus it is clear that the study of behavior is multidimensional and embraces many primary biological arenas including anatomy, physiology, heredity, ontogeny, ecology, and evolution. Many approaches have been employed in the study of behavior. These include comparative and physiological psychology, neurobiology, ethology, behavioral ecology, and sociobiology. In the course our study will consider all of these elements, but the focus will concentrate on the ethological and ecological perspectives. Credit, three hours.

BIOL-520. CELL BIOLOGY

The course offers a study of cellular and subcellular biology. Credit, three hours.

BIOL-521. MOLECULAR BIOLOGY

The molecular biology course is rooted in the most basic understanding of life, at the molecular level. Credit, three hours.

BIOL-535. CURRENT TECHNIQUES IN BIOLOGY

The purpose of this course is to expose the new graduate student to various key biological techniques within various laboratories in the department and college. The course will be team taught with the student spending about two weeks in each faculty lab. It will also acquaint the student with the various research options for their thesis. Credit, three hours.

BIOL-575. MOLECULAR GENETICS AND GENOMICS

An in-depth discussion of molecular genetic principles and genomic methods as applied to model and commercially relevant biological organisms. Review of cutting-edge technology, literature, and methods applied on a genomic scale; this course will also investigate evolutionary relationships between various organisms and utilization of tools from the genomic era to better elucidate similarities and differences. Equivalent to AGRI-575. Credit, three hours.

BIOL-590. PROFESSIONAL DEVELOPMENT WORKSHOP I

The course focuses on developing professional skills and experiences by participation and presentation in workshops, seminars, grant writing, and research reviews. Credit, two hours.

BIOL-591. PROFESSIONAL DEVELOPMENT WORKSHOP II

The course assigns credit for continued participation as described in 23-590 and for the student to identify a research advisor to initiate a faculty-supervised research leading to development and writing of a thesis project proposal. Credit, one hour.

BIOL-595. CAREERS SEMINAR IN BIOTECHNOLOGY/PHARMACOLOGY

This course will introduce students to leaders in industrial research companies and government regulatory agencies that hire large numbers of biologists. Each week a speaker from industry or government will present about their industry or agency and will present a case study of a related issue or problem. Prerequisites: MA graduate student in Department of Biological Sciences or related area; Bioscience major. Credit, one credit hour

BIOL-599. SPECIAL PROJECTS

The course is for continued participation in research, or other special needs.
Prerequisites: Consent of the Chair. Credit, three hours.

BIOL-600. MOLECULAR ENDOCRINOLOGY

The graduate level course is designed to: 1.) engage students in mastering a working knowledge of advanced principles in endocrinology, 2.) broaden student comprehension and discussion of current topics in endocrinology, in particular current journal articles, and 3.) develop experimental design / grant writing techniques relevant to endocrinology. Credit, three hours.

BIOL-603. STRATEGIES FOR EFFECTIVE TEACHING IN BIOLOGY

The course provides an introduction to the principles and techniques of effective pedagogy as it applies to teaching in the life sciences. While the course is focused on college-level instruction, secondary school teaching will be considered. This course is required for graduate students planning to teach in DSU's biology department.
Prerequisites: Second year biology graduate student status. Credit, three hours.

BIOL-604. SCIENTIFIC INTEGRITY

The course provides an introduction to the principles of ethical conduct of research including scientific integrity and relevant human subjects and animal use regulations. The course will be taught using a case-study method where students will read and discuss situations that they might encounter in the practice of research. Prerequisites: Second year graduate student status. Credit, three hours.

BIOL-605. CELL MORPHOGENESIS

Current topics related to basic processes of molecular aspects of differentiation and development in living cells. Credit, three hours.

BIOL-607. CANCER BIOLOGY

This course is designed to extend the concepts introduced in Cell Biology and Genetics and apply them to a well-known human disease. Cancer Biology covers current concepts and knowledge of cancer, including cancer research and cancer treatment. This course will explore the cellular and molecular mechanisms underlying cancer development with the aim of understanding how changes in the normal growth and division processes lead to the formation of tumors. Lecture topics include the natural history of cancer, oncogenes, tumor suppressors, cancer-causing viruses, signal transduction, other genetic alternations in cancer, epidemiology, health care policy and current therapeutic approaches to cancer treatment.
Prerequisites: Graduate student in Department of Biological Sciences or related area. Credit, three hours.

BIOL-608. PATHOPHYSIOLOGY

Pathophysiology is the study of abnormal function in living tissue. This course describes the basic biology of various disease processes, building upon the knowledge gained in Genetics, Cell Biology, and Principles of Physiology. Physiological principles underlying the causes, signs, symptoms, and pattern of development of human disease will be examined. Building upon a basic background in human biology, the manifestations of various human diseases will be explained by the way these diseases disrupt normal physiology, anatomy, and biochemistry. Knowing how diseases disrupt normal physiology will also help in understanding the rationale behind many types of treatment. Health disparities will also be addressed.
Prerequisites: Graduate student in Department of Biological Sciences or related area. Credit, three hours.

BIOL-610. FUNCTIONAL NEUROANATOMY

The course is designed for graduate students in the life sciences who are interested in becoming familiar with the structure and function of the vertebrate nervous system at both the gross and microstructure levels. The course will include computer exercises and microscopic examinations.

Credit, three hours.

BIOL-611. ADVANCED GENETICS

The course offers an in depth exploration of principles of modern genetics as they apply to plants, animals, and micro-organisms ranging from the molecular to the population level. Four (4) hours lecture/laboratory. Credit, three hours.

BIOL-612. NEUROCHEMISTRY

The course is designed for graduate students in the life sciences who are interested in learning the current state of scientific knowledge about neurotransmitters, their receptors and cellular effectors, and their relationship to disease. The course will help students understand the history and development of the current understanding of the chemistry of the nervous system by presenting some of the experimental evidence on which the knowledge is based. Credit, three hours.

BIOL-621. ADVANCED MICROBIOLOGY

The course will emphasize the role of micro-organisms in the diseases of man. The history of microbiology and the anatomy, physiology, ecology, and applications of bacteria will be emphasized. Credit, three hours.

BIOL-622. THE PHYSIOLOGY OF EXCITABLE CELLS

The course is designed for graduate students in the life sciences who are interested in learning the current state of scientific knowledge of the physiology of nerve, muscle, and sensory cells. The course will help students understand the history and development of the current understanding of excitable cell physiology by presenting some of the experimental evidence on which the knowledge is based.

Credit, three hours.

BIOL-625. IMMUNOLOGY

The course offers a study of cellular, humoral, and molecular aspects of immune reactions. There will be an introduction to immunobiology and immunochemistry. The use of antigen-antibody reactions will be emphasized. Credit, three hours.

BIOL-631. CELL BIOCHEMISTRY/HISTOCHEMISTRY

The course offers a comparative and correlative study of cellular chemistry as related to the physiological functions and metabolism of various tissues and organs from a diverse range of vertebrates. Some human biomedical correlations will be included. Demonstrations and laboratory exercises are included. Two (2) lecture hours and one two-hour lab each week.

Credit, three hours.

BIOL-650. BIOLOGICAL MECHANISMS

The course provides an integration of the molecular and cellular functions within a cell and how these relate to overall system operations. The course will emphasize regulatory, homeostatic, and biochemical approaches to understanding cell function.

Credit, three hours.

BIOL-651. PROTEINS: STRUCTURES AND MOLECULAR PROPERTIES

The course will examine the chronological events in the life of a protein. These events include protein composition, biosynthesis, and molecular dynamics. Evolutionary aspects of ancestral proteins will be used to explore the origins of contemporary primary structures. A laboratory will be included to examine the various protein separation schema that are currently used in modern molecular labs. Background in genetics, molecular, and cell biology required. Credit, three hours.

BIOL-653. DISEASES OF THE NERVOUS SYSTEM

With the dramatic advances in neuroscience and psychiatry, we are able to identify the anatomical, chemical, and psychological anomalies underlying many mental and nervous system disorders. These advances may help us find better treatment options as well as potential preventative measures. Using several different reading sources, the present course will cover epidemiology, symptoms, known causes, neurobiology and treatment of nervous system disorders that include Schizophrenia, addiction, autism, depression, bipolar disorder, anxiety disorder, Alzheimer's, Parkinson's and Huntington's diseases.

Prerequisites: Graduate student in Department of Biological Sciences or related area.

Credit, three hours.

BIOL-666. BIOTECHNOLOGY

The course provides a series of lecture presentations featuring speakers from academics and industry in the expanding field of Biotechnology. An extensive research paper will be required of each student. Credit, three hours.

BIOL-689. PROBLEMS IN BIOLOGY

The course offers an in-depth individualized literature investigation of a research problem conducted under supervision of advisor. The course includes use of library, integrating data from various sources, and conceptual thinking to produce a final Review paper. The outcome will be reviewed by faculty and the student must defend to a committee in a seminar. Prerequisites: Graduate Biology student in M.A. program. Credit, typically three hours but may be one hour.

BIOL-690. THESIS RESEARCH I

An in-depth individualized investigation of a research problem conducted under close supervision of the thesis advisor. Includes training in experimental techniques, problem design, testing, data collection, data analysis, and preparation of thesis. University and departmental guidelines are to be followed in preparing and defending the thesis. It is expected that the research will be of sufficient quality to be published as a scholarly paper coauthored by the thesis advisor in an appropriate refereed journal. Credit, typically three hours each, but may be taken for one to six.

BIOL-691. THESIS RESEARCH II

An in-depth individualized investigation of a research problem conducted under close supervision of the thesis advisor. Includes training in experimental techniques, problem design, testing, data collection, data analysis, and preparation of thesis. University and departmental guidelines are to be followed in preparing and defending the thesis. It is expected that the research will be of sufficient quality to be published as a scholarly paper coauthored by the thesis advisor in an appropriate refereed journal. Credit, typically three hours each, but may be taken for one to six.

BIOL-692. THESIS RESEARCH III

An in-depth individualized investigation of a research problem conducted under close supervision of the thesis advisor. Includes training in experimental techniques, problem design, testing, data collection, data analysis, and preparation of thesis.

University and departmental guidelines are to be followed in preparing and defending the thesis. It is expected that the research will be of sufficient quality to be published as a scholarly paper coauthored by the thesis advisor in an appropriate refereed journal. Credit, typically three hours each, but may be taken for one to six.

23-698. THESIS SUSTAINING – BIOLOGY

Upon completion of all courses and research, this course is used to maintain registration until graduation. Credit, none.

**PROGRAM: MS IN CELLULAR AND MOLECULAR
NEUROSCIENCE**

Year 1 Fall Semester			Year 1 Spring Semester		
Course	Course Name	Cr	Course	Course Name	Cr
BIOL 503*	Introduction to Neuroscience	3	BIOL 612*	Neurochemistry	3
BIOL 590*	Professional Development I	2	BIOL 521*	Molecular Biology	3
BIOL 535*	Current Techniques in Biology	3	BIOL 591*	Professional Development II	1
	Total Credits	8		Total Credits	7

Year 2 Fall Semester			Year 2 Spring Semester		
Course	Course Name	Cr	Course	Course Name	Cr
BIOL 610*	Functional Neuroanatomy	3	BIOL 622*	Physiology of Excitable Cells	3
BIOL 505*	Experimental Design and Biostatistics	3	BIOL xxx+	Neuroscience Elective	3
BIOL 690*	Thesis Research I	3	BIOL 691*	Thesis Research II	3
	Total Credits	9		Total Credits	9
			Total Credits: 33		

*Denotes a Core Requirement

+Denotes an elective

Total Core Credits = 30

Total Elective Credits = 3

Candidacy Requirement: Proposal Defense with Thesis Committee and submission with candidacy application to Graduate Studies and Research

Capstone or Culminating Experience: Public thesis presentation and Oral defense of Research Thesis

DOCTOR OF PHILOSOPHY IN NEUROSCIENCE

PROGRAM OBJECTIVES

The objective of the Ph.D. in Neuroscience is to prepare students for a teaching and research professional career in neuroscience. While DSU provides students with a comfortable, familiar, and nurturing environment in which they can pursue their Ph.D. in Neuroscience, the program also has linkages with faculty researchers at the University of Delaware and the A.I. DuPont Children's Hospital that provide diverse opportunities for DSU students to access a broad range of research training with high-profile investigators working at the cutting edge of neuroscience research.

In order to best prepare our students for the fast-growing and opportunity-rich field of neuroscience, our Ph.D. program brings together students and faculty throughout the state, making neuroscience a truly inter-institutional program. Currently, DSU has 13 faculty conducting neuroscience research in three departments plus research opportunities at the A.I. DuPont Children's Hospital that has an active basic neuroscience research program and the University of Delaware which has neuroscientists scattered across six departments. Both UD and A.I. DuPont Hospital are less than a one hour drive from DSU, and all three institutions have videoconferencing capabilities making joint seminars, classes, and an inter-institutional research training program easily managed.

Faculty at DSU are supported by grants from the National Institutes of Health (NIH), National Science Foundation (NSF), and private foundations. As students of the only biology-based neuroscience degree program in the state, DSU students will be recruited by neuroscience researchers at all institutions, while our specialized neuroscience graduate courses and seminars will be attractive to students in other programs who are interested in neuroscience.

PROGRAM GOALS

Students in the Neuroscience Program will have broadened knowledge in the fields of biology and / or neuroscience. Our programs aim to enhance student research skills and the ability to apply classroom and laboratory knowledge to real-world situations. Additionally, the student will be informed of recent trends in research and engineering practices. Students are required to complete a research project directed by faculty mentor and submit a thesis, which will be defended before their committee.

STUDENT LEARNING OUTCOMES

Expanded knowledge of biological concepts;
Proficiency in experimental design and laboratory research experiments and techniques;
Familiarity with current research topics in the field;
Enriched skills in data analysis and interpretation;
Enhanced experience with scientific writing and oral presentation of research findings.

ADMISSION AND DEGREE REQUIREMENTS

Application Deadlines (Fall Admission Only): April 15

International Admission Deadlines: April 15

All applicants are required to:

- Have earned a Baccalaureate degree in Biological Sciences or a related field.
- Have earned a cumulative grade point average of at least 2.75 with 3.00 minimum in the major.
- Provide official scores on the Graduate Record Examination (GRE). Testing must be within five years of application.
- Complete an application for admission.
- Submit official transcript(s).
- Submit two letters of recommendation.
- Submit an essay defining your career goal in neuroscience.
- Submit a personal statement that addresses prior research, professional, and academic experiences as related to your objectives in obtaining the degree, and your research areas of interest pursuant to the degree within the Department of Biological Sciences.
- International applicants must meet all requirements.

NOTE: Only complete applications will be considered for admission.

The Department of Biological Sciences Graduate Program Committee will review students' application materials (Priority Review to commence on March 15) and make a recommendation for acceptance into the Graduate Program to the Dean, Graduate Studies and Research, who extends an offer of admission to the applicant. Funding (i.e. a stipend and tuition waiver supported through a teaching or research assistantship) is not guaranteed to any student upon his or her recommendation for admission; funding status is assessed on an individual basis and depends on availability of funds along with evaluation of the student during his or her progression through the program.

DEGREE REQUIREMENTS

The Ph.D. in Neuroscience program is a specialty degree program designed to prepare students for professional careers in the area of neuroscience. The degree requirements include and emphasize a neuroscience-based research dissertation based on mentored research conducted in one of our neuroscience research laboratories. The program will require at least 60 credit hours, with 36 from course work. To become a candidate for the Ph.D., the student must complete all courses and pass a two-part qualifying exam; part I consists of a written examination covering any material related to the course work taken within the first two years, and in part II, the students must write and defend a research proposal choosing from a list of topics generated by the faculty. Each student, upon achieving candidacy, is required to complete the teaching strategies course and to teach the equivalent of 4 credit hours, or one lecture course, before completion of the degree program.

FINANCIAL SUPPORT

A best effort will be made to support students in the Ph.D. program with either research or teaching assistantships and tuition support so that they may focus full-time on their studies and research.

FACULTY

Because the Ph.D. program in Neuroscience is interdisciplinary and multi-institutional, doctoral candidates work with a broad array of faculty and are exposed to diverse perspectives, techniques, and theoretical approaches. Faculty members at Delaware State and its partner institutions are engaged in pioneering research funded by the National Science Foundation, National Institutes of Health, and other agencies.

BIOLOGICAL SCIENCES RESEARCH FACULTY

Faculty in the Department of Biological Sciences are dedicated both to research and teaching. Their areas of expertise are diverse, including biotechnology, microbiology, cancer biology, and a range of neuroscience disciplines. Active members of the research faculty are below.

Dr. Melissa Harrington, Professor – Neuroscience
Dr. Vincent Fondong, Associate Professor – Epidemiology
Dr. Harbinder Dhillon, Associate Professor – Biochemistry
Dr. Anthea Aikins, Assistant Professor - Microbiology
Dr. Michael Gitcho, Assistant Professor – Cellular & Molecular Pharmacology
Dr. Y. Hwan Kim, Associate Professor – Physiological Science
Dr. Hakeem Lawal, Assistant Professor – Biology
Dr. Karl Miletti, Assistant Professor – Microbiology & Molecular Genetics
Dr. Theresa Szabo-Maas, Assistant Professor – Zoology
Dr. Murali Temburni, Associate Professor – Life Sciences
Dr. Andrew Lloyd, Professor – Microbiology
Dr. Sabrina McGary, Associate Professor – Animal and Avian Sciences
Dr. Derrick Scott, Visiting Assistant Professor – Biological Sciences
Dr. Cynthia VanGolen, Associate Professor – Neuroscience
Dr. Clytrice Watson, Professor – Food Science & Technology
Dr. Charlie Wilson, Associate Professor – Biological Sciences

FACILITIES

The Department of Biological Sciences is housed in the Mishoe Science Center. The Department consists of 11 active research laboratories, a common biotechnology-equipped laboratory, six laboratory classrooms with prep rooms, faculty offices, a science reading room, an animal room, and a research greenhouse. These facilities provide strong support capabilities in teaching and research areas of modern biology. The faculty has active research programs that are funded by research grants in various areas of biology but especially in plant biotechnology, cancer, and neuroscience.

In addition, the Department is a cosponsor of the Claude E. Phillips Herbarium. The Herbarium is the largest collection of preserved plant materials at any historically black institution in the country and the only such collection on the Delmarva Peninsula.

The Department of Biological Sciences has a dedicated and well-prepared faculty with diverse backgrounds and areas of specialization. All faculty have published in their respective fields, and they maintain active research involvement. The faculty is serious and talented professors. The small class size insures that students interact closely with faculty in the learning experience. Scholarly involvement in research keeps the faculty current and able to offer exciting research opportunities to the students in a variety of areas.

Required Core Courses:

Course #	Course Name	Credits
BIOL-503	Introduction to Neuroscience	3
BIOL -505	Experimental Design and Biostatistics	3
BIOL -612	Neurochemistry	3
BIOL -622	The Physiology of Excitable Cells	3
BIOL -610	Functional Anatomy From Neuron to Brain	3
BIOL -535	Current Techniques in Biology	3

Foundation Courses: (must take two of these three)

Course #	Course Name	Credits
BIOL -520	Cell Biology	3
BIOL -521	Molecular Biology	3
BIOL -650 <u>or</u>	Biological Mechanisms	3
CHEM-521 <u>or</u>	Advanced Biochemistry	3
CHEM-671	Bioorganic Chemistry	3

Seminar Courses: (required)

Course #	Course Name	Credits
BIOL -590	Professional Development I	2
BIOL -591	Professional Development II	1
BIOL -700	Current Topics I	1
BIOL -701	Current Topics II	1
BIOL -603	Strategies for Effective Teaching in Biology	1
BIOL -604	Scientific Integrity	1

Electives:

BIOL -xxx Electives (must complete at least three, with advisor's approval)		9
Research: Not to exceed 18 credits		
		3 (each)
BIOL -690,691,692	Thesis Research	8 (at least)
BIOL -800	Dissertation Research	60
CREDITS TOTAL		

CREDITS TOTAL**Suggested Electives for Neuroscience doctoral program (Credits, three hours each):**

BIOL-511 Pharmacology	BIOL-605 Cell Morphogenesis
BIOL-515 Behavior	BIOL-625 Immunology
BIOL-575 Molecular Genetics & Genomics	BIOL-651 Proteins: Structure and Function
BIOL-600 Molecular Endocrinology	BIOL-653-Nervous System Disorders

In addition to the electives listed above, other courses at DSU or UD may count toward elective credits pending prior approval by the Dissertation Advisor and Departmental Graduate Programs Committee or Chair of the Department of Biological Sciences at DSU.

COURSE DESCRIPTIONS

All courses require that students have, as minimal prerequisites, one year of Biology courses on the undergraduate level. Additional prerequisites are noted in each course description. While a degree in Biological Sciences or its equivalent is an admission requirement for the graduate degree programs in Biology, not all courses require this extensive background. Certain courses will thus also be appropriate for graduate students in other fields who may not have undergraduate degrees in Biology.

BIOLOGICAL SCIENCES (BIOL)

BIOL -503. INTRODUCTION TO NEUROSCIENCE

The course is a broad overview of the field of neuroscience covering three levels of analysis:

1.) molecular and cellular; 2.) systems neuroscience; and 3.) behavioral neuroscience. The course provides a common foundation in neuroscience for students planning further study or for those interested in learning about the area. Credit, three hours.

BIOL -505. EXPERIMENTAL DESIGN AND BIO-STATISTICS

A survey of statistical methods used in biological research. Topics include parametric and nonparametric statistics, aspects of experimental design, and use of the computer in statistical analysis.

Credit, three hours.

BIOL -511. PHARMACOLOGY

A study of how drugs are used to achieve therapeutic benefits. The mechanism of action of various drug types at the molecular, cellular, and interactive-system levels will be addressed. Topics will include the basis for rationale uses of medically-relevant drugs in biological systems and detailing their effectiveness in various diseases and disorders. Focus will be on understanding the balance between pharmacodynamics, pharmacokinetic, and toxicological side-effects that underlies effective treatments.

Credit, three hours.

BIOL -515. MOLECULAR FOUNDATIONS OF BEHAVIOR

The course explores the broad and diverse spectrum of behaviors demonstrated by living things. The scope of the course is, taxonomically speaking, broad-based, although most of attention will be directed within the animal kingdom. The course will examine behaviors in both proximate and ultimate contexts and will include analysis of their mechanisms, origins, transmission, development, and significance. Thus it is clear that the study of behavior is multidimensional and embraces many primary biological arenas including anatomy, physiology, heredity, ontogeny, ecology, and evolution. Many approaches have been employed in the study of behavior. These include comparative and physiological psychology, neurobiology, ethology, behavioral ecology, and sociobiology. In the course our study will consider all of these elements, but the focus will concentrate on the ethological and ecological perspectives. Credit, three hours.

BIOL -520. CELL BIOLOGY

The course offers a study of cellular and subcellular biology. Credit, three hours.

BIOL -521. MOLECULAR BIOLOGY

The molecular biology course is rooted in the most basic understanding of life, at the molecular level. Credit, three hours.

BIOL -535. CURRENT TECHNIQUES IN BIOLOGY

The purpose of this course is to expose the new graduate student to various key biological techniques within various laboratories in the department and college. The course will be team taught with the student spending about two weeks in each faculty lab. It will also acquaint the student with the various research options for their thesis. Credit, three hours.

BIOL -575. MOLECULAR GENETICS AND GENOMICS

An in-depth discussion of molecular genetic principles and genomic methods as applied to model and commercially relevant biological organisms. Review of cutting-edge technology, literature, and methods applied on a genomic scale; this course will also investigate evolutionary relationships between various organisms and utilization of tools from the genomic era to better elucidate similarities and differences. Equivalent to AGRI-575. Credit, three hours.

BIOL -590. PROFESSIONAL DEVELOPMENT WORKSHOP I

The course focuses on developing professional skills and experiences by participation and presentation in workshops, seminars, grant writing, and research reviews. Credit, two hours.

BIOL -591. PROFESSIONAL DEVELOPMENT WORKSHOP II

The course assigns credit for continued participation as described in 23-590 and for the student to identify a research advisor to initiate a faculty-supervised research leading to development and writing of a thesis project proposal. Credit, one hour.

BIOL-595. CAREERS SEMINAR IN BIOTECHNOLOGY/PHARMACOLOGY

This course will introduce students to leaders in industrial research companies and government regulatory agencies that hire large numbers of biologists. Each week a speaker from industry or government will present about their industry or agency and will present a case study of a related issue or problem. Prerequisites: MA graduate student in Department of Biological Sciences or related area; Bioscience major. Credit, one credit hour

BIOL -599. SPECIAL PROJECTS

The course is for continued participation in research, or other special needs.
Prerequisites: Consent of the Chair. Credit, three hours.

BIOL -600. MOLECULAR ENDOCRINOLOGY

The graduate level course is designed to: 1.) engage students in mastering a working knowledge of advanced principles in endocrinology, 2.) broaden student comprehension and discussion of current topics in endocrinology, in particular current journal articles, and 3.) develop experimental design / grant writing techniques relevant to endocrinology. Credit, three hours.

BIOL -603. STRATEGIES FOR EFFECTIVE TEACHING IN BIOLOGY

The course provides an introduction to the principles and techniques of effective pedagogy as it applies to teaching in the life sciences. While the course is focused on college-level instruction, secondary school teaching will be considered. This course is required for graduate students planning to teach in DSU's biology department.
Prerequisites: Second year biology graduate student status. Credit, three hours.

BIOL -604. SCIENTIFIC INTEGRITY

The course provides an introduction to the principles of ethical conduct of research including scientific integrity and relevant human subjects and animal use regulations. The course will be taught using a case-study method where students will read and discuss situations that they might encounter in the practice of research. Prerequisites: Second year graduate student status. Credit, three hours.

BIOL-605. CELL MORPHOGENESIS

Current topics related to basic processes of molecular aspects of differentiation and development in living cells. Credit, three hours.

BIOL-607. CANCER BIOLOGY

This course is designed to extend the concepts introduced in Cell Biology and Genetics and apply them to a well-known human disease. Cancer Biology covers current concepts and knowledge of cancer, including cancer research and cancer treatment. This course will explore the cellular and molecular mechanisms underlying cancer development with the aim of understanding how changes in the normal growth and division processes lead to the formation of tumors. Lecture topics include the natural history of cancer, oncogenes, tumor suppressors, cancer-causing viruses, signal transduction, other genetic alternations in cancer, epidemiology, health care policy and current therapeutic approaches to cancer treatment.
Prerequisites: Graduate student in Department of Biological Sciences or related area. Credit, three hours

BIOL-608. PATHOPHYSIOLOGY

Pathophysiology is the study of abnormal function in living tissue. This course describes the basic biology of various disease processes, building upon the knowledge gained in Genetics, Cell Biology, and Principles of Physiology. Physiological principles underlying the causes, signs, symptoms, and pattern of development of human disease will be examined. Building upon a basic background in human biology, the manifestations of various human diseases will be explained by the way these diseases disrupt normal physiology, anatomy, and biochemistry. Knowing how diseases disrupt normal physiology will also help in understanding the rationale behind many types of treatment. Health disparities will also be addressed.
Prerequisites: Graduate student in Department of Biological Sciences or related area. Credit, three credit hours

BIOL -610. FUNCTIONAL NEUROANATOMY

The course is designed for graduate students in the life sciences who are interested in becoming familiar with the structure and function of the vertebrate nervous system at both the gross and microstructure levels. The course will include computer exercises and microscopic examinations. Credit, three hours.

BIOL -611. ADVANCED GENETICS

The course offers an in depth exploration of principles of modern genetics as they apply to plants, animals, and micro-organisms ranging from the molecular to the population level. Four (4) hours lecture/laboratory. Credit, three hours.

BIOL -612. NEUROCHEMISTRY

The course is designed for graduate students in the life sciences who are interested in learning the current state of scientific knowledge about neurotransmitters, their receptors and cellular effectors, and their relationship to disease. The course will help students understand the history and development of the current understanding of the chemistry of the nervous system by presenting some of the experimental evidence on which the knowledge is based. Credit, three hours.

BIOL -621. ADVANCED MICROBIOLOGY

The course will emphasize the role of micro-organisms in the diseases of man. The history of microbiology and the anatomy, physiology, ecology, and applications of bacteria will be emphasized. Credit, three hours.

BIOL -622. THE PHYSIOLOGY OF EXCITABLE CELLS

The course is designed for graduate students in the life sciences who are interested in learning the current state of scientific knowledge of the physiology of nerve, muscle, and sensory cells. The course will help students understand the history and development of the current understanding of excitable cell physiology by presenting some of the experimental evidence on which the knowledge is based. Credit, three hours.

BIOL -625. IMMUNOLOGY

The course offers a study of cellular, humoral, and molecular aspects of immune reactions. There will be an introduction to immunobiology and immunochemistry. The use of antigen-antibody reactions will be emphasized. Credit, three hours.

BIOL -631. CELL BIOCHEMISTRY/HISTOCHEMISTRY

The course offers a comparative and correlative study of cellular chemistry as related to the physiological functions and metabolism of various tissues and organs from a diverse range of vertebrates. Some human biomedical correlations will be included. Demonstrations and laboratory exercises are included. Two (2) lecture hours and one two-hour lab each week. Credit, three hours.

BIOL -650. BIOLOGICAL MECHANISMS

The course provides an integration of the molecular and cellular functions within a cell and how these relate to overall system operations. The course will emphasize regulatory, homeostatic, and biochemical approaches to understanding cell function. Credit, three hours.

BIOL -651. PROTEINS: STRUCTURES AND MOLECULAR PROPERTIES

The course will examine the chronological events in the life of a protein. These events include protein composition, biosynthesis, and molecular dynamics. Evolutionary aspects of ancestral proteins will be used to explore the origins of contemporary primary structures. A laboratory will be included to examine the various protein separation schema that are currently used in modern molecular labs. Background in genetics, molecular, and cell biology required. Credit, three hours.

BIOL-653. DISEASES OF THE NERVOUS SYSTEM

With the dramatic advances in neuroscience and psychiatry, we are able to identify the anatomical, chemical, and psychological anomalies underlying many mental and nervous system disorders. These advances may help us find better treatment options as well as potential preventative measures. Using several different reading sources, the present course will cover epidemiology, symptoms, known causes, neurobiology and treatment of nervous system disorders that include Schizophrenia, addiction, autism, depression, bipolar disorder, anxiety disorder, Alzheimer's, Parkinson's and Huntington's diseases.

Prerequisites: Graduate student in Department of Biological Sciences or related area.

Credit, three hours

BIOL-666. BIOTECHNOLOGY

The course provides a series of lecture presentations featuring speakers from academics and industry in the expanding field of Biotechnology. An extensive research paper will be required of each student. Credit, three hours.

BIOL -689. PROBLEMS IN BIOLOGY

The course offers an in-depth individualized literature investigation of a research problem conducted under supervision of advisor. The course includes use of library, integrating data from various sources, and conceptual thinking to produce a final Review paper. The outcome will be reviewed by faculty and the student must defend to a committee in a seminar. Prerequisites: Graduate Biology student in M.A. program. Credit, typically three hours but may be one hour.

BIOL -690. THESIS RESEARCH I

An in-depth individualized investigation of a research problem conducted under close supervision of the thesis advisor. Includes training in experimental techniques, problem design, testing, data collection, data analysis, and preparation of thesis. University and departmental guidelines are to be followed in preparing and defending the thesis. It is expected that the research will be of sufficient quality to be published as a scholarly paper coauthored by the thesis advisor in an appropriate refereed journal. Credit, typically three hours each, but may be taken for one to six.

BIOL -691. THESIS RESEARCH II

An in-depth individualized investigation of a research problem conducted under close supervision of the thesis advisor. Includes training in experimental techniques, problem design, testing, data collection, data analysis, and preparation of thesis. University and departmental guidelines are to be followed in preparing and defending the thesis. It is expected that the research will be of sufficient quality to be published as a scholarly paper coauthored by the thesis advisor in an appropriate refereed journal. Credit, typically three hours each, but may be taken for one to six.

BIOL -692. THESIS RESEARCH III

An in-depth individualized investigation of a research problem conducted under close supervision of the thesis advisor. Includes training in experimental techniques, problem design, testing, data collection, data analysis, and preparation of thesis. University and departmental guidelines are to be followed in preparing and defending the thesis. It is expected that the research will be of sufficient quality to be published as a scholarly paper coauthored by the thesis advisor in an appropriate refereed journal. Credit, typically three hours each, but may be taken for one to six.

BIOL -698. THESIS SUSTAINING – BIOLOGY

Upon completion of all courses and research, this course is used to maintain registration until graduation. Credit, none.

BIOL-700. CURRENT TOPICS I

The course will be a combination of presentations in both "Journal Club" and "lab meeting" format. Students will make presentations and discuss primary literature describing new and exciting scientific advances in the field of neuroscience. At least once each semester students will also make a presentation and lead a discussion about their own research project. Prerequisites: Ph.D. Candidate status.

Credit, one hour. May be repeated to maximum of three (3) credits.

BIOL-701. CURRENT TOPICS II

The course is a continuation of BIOL-700.

Prerequisites: BIOL-700, Ph.D. Candidate status.

Credit, one hour. May be repeated to maximum of three (3) credits.

BIOL-800. DISSERTATION RESEARCH

The course is for students who have advanced to candidacy in a Ph.D. program in the Department of Biological Sciences and who are working on their dissertation research under the supervision of a faculty mentor. Prerequisites: Ph.D. Candidate status. Credit, six to eight per semester. May be repeated; no maximum.

PROGRAM: PHD IN NEUROSCIENCE

Year 1 Fall Semester			Year 1 Spring Semester		
Course	Course Name	Cr	Course	Course Name	Cr
BIOL 503*	Introduction to Neuroscience	3	BIOL 612*	Neurochemistry	3
BIOL 590*	Professional Development I	2	BIOL 521*	Molecular Biology	3
BIOL 535*	Current Techniques in Biology	3	BIOL 591*	Professional Development II	1
BIOL 604	Scientific Integrity	1			
	Total Credits	9		Total Credits	7

Year 2 Fall Semester			Year 2 Spring Semester		
Course	Course Name	Cr	Course	Course Name	Cr
BIOL 610*	Functional Neuroanatomy	3	BIOL 622*	Physiology of Excitable Cells	3
BIOL 505*	Experimental Design and Biostatistics	3	BIOL xxx+	Neuroscience Elective	3
BIOL 690*	Thesis Research I	2	BIOL 691*	Thesis Research II	2
	Current Topics I	1		Current Topics II	1
	Total Credits	9		Total Credits	9

Year 3 Fall Semester			Year 3 Spring Semester		
Course	Course Name	Cr	Course	Course Name	Cr
BIOL 520#	Cell Biology	3	BIOL 521#	Molecular Biology	3
BIOL 650# or CHEM 521 or CHEM 671	Biological Mechanisms or Advanced Biochem or Bioorganic Chem	3	BIOL xxx	Neuroscience Elective	3
BIOL 603	Strategies for Effective Teaching in Biology	1	BIOL 800\$	Dissertation Research	3
BIOL 692	Thesis Research III	2			
	Total Credits	9		Total Credits	9

Year 4 Fall Semester			Year 4 Spring Semester		
Course	Course Name	Cr	Course	Course Name	Cr
BIOL xxx	Neuroscience Elective	3	BIOL 800\$	Dissertation Research	2
BIOL 800\$	Dissertation Research	3			
	Total Credits	6		Total Credits	2

Total Credits: 60

*Denotes a Core Requirement

Must take 2 of the three foundation courses

+Denotes an elective

\$After passing QE exam

Total Core Credits = 18

Total Foundation/Elective Credits = 18

Candidacy Requirement: Proposal Defense with Thesis Committee, Passing Qualifier Exams 1 and 2, teaching experience (approved by Research Advisor and Graduate Program Director) submission of examination results, research plan with Candidacy application to Graduate Studies and Research

Capstone or Culminating Experience: Public dissertation presentation and Oral defense of Research Thesis

DEPARTMENT OF CHEMISTRY

MASTER OF SCIENCE IN APPLIED CHEMISTRY (THESIS)

PROGRAM OBJECTIVES

The Master of Science Degree in Applied Chemistry (Thesis) is a specific degree program designed to train the new generation of chemist with broad knowledge in chemistry, independent chemistry laboratory working techniques, and strong chemistry communication skills. Students graduating from this program may become a good fit for positions including chemical industry lab/field research scientist, government agency office/lab chemist/technician, and educator in various levels of institutions/schools.

PROGRAM GOALS

Students in this program will be provided with a broader understanding of the areas of chemical laboratory practices and advanced chemistry theories. Courses will enhance the student's professional skills and capabilities for dealing with the complex laboratory hardware common to the chemical industry and research institutions. Additionally, the student will be informed of recent trends in research and engineering practices. Students involved in teaching will be exposed to the latest innovations in computer technology as related to laboratory practices and safety. As the capstone, students will be required to complete research directed by faculty mentor and submit a thesis, which will be defended before his or her committee.

STUDENT LEARNING OUTCOMES

Expanded knowledge of chemical concepts and theories;
Enhanced skills in lab practices for independent research projects;
Familiarity with new trends in chemical research and engineering practices;
Improved capability in experimental data interpretation and analysis;
Enriched skills in results organization and presentation.

ADMISSION DEADLINE AND DEGREE REQUIREMENTS

Application Deadline:

Fall - April 15

Spring – November 1

- Completed online application form;
- Official transcript with overall GPA at 3.0 or higher (WES, AACRO, ECE, or GCE evaluation required for international applicants);
- Interest statement (1-2 pages);
- Official copy of GRE score (no more than 5 years old);
- Official copy of TOEFL score (no more than 2 years old) (for international applicants only);
- Two recommendation letters from professionals.
- All documents are required to be submitted online. The Graduate Committee of the Chemistry Department will review students' application materials and make recommendation for admission into the Applied Chemistry Master Degree (Thesis) Program to the Dean of Graduate Studies and Research, who extends an offer of admission to the applicant.

For admission to this program, applicants must show evidence that they have earned (or will earn at the end of the semester before admission into the graduate program) the bachelor's degree in chemistry, or a closely related field, at an accredited college or university and possess the ability to carry out graduate work of high quality.

In the case that a student does not have a bachelor's degree in Chemistry but has taken enough undergraduate chemistry credits at an accredited college or university, the Chemistry Department Graduate Committee may recommend the student for acceptance into the graduate program.

All applicants should have a minimum cumulative undergraduate grade point average of 3.0 (on a 4-point scale) and a scholastic average of 3.0 in their undergraduate major with at least 24 credit hours in chemistry, including six credits in organic chemistry, six credits in physical chemistry, six credits in physics and six credits of calculus. If a student fails to meet these requirements the graduate committee may recommend a conditional acceptance into the program. Students must meet all of the conditions of their acceptance by the end of the designated period of time in the graduate program in order to continue.

DEGREE REQUIREMENTS

The Master of Science Degree (Thesis) in Applied Chemistry Program requires the completion a minimum of 30 credit hours, including the completion of Thesis Research (18 credit hours). Students in this program are required to submit thesis and defend before their thesis committees.

Required Courses:	Credits
Chem 520 Advanced Organic Chemistry	3
Chem 573 Advanced Physical Chemistry	3
Chem 506 Structural Inorganic Chemistry	3
Chem 521 Advanced Biochemistry	3
Chem 556 and 557 Seminar in Chemistry I and II	2 (total)
Chem 560 Chemical Literature	1
Electives*	27
Research and Thesis Chem 590 & 591	18
Total	30 hours minimum

Possible Elective Courses Include:

<i>Chemistry electives</i> (*Must take 2 of these 3 electives)	
CHEM 510 Environmental Chemistry*	CHEM 518 Molecular Spectroscopy
CHEM 505 Inorganic Solution Chemistry	CHEM 562 Chemical Toxicology*
CHEM 507 Theory and Application of Spectroscopy	CHEM 569 Polymer Chemistry*
CHEM 508 Theory and Application of Chromatography	CHEM 630 Electroanalytical Chemistry
CHEM 511 Selected Topics in Chemistry	CHEM 670 Organic Spectroscopy
CHEM 516 Quantum Chemistry	CHEM 671 Bio-Organic Chemistry
Biology Electives:	
BIOL 505 Exp. Design and Bio-Statistics	BIOL 521 Molecular Biology
BIOL 511 Pharmacology	BIOL 612 Neurochemistry
BIOL 520 Cell Biology	BIOL 651 Proteins: Structure and Molecular Properties
Physics Electives:	
PHYS 563 Math Methods III	PHYS 672 Advanced Electromagnetic Theory 2
PHYS 667 Math Methods IV	PHYS 675 Quantum Mechanics I
PHYS 665 Statistical Mechanics	PHYS 676 Quantum Mechanics II
PHYS 671 Advanced Electromagnetic Theory	

Transfer Credits: A maximum of 9 graduate credits may be transferred into the program from another accredited institution. For credit transfer, the following conditions apply:
The course curriculum to be transferred must be official (if translated, original copy must be provided).
The course curriculum to be transferred must be equivalent to that of the course to be substituted within the program.

The course to be transferred must have a grade of "B" or higher.
Course credit transfer must be applied in the first semester after the student comes into the program when filing a Plan of Study.

FACULTY AND FACILITIES

The Chemistry Department currently has 5 research faculty members, including

Dr. Peter DiMaria, Associate Professor, Biochemistry
Dr. Bizuneh Workie, Associate Professor, Analytical/Electro-Chemistry
Dr. Qiquan Wang, Associate Professor, Environmental Chemistry
Dr. Cherese Winstead Casson, Associate Professor, Analytical/Polymer Chemistry
Dr. Young-Gi Kim, Associate Professor, Organic Chemistry

The Chemistry Department is located in the Science Center Building, occupying an approximate area of 20,000 ft² in the third and first floor of the south side and an approximate area of 4000 ft² in the second floor of the north side. It includes nine spacious research laboratories, two instrument rooms, three teaching laboratories, 11 offices, one student lounge, and one seminar room.

The Department has a wide selection of modern instruments and equipment to support teaching and research. Available equipment includes several gas chromatograph with a variety of detectors, a nuclear magnetic resonance spectrometer (400mHz), a flame and flameless atomic absorption, a FTIR, and several ultraviolet-visible spectrophotometers, several high performance liquid chromatograph with data collection system, and an electroanalytical system.

COURSE DESCRIPTIONS

CHEMISTRY (CHEM) (24)

CHEM-505. INORGANIC SOLUTION CHEMISTRY

The course provides a study of the chemical kinetics of chemical forces and their effects on structure and reactivity of coordination compounds. Two (2) 75-minute lectures per week. Prerequisites: CHEM-308 or equivalent. Credit, three hours.

CHEM-506. STRUCTURAL INORGANIC CHEMISTRY

The course provides detailed discussions of the nature of chemical forces and their effects on structure and reactivity of coordination compounds. One (1) 150-minute lecture per week. Prerequisites: CHEM-308 or equivalent. Credit, three hours.

CHEM-507. THEORY AND APPLICATIONS OF SPECTROSCOPY

The course offers a presentation of molecular spectra and structure correlations demonstrating the use of IR, Visible UV, NMR, and AA. One (1) 150-minute lecture per week. Prerequisites: CHEM-306 or equivalent. Credit, three hours.

CHEM-508. THEORY AND APPLICATIONS OF CHROMATOGRAPHY

The course provides investigations of the separation and identification of substances via packed and capillary column gas chromatography. HPLC and GLC using various detectors. One (1) 150-minute lecture per week. Prerequisites: CHEM-306 or equivalent. Credit, three hours.

CHEM-510. ENVIRONMENTAL CHEMISTRY

The course covers the analyses of water, soil, plant, and animal tissues for various parameters including traces organics and metals using classical and instrumental methods of analysis. One (1) 150-minute lecture per week. Credit, three hours.

CHEM-511. SELECTED TOPICS IN CHEMISTRY

The course covers advanced topics in the various fields of chemistry. Topics may vary from year to year. One (1) 150-minute lecture per week. Credit, three hours.

CHEM-516. QUANTUM CHEMISTRY

The course covers the wave equation and approximate treatments of the hydrogen molecular ion, the hydrogen molecule, diatomic molecules, and polyatomic molecules. Two (2) 75-minute lectures per week. Prerequisites: CHEM-301, CHEM-302, CHEM-303, CHEM-304 or equivalent courses. Credit, three hours.

CHEM-518. MOLECULAR SPECTROSCOPY

The course covers the use of molecular symmetry and group theory to study rotational, vibrational, and electronic spectra of molecules. One (1) 150-minute lecture per week. Prerequisites: CHEM-301, CHEM-302 or equivalent. Credit, three hours.

CHEM-520. ADVANCED ORGANIC CHEMISTRY

The course covers an advanced study of reaction mechanisms, stereochemistry, and organic chemical bonding. One 150-minute lecture per week. Prerequisites: CHEM-301, CHEM-302. Credit, three hours.

CHEM-521. ADVANCED BIOCHEMISTRY

The course covers an advanced study of biochemical reactions and reaction mechanisms. One (1) 150-minute lecture per week. Prerequisites: CHEM-403 or equivalent. Credit, three hours.

CHEM-556. SEMINAR IN CHEMISTRY I

The course includes presentations of current topics and/or research by faculty and students. One (1) lecture per week. Credit, one hour.

CHEM-557. SEMINAR IN CHEMISTRY II

The course includes presentations of current topics and/or research by faculty and students. One (1) lecture per week. Credit, one hour.

CHEM-560. CHEMICAL LITERATURE

The course requires the use of the chemistry library, chemical journals, reference works, other technical publications, assembling and data use, and computer assisted literature searches. One (1) lecture per week. Credit, one hour.

CHEM-562. CHEMICAL TOXICOLOGY

The course provides a study of the adverse effects of chemical substances. The course includes the general principles of toxicology, the toxicology of systems, toxic agents, environmental toxicology, forensic toxicology, applications toxicology, and the effect of toxic substances on reproduction and the body. One (1) lecture per week. Credit, one hour.

CHEM-569. POLYMER CHEMISTRY

The course provides an introduction to the chemistry of macromolecules including biologically molecules, plastics, and other important classes of industrial polymers. One (1) 150-minute lecture per week. Prerequisites: CHEM-301, CHEM-302. Credit, three hours.

CHEM-573. ADVANCED PHYSICAL CHEMISTRY

The course provides an introduction to the thermodynamics of large molecular collections and the quantum statistics of these systems. One (1) 150-minute lecture per week.

Prerequisites: CHEM-303, CHEM-304. Credit, three hours.

CHEM-590. RESEARCH AND THESIS

The course requires publishable research work by students and the writing and defense of a thesis. Credit, three hours each semester.

CHEM-591. RESEARCH AND THESIS

The course requires publishable research work by students and the writing and defense of a thesis. Credit, three hours each semester.

CHEM-630. ELECTROANALYTICAL CHEMISTRY

The course introduces students to the basic principles involved in electroanalytical chemistry. The course will cover modern electrochemical methods such as cyclic, pulse and hydrodynamic voltammetry, chronoamperometry, chronocoulometry, polarography, and stripping analysis. Instrumentation and some practical aspects of electroanalytical chemistry will also be covered. Experiments of most of the electrochemical methods introduced will either be carried out by the students or will be demonstrated.

Prerequisites: B.S. degree in Chemistry or consent of the Department Chair. Credit, three hours.

CHEM-670. ORGANIC SPECTROSCOPY

The course will provide an in-depth presentation of recent advances in Infrared Spectroscopy, Nuclear Magnetic Spectroscopy, Ultraviolet and Visible Spectroscopy, Mass Spectroscopy, and other spectroscopic methods.

Prerequisites: B.S. degree in Chemistry or consent of the Department Chair. Credit, three hours.

CHEM-671. BIOORGANIC CHEMISTRY

This course will provide an in-depth understanding of Bioorganic Chemistry of Amino Acids and Polypeptides, Bioorganic Chemistry of DNA, Enzyme Chemistry & Enzyme Models, Metalloenzymes, and Molecular Devices. Prerequisites: B.S. degree in Chemistry or consent of the Department Chair. Credit, three hours.

Course descriptions for courses offered by the Biology and Physics Departments and chosen as possible electives in this degree program can be found in the catalogue of graduate programs in these two departments.

MASTER'S PROGRAM

Semester I (Fall)			Semester II (Spring)		
Course	Course Name	Cr	Course	Course Name	Cr
CHEM 520	*Advanced Organic Chemistry	3	CHEM 506	*Structural Inorganic Chemistry	3
CHEM 573	*Advanced Physical Chemistry	3	CHEM 521	*Advanced Biochemistry	3
CHEM XXX	+Elective	3	CHEM XXX	+Elective	3
		Total Credits			Total Credits
		9			9

Semester III (Fall)			Semester IV (Spring)		
Course	Course Name	Cr	Course	Course Name	Cr
CHEM 590	Research & Thesis	3	CHEM 590	Research & Thesis	3
CHEM 556	Seminar in Chemistry I	1	CHEM 557	Seminar in Chemistry II	1
CHEM XXX	+Elective	3	CHEM 560	Chemical Literature	1
		Total Credits			Total Credits
		7			5

*Denotes a Core Requirement

+Denotes an elective

Total Core Credits = 15

Total Elective Credits = 9

Candidacy Requirement: Not Applicable for Master's Degree

Capstone or Culminating Experience: Thesis

DOCTOR OF PHILOSOPHY IN APPLIED CHEMISTRY

PROGRAM OBJECTIVES

A Ph.D. degree is the highest degree in chemistry field. This program aims to train students in the program to become leading chemistry professionals with profound knowledge of chemistry, independent research capability, and professional communication skills. Students' dissertation research may focus on areas which are hot topics/technologies which are critical for human society to solve some current crisis. Students graduating from this program may become experts in one or more subfields of chemistry, including physical chemistry polymer chemistry, biochemistry, environmental chemistry, organic chemistry, inorganic chemistry, and analytical chemistry.

PROGRAM GOALS

Students entering the program must formulate a course of study and research in consultation with the Graduate Program Director (or with the student's Dissertation Advisor once an Advisor has been chosen). Although course work and seminar presentations/oral exams are important aspects in the program, the student's primary focus and devotion is on an independent research project in his or her chosen field. A PhD dissertation based on independent publishable original research must be defended in an oral presentation before the student's PhD Dissertation Committee in a formal presentation once the research is completed.

STUDENT LEARNING OUTCOMES

Expanded knowledge of chemical concepts and theories;

Expertized understanding in a chosen sub-field of chemistry or interdisciplinary Intensive experience in lab practices for independent research projects;

Familiarity with new trends in chemical research and engineering practices; specialized capability in result interpretation and analysis;

Proficient skills in results organization and presentation.

ADMISSION DEADLINE AND DEGREE REQUIREMENTS

Application Deadline: April 15 – Fall; November 1 - Spring

Application Documents for Admission:

- Completed online application form;
- Official transcript with overall GPA at 3.0 or higher (WES, AACRO, ECE, or GCE evaluation required for international applicants) and scholastic GPA at 3.0 or higher;
- Interest statement (1-2 pages);
- Official copy of GRE score (no more than 5 years old);
- Official copy of TOEFL score (no more than 2 years old) (for international applicants only);
- Two recommendation letters from professionals;
- A resume.
- All documents are required to be submitted online. The Graduate Committee of the Chemistry Department will review students' application materials and make recommendation for admission into the Applied Chemistry Master Degree (Thesis) Program to the Dean of Graduate Studies and Research, who extends an offer of admission to the applicant.

For admission to this program, applicants must show evidence that they have earned (or will earn at the end of the semester before admission into the graduate program) the bachelor's degree in chemistry, or a closely related field, at an accredited college or university and possess the ability to carry out graduate work of high quality.

In the case that a student does not have a bachelor's degree in Chemistry but has taken enough undergraduate chemistry credits at an accredited college or university, the Chemistry Department Graduate Committee may recommend the student for acceptance into the Graduate Program.

All applicants should have a minimum cumulative undergraduate grade point average of 3.0 (on a 4-point scale) and a scholastic average of 3.0 in their undergraduate major with at least 20 credit hours in chemistry, including 8 credits in organic chemistry, 4 credits in physical chemistry, 4 credits in analytical chemistry and 4 credits of inorganic chemistry. If a student fails to meet these requirements, the Graduate Committee may recommend a conditional acceptance into the program. Students must meet all of the conditions of their acceptance by the end of the designated period of time in the Graduate Program in order to continue.

DEGREE REQUIREMENTS

The PhD of Science Degree in Applied Chemistry Program requires the completion a minimum of 60 credit hours, of which 18 credits are dissertation research. Students in this program are required to submit dissertations and defend before their committees. In addition, students are required to pass cumulative exams with enough points and pass literature review in their first two years of study.

Course	Credits
CHEM 520 Advanced Organic Chemistry	3
CHEM 573 Advanced Physical Chemistry	3
CHEM 506 Structural Inorganic Chemistry	3
CHEM 521 Advanced Analytical Chemistry	3
CHEM 556 and 557 Seminar in Chemistry I and II	2 (total)
CHEM 560 Chemical Literature	1
Electives*	27
Research and Thesis CHEM 590 & 591	18 total for research
Total	60 hours minimum

Possible elective courses are the same as those for Master of Science in Applied Chemistry (Thesis).

FACULTY AND FACILITIES

The Chemistry Department currently has 5 research faculty members, including

Dr. Peter DiMaria, Associate Professor, Biochemistry
Dr. Bizuneh Workie, Associate Professor, Analytical/Electro-Chemistry
Dr. Qiquan Wang, Associate Professor, Environmental Chemistry
Dr. Cherese Winstead Casson, Associate Professor, Analytical/Polymer Chemistry
Dr. Young-Gi Kim, Associate Professor, Organic Chemistry

The Chemistry Department is located in the Science Center Building, occupying an approximate area of 20,000 ft² in the third and first floor of the south side and an approximate area of 4000 ft² in the second floor of the north side. It includes nine spacious research laboratories, two instrument rooms, three teaching laboratories, 11 offices, one student lounge,

and one seminar room.

The Department has a wide selection of modern instruments and equipment to support teaching and research. Available equipment includes several gas chromatograph with a variety of detectors, a nuclear magnetic resonance spectrometer (400MHz), a flame and flameless atomic absorption, a FTIR, several ultraviolet-visible spectrophotometers, several high performance liquid chromatograph with data collection systems, and electroanalytical systems.

COURSE DESCRIPTIONS

CHEMISTRY (CHEM) (24)

CHEM-505. INORGANIC SOLUTION CHEMISTRY

The course provides a study of the chemical kinetics of chemical forces and their effects on structure and reactivity of coordination compounds. Two (2) 75-minute lectures per week. Prerequisites: CHEM-308 or equivalent. Credit, three hours.

CHEM-506. STRUCTURAL INORGANIC CHEMISTRY

The course provides detailed discussions of the nature of chemical forces and their effects on structure and reactivity of coordination compounds. One (1) 150-minute lecture per week. Prerequisites: CHEM-308 or equivalent. Credit, three hours.

CHEM-507. THEORY AND APPLICATIONS OF SPECTROSCOPY

The course offers a presentation of molecular spectra and structure correlations demonstrating the use of IR, Visible UV, NMR, and AA. One (1) 150-minute lecture per week. Prerequisites: CHEM-306 or equivalent. Credit, three hours.

CHEM-508. THEORY AND APPLICATIONS OF CHROMATOGRAPHY

The course provides investigations of the separation and identification of substances via packed and capillary column gas chromatography. HPLC and GLC using various detectors. One (1) 150-minute lecture per week. Prerequisites: CHEM-306 or equivalent. Credit, three hours.

CHEM-510. ENVIRONMENTAL CHEMISTRY

The course covers the analyses of water, soil, plant, and animal tissues for various parameters including traces organics and metals using classical and instrumental methods of analysis. One (1) 150-minute lecture per week. Credit, three hours.

CHEM-511. SELECTED TOPICS IN CHEMISTRY

The course covers advanced topics in the various fields of chemistry. Topics may vary from year to year. One (1) 150-minute lecture per week. Credit, three hours.

CHEM-516. QUANTUM CHEMISTRY

The course covers the wave equation and approximate treatments of the hydrogen molecular ion, the hydrogen molecule, diatomic molecules, and polyatomic molecules. Two (2) 75-minute lectures per week. Prerequisites: CHEM-301, CHEM-302, CHEM-303, CHEM-304 or equivalent courses. Credit, three hours.

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The course covers the use of molecular symmetry and group theory to study rotational, vibrational, and electronic spectra of molecules. One (1) 150-minute lecture per week. Prerequisites: CHEM-301, CHEM-302 or equivalent. Credit, three hours.

CHEM-520. ADVANCED ORGANIC CHEMISTRY

The course covers an advanced study of reaction mechanisms, stereochemistry, and organic chemical bonding. One 150-minute lecture per week. Prerequisites: CHEM-301, CHEM-302. Credit, three hours.

CHEM-521. ADVANCED BIOCHEMISTRY

The course covers an advanced study of biochemical reactions and reaction mechanisms. One (1) 150-minute lecture per week. Prerequisites: CHEM-403 or equivalent. Credit, three hours.

CHEM-556. SEMINAR IN CHEMISTRY I

1:1:0

The course includes presentations of current topics and/or research by faculty and students. One (1) lecture per week. Credit, one hour.

CHEM-557. SEMINAR IN CHEMISTRY II

1:1:0

The course includes presentations of current topics and/or research by faculty and students. One (1) lecture per week. Credit, one hour.

CHEM-560. CHEMICAL LITERATURE**1:1:0**

The course requires the use of the chemistry library, chemical journals, reference works, other technical publications, assembling and data use, and computer assisted literature searches. One (1) lecture per week. Credit, one hour.

CHEM-562. CHEMICAL TOXICOLOGY

The course provides a study of the adverse effects of chemical substances. The course includes the general principles of toxicology, the toxicology of systems, toxic agents, environmental toxicology, forensic toxicology, applications toxicology, and the effect of toxic substances on reproduction and the body. One (1) lecture per week. Credit, one hour.

CHEM-569. POLYMER CHEMISTRY

The course provides an introduction to the chemistry of macromolecules including biologically molecules, plastics, and other important classes of industrial polymers. One (1) 150-minute lecture per week. Prerequisites: CHEM-301, CHEM-302. Credit, three hours.

CHEM-573. ADVANCED PHYSICAL CHEMISTRY

The course provides an introduction to the thermodynamics of large molecular collections and the quantum statistics of these systems. One (1) 150-minute lecture per week.

Prerequisites: CHEM-303, CHEM-304. Credit, three hours.

CHEM-590. RESEARCH AND THESIS**3:3:9**

The course requires publishable research work by students and the writing and defense of a thesis. Credit, three hours each semester.

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The course requires publishable research work by students and the writing and defense of a thesis. Credit, three hours each semester.

CHEM-630. ELECTROANALYTICAL CHEMISTRY

The course introduces students to the basic principles involved in electroanalytical chemistry. The course will cover modern electrochemical methods such as cyclic, pulse and hydrodynamic voltammetry, chronoamperometry, chronocoulometry, polarography, and stripping analysis. Instrumentation and some practical aspects of electroanalytical chemistry will also be covered. Experiments of most of the electrochemical methods introduced will either be carried out by the students or will be demonstrated.

Prerequisites: B.S. degree in Chemistry or consent of the Department Chair. Credit, three hours.

CHEM-670. ORGANIC SPECTROSCOPY

The course will provide an in-depth presentation of recent advances in Infrared Spectroscopy, Nuclear Magnetic Spectroscopy, Ultraviolet and Visible Spectroscopy, Mass Spectroscopy, and other spectroscopic methods.

Prerequisites: B.S. degree in Chemistry or consent of the Department Chair. Credit, three hours.

CHEM-671. BIOORGANIC CHEMISTRY

This course will provide an in-depth understanding of Bioorganic Chemistry of Amino Acids and Polypeptides, Bioorganic Chemistry of DNA, Enzyme Chemistry & Enzyme Models, Metalloenzymes, and Molecular Devices. Prerequisites: B.S. degree in Chemistry or consent of the Department Chair. Credit, three hours.

Course descriptions for courses offered by the Biology and Physics Departments and chosen as possible electives in this degree program can be found in the catalogue of graduate programs in these two departments.

PH.D. PROGRAM

Year 1: Fall			Year I: Spring		
Course	Course Name	Cr	Course	Course Name	Cr
*CHEM 521	Advanced Analytical Chemistry	3	*CHEM 506	Structural Inorganic Chemistry	3
*CHEM 556	Seminar in Chemistry I	1	+CHEM 510	Environmental Chemistry	3
*CHEM 560	Chemical Literature	1	+CHEM 519	Applications of Spectroscopy	3
+CHEM 508	Theory and Applic. of Chromatogr.	3	+CHEM 511	Selected Topics in Chemistry	3
+CHEM 518	Molecular Spectroscopy	3			
		Total Credits			Total Credits
		*11			*12

Year 2: Fall			Year II: Spring		
Course	Course Name	Cr	Course	Course Name	Cr
*CHEM 573	Advanced Physical Chemistry	3	*CHEM 520	Advanced Organic Chemistry	3
*CHEM 557	Seminar in Chemistry II	1	+CHEM 562	Chemical Toxicology	3
+CHEM 569	Polymer Chemistry	3	+CHEM 516	Quantum Chemistry	3
+CHEM 521	Advanced Biochemistry	3	+CHEM 630	Electroanalytical Chemistry	3
+CHEM 511	Selected Topics in Chemistry	3			
		Total Credits			Total Credits
		13			12

- ***Denotes a Core Requirement**
- **+Denotes an elective**
- **Total Core Credits = 60**
- **Total Elective Credits = 27**
- **Candidacy Requirement:** (1) one year of course work with GPA of 3.0 or higher; (2) Approved Advisory Committee Form; (3) Approved Literature Review; (4) Adequate cumulative exam points (8) points in first two years with at least two full passes
- **Capstone or Culminating Experience:** Pass Dissertation Oral Defense

DEPARTMENT OF HUMAN ECOLOGY

MASTER OF SCIENCE IN FOOD SCIENCE AND BIOTECHNOLOGY

PROGRAM OBJECTIVES

The educational objectives for this degree program are to train a new cadre of food scientists through teaching and research. Our research activities are designed to expand understanding of the biological/microbiological, chemical, physical, sensory, and nutritional properties of foods and beverages. The program will prepare a high-tech workforce for the food industry through hands-on experience and integration of emerging technologies with the more traditional lecture. Integration of instruction and research will help students acquire the knowledge and skills needed to be successful food scientists in the global economy. The graduate program in Food Science is a multi-disciplinary program that integrates knowledge of biology, chemistry, biochemistry, microbiology, nutrition and engineering. Students entering the program must choose one of three concentrations: 1) Food Chemistry, 2) Food Microbiology or 3) Biotechnology. Foundation course requirements will normally be satisfied with completion of a B.S. degree in Food Science from an accredited institution. Students deficient in foundation courses will be required to complete selected undergraduate course work to fulfill this requirement.

PROGRAM GOALS

The goal of the Food Science program is to educate, train, and prepare students as the next generation of food scientists for career opportunities in the food and allied industries, or for further studies in graduate or professional programs. To achieve this goal, DSU's Food Science graduate program focuses on three signature areas: 1) Food Chemistry, 2) Food Microbiology and Safety, and 3) Biotechnology.

STUDENT LEARNING OUTCOMES

Students will demonstrate an advanced knowledge and understanding in an area of emphasis offered by the Food Science and Biotechnology program.

Students will design an experiment, collect, analyze, interpret data and report findings.

Students will demonstrate competency in scholarly writing and oral communication by writing a M.S. thesis or M.S. report and presenting it to a committee of professors in their field, or, if in a non-thesis/report option, by presenting an original scientific seminar and passing an oral exam.

ADMISSION DEADLINES AND DEGREE REQUIREMENTS

Application Deadlines:

Fall – June 15
Spring – Nov. 15
Summer – April 15

International Admission Deadlines:

Fall – May 1

Spring – Nov. 1

Summer – April 1

All applicants are required to submit evidence of the following for consideration of unconditional admission:

- An earned baccalaureate degree in Food Science, Biology, Chemistry, Nutrition, or a closely related field with a minimum undergraduate cumulative grade point average of 2.75.
- An online application for admission.
- Official transcript(s) of all academic work completed.
- GRE scores.
- A resume.
- Three letters of recommendation via the online application process.
- A statement of intent to include the following: (a) your objectives in obtaining the degree, (b) area(s) of research interest, and (c) your interest in the Food Science or Biotechnology area (maximum two pages).

The department of Human Ecology graduate committee will review students' application materials and make recommendation for acceptance into the Food Science program to the Dean, Graduate Studies and Research, who extends an offer of admission to the applicant.

DEGREE REQUIREMENTS

The degree will involve a minimum of two years of advanced course work in food science. Students entering the Food Science program must choose one of three concentrations: 1) Food Chemistry, 2) Food Microbiology or 3) Biotechnology. Foundation course requirements will normally be satisfied with completion of a BS degree in Food Science from an accredited institution. Students deficient in the foundation courses will be required to complete selected undergraduate course deficiencies within the first year to fulfill these requirements.

Foundation Courses are noted below:

Mathematics, including college algebra, calculus and statistics

Organic Chemistry and Biochemistry

Introduction to Physics

Introduction to Microbiology Botany or General Biology

The Food Science and Biotechnology program offers a master's degree with thesis and non-thesis options. All course credits toward the degree must be at 500-level or above.

M.S. Thesis Option:

Students selecting the thesis option are required to complete at least 30 credit hours of graduate-level course work which includes 6 credits of thesis work. Candidacy requirement consists of the development of a thesis topic and preparation of a research prospectus which is subject to the approval of the Thesis Committee. Following admission to candidacy and as a graduation requirement, all students selecting the thesis option must develop their research prospectus into a full research project consisting of collection and analysis of data and documented in a thesis format which meets the standards established by the College of Agriculture, Science and Technology and Graduate Studies

and Research. The completed thesis will be submitted to the Thesis Committee for review and if deemed acceptable, an oral examination, consisting principally of a defense of the thesis, will be scheduled. After the thesis has been read and approved by the Thesis Committee, it must be submitted to the Dean of the College and finally to Graduate Studies and Research. A majority of the student's Thesis Committee must approve the thesis and its defense. If approval is denied, the candidate will not be recommended for graduation. In this event, the student may be re-examined at a later period as determined by the Thesis Committee.

M.S. Non-Thesis Option:

Students selecting a non-thesis option are required to complete at least 33 credit hours of graduate-level course work. Candidacy requirements require successful passage of a written comprehensive and oral examination. Students are also required to write a comprehensive term paper on a topic related to Food Microbiology or Food Chemistry. The examination will be administered each spring semester and during the first summer session each year. To be eligible to take the examination, the student must be within 6 hours or less of completing degree requirements the semester in which the comprehensive examination is scheduled.

Non-Degree Option:

This option provides an opportunity for MBA and other professionals who are seeking graduate course work for their professional growth.

Required Course Work:

Students enrolled in the Food Science graduate program are required to complete a minimum of 30 credit hours for the thesis option or 33 credit hours for the non-thesis option.

Required courses include:

HMEC 500 - Fundamentals of Food Science
HMEC 520 - Food Microbiology
HMEC 590 - Food Toxicology
AGRI 506 - Experimental Design
HMEC 601 - Graduate Seminar (Thesis Option only)

Student registration in graduate-level course work is subject to the approval of an assigned Advisor.

FACULTY

The faculty members in the Food Science Program are dedicated to their respective fields of study and have a diverse background. Specific areas of research interest of the Food Science faculty include food microbiology, food safety, food biotechnology, food chemistry, lipid chemistry, etc. Active research projects exist within these areas and offer graduate students many opportunities for active learning and discovery.

PROGRAM FACULTY

Samuel A. Besong Ph.D., Professor, Food and Nutrition
Jung-Lim Lee Ph.D., Associate Professor, Food Biochemistry
Alberta Aryee Ph.D., Assistant Professor, Food Science

COURSE DESCRIPTIONS

(Note: Additional Course Descriptions can be found under Animal Science, Food Science, Plant Science, Natural Resources and Biology).

HMEC-500. FUNDAMENTALS OF FOOD SCIENCE

This course provides an in-depth review of the fundamental concepts in food science including food chemistry, food microbiology and safety, food processing and engineering, nutrition, sensory evaluation, and food product development. Students would develop the skills needed to analyze the composition, chemical and physical properties of food in the laboratory. Three (3) hours of lecture. Credit, three hours.

HMEC-510. FOOD PROCESSING

The course integrates principles of food chemistry including nutrition, food biotechnology, characteristics of raw food materials, principles of food preservation including low and high temperatures, pH, salinity, water activity, Principles of food processing techniques such as freeze drying, high pressure, aseptic processing, extrusion, packaging materials and methods, cleaning and sanitation, water and waste management. Three (3) hours of lecture. Credit, three hours.

HMEC-520. FOOD MICROBIOLOGY

The course deals with the identification, enumeration, and characterization of pathogenic and spoilage microorganisms associated with foods and food processing. Beneficial microorganisms in food systems will be discussed. Influence of the food system on the growth and survival of microorganisms and control of microorganisms will be studied. The course introduces techniques for detecting and quantifying microorganisms in foods. Application of colony counts, most probable numbers, immunoassays, and molecular techniques is used to understand the numbers and types of microorganisms or microbial end products in foods. Laboratory safety and oral and written reports are emphasized. The course provides students with standard techniques used in microbial analysis of foods and the major groups of organisms associated with food safety and spoilage problems, and food production. Two (2) hours of lecture and one (1) hours of lab. Credit, three hours.

HMEC-530. FOOD CHEMISTRY

The course covers the structure and properties of major and minor food components, including water, carbohydrates, protein, lipids, other nutrients and food additives, and the chemistry of changes occurring during food processing, storage and utilization. Three (3) hours lecture and three (3) hours lab a week. Prerequisites: HMEC-500, CHEM-302. Credit, three hours.

HMEC-535. FOOD TOXICOLOGY

This course emphasizes biological and chemical aspects of toxicology, microbial aspects of food borne infections and intoxications, food additives, toxic substances occurring in food, either naturally or formed during processing, and the toxic effects of these substances on the biological systems. Safety of genetically engineered foods, risk assessment and food safety policy will be discussed as general topics. Three (3) lecture hours a week. Prerequisites: HMEC-520, HMEC-530. Credit, three hours.

HMEC-540. FOOD ANALYSIS

Principles, methods and techniques used for quantitative physical and chemical analyses of food and food ingredients. Analytical techniques will include spectroscopy, chromatography, mass spectrometry, immunochemistry and atomic absorption. Physical measurements of food properties will cover color, pH, water activity, water holding capacity and textural characteristics. Two (2) hours lecture and three (3) hours lab a week. Prerequisites: CHEM-530. Credit, three hours.

HMEC-550. FOOD ENGINEERING

The course deals with the material and energy balances with application food processing, fluid flow, and heat and mass transfer in food processing, and thermodynamics properties. Three (3) hours lecture a week. Prerequisites: PHYS- 20 1, MTSC-251. Credit, three hours.

HMEC-560. PRINCIPLES OF HACCP

The course provides an in-depth review of the Hazard Analysis and Critical Control Point (HACCP) system and its application in the food industry. Two (2) hours lecture a week. Credit, two hours.

HMEC-570. SENSORY EVALUATION OF FOODS

Sensory techniques used in evaluating food appearance, texture, and flavor, and the evaluation of consumer acceptance.

The course includes an introduction to sensory testing methods, consumer panels and statistical methods for analyzing sensory data. Two (2) hours lecture and three (3) hours lab a week. Prerequisites: HMEC-500. Three hours.

HMEC-580. FOOD QUALITY ASSURANCE

All technical aspects of quality assurance and quality control will be covered. Topics covered will include quality management systems, selection of analytical methods, HACCP principles, acceptance sampling, product recall plans, statistical quality control methods, government regulation and food legislation. Three hours lecture a week. Prerequisites: HMEC-510. Credit, three hours.

HMEC-600. FOOD PRODUCT DEVELOPMENT

The course deals with all aspects of new food product development from concept to commercialization, including market screening; idea generation; prototype development; ingredient functionality and interactions; processing; packaging; safety and regulatory issues; labeling; physical, chemical, microbiological, and sensory evaluations; quality control procedures; and HACCP plans. Two (2) hours lecture and one (1) hour lab a week. Prerequisites: HMEC-530 or consent of the Instructor. Credit, three hours.

HMEC-610. ADVANCED FOOD SAFETY

The course provides and understanding of the relationship of environmental factors to occurrence, growth and survival of microorganisms in foods, Food Safety Epidemiology, HACCP, sanitation, food safety education, and risk assessment. Risk Management in the context of food safety is-the process of weighing policy alternatives to control risks as effectively as possible. Food Safety Epidemiology. Three (3) hours lecture a week. Prerequisites: HMEC-560. Credit, three hours.

HMEC-615. FUNDAMENTALS OF FOOD POLICY

Fundamentals of Food Policy examines policy issues pertaining to the production, processing, marketing, and consumption of food. The course specifically reviews policy issues relevant to food production, food safety, international trade, sustainability of agricultural resources, food consumption and demographic changes, effects of renewable energy on food security, biotechnology, water supply, biodiversity, and effects of urbanization on food choice, nutrition and health. This course will also introduce students to the inherent risks associated with the food supply, and the use of public policy (laws and regulations) and technology to reduce those risks. After taking this course, students should be able to develop innovative ideas on how to create a sustainable food system for the increasing world population.

HMEC-620. FOOD SCIENCE INTERNSHIP

Supervised on-site, hands-on experience in the food industry or in governmental agencies that regulate food. Students will be full-time interns and are required to work a minimum of three (3) months during the summer, fall, or spring semester. An intern will be expected to prepare and present a written report at the end of the internship. Credit, three hours.

HMEC-625. RESEARCH PROBLEMS IN FOOD SCIENCE

A special problem course designed to provide research training in the area of the student's area of concentration and specification related to the needs of their research and thesis work.
Credit, three to six hours.

HMEC-630. THESIS RESEARCH

An in-depth individualized investigation of a research problem conducted under close supervision of the thesis advisor. Includes training in experimental techniques, problem design, testing, data collection, data analysis, and preparation of thesis. University and departmental guidelines are to be followed in preparing and defending the thesis. It is expected that the research will be of sufficient quality to be published as a scholarly paper coauthored by the thesis advisor in an appropriate refereed journal. Credit, three to six hours.

HMEC-631. THESIS RESEARCH II

An in depth individualized investigation of a research problem conducted under close supervision of the thesis advisor. Includes training in experimental techniques, problem design, testing, data collection, data analysis, and preparation of thesis. University and departmental guidelines are to be followed in preparing and defending the thesis. It is expected that the research will be of sufficient quality to be published as a scholarly paper coauthored by the thesis advisor in an appropriate refereed journal. Credit, three to six hours.

HMEC-661. GRADUATE SEMINAR

A seminar, meeting once per week with faculty and student presentations on their research and/or other relative scientific topics. Credit, one hour.

**PROGRAM: MASTER OF SCIENCE IN FOOD
SCIENCE AND BIOTECHNOLOGY**



(Fall Semester Year I)			(Spring Semester Year I)		
Course	Course Name	Cr	Course	Course Name	Cr
CHEM-xxx+	Biochemistry	3	HMEC-565*	Experimental Design & Data Analysis	3
HMEC-502*	Functional Properties of Carbohydrate, Protein, Lipids & Enzymes in Food	3	HMEC-530*	Food Chemistry	3
HMEC-520*	Food Microbiology	3	HMEC-610*	Advanced Food Safety	3
HMEC-501*	Molecular & Biotech. Application in Food Science	3			
	Total Credits	12		Total Credits	9
(Fall Semester Year II)			(Spring Semester Year II)		
Course	Course Name	Cr	Course	Course Name	Cr
HMEC-510+	Food Processing	3	HMEC-600	Food Product Development	3
HMEC-630	Thesis Research I	3	HMEC-701	Thesis Research II	3
HMEC-540	Food Analysis	3	HMEC-661	Graduate Seminar	1
HMEC-xxx	Elective	3	HMEC-xxx	Elective	3
	Total Credits	9		Total Credits	7

- Elective Courses
- *Denotes a Core Requirement
- +Denotes an elective
- Total Core Credits = 24 credits
- Total Elective Credits = 6
- Candidacy Requirement: Complete 18 hours of course work Thesis Students - Submission of Research Plan with Candidacy Application to Graduate Studies and Research
- Capstone or Culminating Experience: 1 credit (HMEC- 661)

Thesis Option: Thesis Defense and Submission of Thesis

Non-Thesis Option: Written and Oral Comprehensive Exam; Comprehensive Term Paper

DIVISION OF PHYSICAL AND COMPUTATIONAL SCIENCES

MASTER OF SCIENCE IN COMPUTER SCIENCE

PROGRAM OBJECTIVES

The educational objective for the Master of Science degree in Computer Science is to train students in breadth and depth in advanced Computer Science. To accomplish breadth across the discipline, students take a series of core courses in each of the three broad areas of computer science -- Theory, Systems, and Computational Intelligence and Informatics. These courses survey key topics in each area at a level of rigor that builds beyond a typical undergraduate Computer Science curriculum. To accomplish depth within the discipline, students select and take a number of elective courses in their area of interest. Elective courses address advanced topics as well as current topics from the recent research literature in an area of interest. The elective courses also engage students in critical thinking and exercise their experimental skills with a semester project. The research component of the curriculum consists of a two-semester sequence of Graduate Seminar. During the first semester, in Graduate Seminar-Survey, students read selections from the research literature, make presentations on studied topics, and engage in discussion. Graduate Seminar-Survey gives students exposure to the research literature as they begin to develop their area of research interest. During the second semester, Graduate Seminar-Critical Thinking covers experimental design. In Graduate Seminar-Critical Thinking, students examine considerations and methods for posing research questions, designing experiments, analyzing data, and discussing results. In addition to dissecting selections from the research literature, students gain experience in applying learned techniques in a semester project. At the end of Graduate Seminar-Critical Thinking, students begin defining their thesis or project topic as well as select a research advisor. The last part of the research component is a master's thesis or project which is performed under the mentorship of the thesis advisor and committee.

PROGRAM GOALS

The Department of Computer and Information Sciences prepares students for career opportunities in research, technology development, professional studies, and further graduate studies in areas related to computer sciences and informatics. Graduates pursue careers in state and federal agencies, private industry, research, teaching, and entrepreneurial opportunities. The program provides rigorous training in computer science with a focus on inquiry, critical thinking, and experimentation.

STUDENT LEARNING OUTCOMES

Students will develop a rigorous understanding and mastery of key advanced computer science topics across the three areas (Theory, Systems, Computational Intelligence and Informatics) of the discipline.

Students will demonstrate mastery of material through written work and reduction to practice.

Students will develop and practice skills in critical analysis of the research literature, scientific inquiry, the design and execution of experiments, and interpretation and articulation of results.

Students will demonstrate competency in scholarly activity through participation in research activity, development of an M.S. thesis or project, and written and oral presentation of the thesis or project to a committee of faculty experts in their field and the general scientific community.

ADMISSIONS DEADLINES AND DEGREE REQUIREMENTS

Application Deadlines (Fall Admission Only): May 31

International Admission Deadlines: May 31

All applicants are required to:

- Have earned a bachelor's degree in Computer Science or related technical field such as math, physics, psychology, or engineering. It is expected that incoming graduate students have had undergraduate preparation equivalent to the following courses in the Computer Science curriculum at Delaware State: Calculus I, Calculus II, Linear Algebra, Probability, Discrete Math, Data Structures and Algorithms I, Data Structures and Algorithms II, Operating Systems, Computer Networking, Principles of Programming Languages, Microprocessor Based Systems, Theory of Computing.

Students who are deficient in one or two areas may receive conditional admissions into the degree program. Accepted students who are deficient are expected to address deficiencies immediately by enrolling in and completing an appropriate undergraduate course with a minimum 3.0 average in the first year of their degree program.

- Have a minimum 3.0 GPA on a 4.0 scale.
- Have mathematical maturity (ability to read proofs) expected of a person beginning graduate studies as well as proficiency in high-level programming languages (such as C, C++, or Java).
- Provide official scores on the Graduate Record Examination (GRE). Testing must be within five years of application. Typical scores of applicants should be in the 65th percentile range.
- Complete an application for admission.
- Submit official transcript(s).
- Submit three letters of reference. Letters of reference must be submitted directly to the Department of Computer and Information Sciences by the references. The applicant must specify the name, address, and contact information of all references in his or her application.
- Include payment of the non-refundable application fee.
- International applicants must submit a transcript evaluation from World Education Services (WES)/Educational Credential Evaluators (ECE), or the Association of Collegiate Registrars and Admissions Officers (AACRAO).
- Personal Statement and Resume are accepted but not required.
- Non-English speaking international students applying for admissions must demonstrate a satisfactory level of proficiency in the English language by taking the TOEFL or IELTS. Typical scores for an applicant for TOEFL should be in the 575 range. A telephone interview may also be required.

FACULTY

The Department of Computer and Information Sciences is comprised of dedicated and well-prepared faculty with diverse educational backgrounds and areas of research specialization. Small class sizes for graduate courses ensure that students interact closely with faculty in the learning experience. All faculty have published in their respective fields, and maintain active research involvement. Scholarly involvement and continuous professional development in research keeps faculty current and able to offer exciting research opportunities to the students in a variety of areas. Faculty in the Department also engage in collaborative research with faculty at Delaware State University as well as outside of the University. The students have opportunity to select research projects from a variety of areas.

Dr. Marwan Rasamny, Associate Professor, Physics
Dr. Kam Kong, Associate Professor, Mathematical Sciences
Dr. Zhongyan Lin, Associate Professor, Mathematics
Dr. Fatima Boukari, Visiting Assistant Professor, Applied Math
Dr. Gary Holness, Associate Professor, Computer Science
Dr. Gokhan Kul, Assistant Professor, Computer Science
Dr. Tomasz Smolinski, Associate Professor, Computer Science & Engineering
Shilpa Patel, Lecturer, Computer Science

FACILITIES

The Department of Computer and Information Sciences is housed in Mishoe Science Center (original) and Grossley Hall. A majority of the faculty is actively engaged in research and maintains research laboratories. Laboratories consist of a combination of physical research laboratory space and virtual laboratory computer resources for research in machine learning, video surveillance and analysis, bioinformatics, robotics, machine perception, mobile systems and cybersecurity. The Department maintains a number of teaching laboratories as well as generally available workstations running Windows and Linux. The Department also maintains high-end printers/print servers available to graduate students. Classrooms are equipped with state-of-the-art Smartboard teaching tools as well as projection equipment.

CURRICULUM

The M.S. program culminates in a thesis representing the proposal, investigation, and addressing of a substantial scientific question related to the student's area of interest and expertise. The process for the M.S. thesis requires the student to select a committee responsible for approval and guidance of the work. The student must conduct an oral defense of the thesis. Every thesis will consist of a writing component that will adhere to the Delaware State University thesis formatting guidelines. A thesis will consist of artifacts of the student's work (software, hardware, mathematical proofs, etc.). The thesis option is optimized to benefit graduate students training for a career of scientific inquiry. In order to accommodate nontraditional, full-time employed, part-time students whose career goals and objectives may not require a thesis, the M.S. program includes a project option. Students who utilize this option will propose, design, and implement a major Computer Science-related project, preferably related to their area of interest and expertise. The process for the project option is not different from the thesis option. A student who selects the project option must select a committee responsible for approving and guiding the project work. The student must also conduct an oral examination for the project. It is expected that the project will solve a substantial engineering problem in an area of Computer Science. The deliverables will vary depending on the project. Every project will have a writing component that will take one of a number of different forms (scholarly article, manual, etc.). A project will also include artifacts from the execution of the project work. This will also take one of a number of different forms (mathematical proof, software implementation, constructed system or prototype). The project option is optimized to benefit graduate students from various branches of industry.

Furthermore, to emphasize the research-oriented aspects of graduate studies, as well as to bolster critical thinking and analysis skills in our students, graduate students will complete two graduate seminars typically within the first two semesters. The seminars, in addition to boosting the aforementioned skills, will allow the students to make a selection of their specific area of interest to be pursued in the form of a dissertation or a project in the second year of study.

Graduate students will have the opportunity to enroll in elective courses in a few areas of computer science. The area of specialization for elective courses will change from semester-to-semester varying among the broad categories: 1) Theory, 2) Systems, and 3) Computational Intelligence and Informatics. Typically, students will take elective courses from one of those groups, which would provide an in-depth knowledge in a chosen sub-specialization.

Consequently, the program requires a total of 32 credit hours. This includes 18 credit hours of required core courses, 2 credit hours of graduate seminar, 6 credit hours of elective courses, and 6 credit hours of thesis or project research. The outline of the curriculum, assuming full-time attendance, is given in the following table. It is anticipated that, for part-time attendance (1 or 2 courses per semester), the curriculum would span a total of 3.5 to 5 years. It is important to note that the statute of limitations for the Master of Science degree is 5 years.

	Fall	Spring
Year 1	Algorithmics - (3 credits)	Theory of Computing - (3 credits)
	Operating systems - (3 credits)	Computer Networking and Communications (3 credits)
	Computational Intelligence and Informatics (3 credits)	Machine Learning - (3 credits)
	Graduate seminar – Survey - (1 credit)	Graduate seminar - Critical Analysis - (1 credit)
Year 2	Thesis research or project - (3 credits)	Thesis research or project - (3 credits)
	Elective 1 - (3 credits)	Elective 2 - (3 credits)

Table 1: M.S. Curriculum in Computer Science.

List of Core Courses:

CSCI-501 Algorithmics
CSCI-502 Theory of Computing
CSCI-510 Advanced Operating Systems
CSCI-520 Advanced Computer Networking and Communications
CSCI-530 Computational Intelligence and Informatics
CSCI-540 Machine Learning
CSCI-691 Graduate Seminar: Survey
CSCI-692 Graduate Seminar: Critical Analysis
CSCI-695 Thesis/Project

List of Approved Electives

Group: Theory

CSCI-560 Numerical Analysis
CSCI-561 Computational Geometry

CSCI-562 Computer Simulation
CSCI-563 Scientific Computing
CSCI-564 Graph Theory
CSCI-565 Computational Learning Theory
CSCI-566 Advanced Statistics

Group: Systems

CSCI-511 Distributed Systems and Parallel Computing
CSCI-512 Computer and Network Security
CSCI-521 Mobile Networking and Computing
CSCI-531 Software Engineering
CSCI-541 Human-Computer Interaction
CSCI-542 Virtual Worlds
CSCI-543 Advanced Computer Graphics
CSCI-544 Game Programming
CSCI-550 Advanced Database Management Systems

Group: Computational Intelligence and Informatics

CSCI-551 Data Warehousing
CSCI-552 Data Mining and Visualization
CSCI-554 Pattern Recognition
CSCI-555 Artificial Neural Networks
CSCI-556 Emergent Algorithms
CSCI-557 Expert Systems
CSCI-558 Evolutionary Computation
CSCI-567 Image Processing
CSCI-570 Computer Vision
CSCI-571 Robotics
CSCI-580 Bioinformatics
CSCI-585 Medical Informatics
CSCI-590 Informatics for Homeland Security
CSCI-599 Topics in Computer Science
CSCI-698 Thesis/Project Sustaining

COURSE DESCRIPTIONS

CSCI-501. ALGORITHMICS

Main purpose of the course is to provide students with systematic overview of techniques for analysis and design of algorithms and to familiarize the students with notions related to computational complexity, intractability and approximation algorithms. Students will become more capable of designing efficient algorithms for specific tasks in computer sciences and their applications, including but not limited to computational geometry, image processing, video surveillance analysis, data mining, etc. Credit, three hours.

CSCI-502. THEORY OF COMPUTING

This course is a graduate level introduction to formal languages and the theoretical aspects of computing. It covers regular and context-free languages, as well as a hierarchy of formal languages and automata, finite and pushdown automata, the Turing machine, computability, decidability, and computational complexity. Credit, three hours.

CSCI-510. ADVANCED OPERATING SYSTEMS

This class will provide an advanced coverage of operating systems through examination of significant recent contributions in operating systems. This will be accomplished through 3 major components consisting of (1) examination of major operating system concepts through regular readings and writings on recent research literature, (2) reduction to practice through the identification of, and experimental design for, a topic of interest, (3) preparation of a research report and oral presentation. Credit, three hours.

CSCI-520. ADVANCED COMPUTER NETWORKING AND COMMUNICATIONS

This course will provide advanced coverage of computer networking through examination of modern topics. This will be accomplished through 3 major components consisting of (1) examination of modern computer networking topics through regular readings and writings on recent research literature, (2) reduction to practice through the identification of, and experimental design for a topic of interest, (3) preparation of a research report and oral presentation. Credit, three hours.

CSCI-530. COMPUTATIONAL INTELLIGENCE AND INFORMATICS

The purpose of this course is to provide students with a broad overview of computational intelligence and informatics through lecture, readings from textbooks, readings from the research literature, and programming projects. The topics covered in the course include a review of nature-inspired methods in computational intelligence, such as neurocomputing, evolutionary computing, fuzzy and rough logic, as well as hybrid systems. Various branches of informatics, such as bioinformatics, neuroinformatics, health/medical informatics, security informatics, business informatics, and legal informatics, with a special emphasis on applications of computational intelligence in those areas, are also reviewed. Credit, three hours.

CSCI-54. MACHINE LEARNING

This class will provide a graduate introductory survey of machine learning, through lecture, readings from textbooks, readings from the research literature, and programming projects. Topics include, what is machine learning, information theoretic methods, probabilistic methods, discrete and continuous distributions, max-likelihood estimation, regularization, the inference problem, feature spaces, considerations for model validation, generative models, discriminative models, model validation, considerations for building practical systems. Credit, three hours.

CSCI-562. COMPUTER SIMULATION

With the advent of powerful computers, scientists and engineers have been able to replace real world situations with various models whose dynamics can be evaluated on computers and consequently simulate these real world situations. Examples are numerous, from aeronautical engineering to weather forecasting. Availability of modern computational tools makes feasible simulation that was just a decade ago impossible. As a result, use of computer simulation is rapidly growing and future researchers and engineers have to be familiar with these methods. This course is designed to expose students in Computer Science and natural sciences to computer-based simulation and its applications to sciences, engineering, and management. Students in this course will be trained to design useful models of real world situations, and to implement them on computers. Credit, three hours.

CSCI-563. SCIENTIFIC COMPUTING

This course is designed to expose students in Computer Science and natural sciences to various aspects of scientific computing. Such topics have become of importance in today's highly technical scientific research environments and in contemporary engineering. In addition to a need to understand fundamental concepts of computing, a researcher or an engineer is hard pressed to acquire the highest possible proficiency in using available computational resources, which in addition to powerful computers include software packages capable of automatizing not only numerical work but also symbolic algebraic manipulations. This course is supposed to address these practical needs. Credit, three hours.

CSCI-564. GRAPH THEORY

Graphs are of particular importance in Computer Science. Many important data structures in Computer Science are described naturally via graphs (trees, for instance). Graphs are essential for describing networks, and on a more abstract level, for describing automata and some features of formal languages. As a consequence of this pervasiveness, numerous algorithms have been developed on graphs, and it is safe to say that a computer science student cannot study algorithms in depth without at least some understanding of Graph Theory. This course is a graduate level introduction to Graph Theory, along with some of its most interesting algorithms. In addition to discussing the theory, it covers miscellaneous applications from operations research, science and several engineering fields. Credit, three hours.

CSCI-565. COMPUTATIONAL LEARNING THEORY

This course is a graduate level introduction to advanced concepts of computational learning theory. It covers study of PAC and weak learners, boosting, concepts of algorithms complexity for learning discrete and continuous functions from examples, as well as study of algorithms including perceptron, winnow, support vector machines and on-line learning algorithms. Credit, three hours.

CSCI-511. DISTRIBUTED SYSTEMS AND PARALLEL COMPUTING / CSCI-511

This course explores the collaboration of algorithm design, programming language structure, and computer architecture to achieve high performance. The nature of concurrent computations, idealized models of parallel systems, Interconnection networks, building-block parallel operations, optimality and efficiency, and mapping and scheduling of computations will be covered. Credit, three hours.

CSCI-512. COMPUTER AND NETWORK SECURITY / CSCI-512

This course will provide a graduate level introduction to aspects of computer and network security such as Operating System security issues, trusted computing base, access control, biometric security, network security issues, cryptographic systems, defense mechanisms, and use of secure communication and storage methodologies. Credit, three hours.

CSCI-521. MOBILE NETWORKING AND COMPUTING / CSCI-521

This course will prepare the student to understand the issues in mobile computing and help in design and deployment of wireless infrastructure. Credit, three hours.

CSCI-531. SOFTWARE ENGINEERING

This course provides a graduate introduction to the principles and paradigms of software engineering with a special focus on the pragmatic aspects, such as requirements analysis, cost estimation, design, team organization, quality control, configuration management, verification, testing and documentation. Students coming out of this course should be familiar with the core concepts and jargon in each area, have gone into a little more depth on some areas, and have experienced an attempt at applying software engineering methods to an actual project, as a member of a team. Credit, three hours.

CSCI-541. HUMAN-COMPUTER INTERACTION

Human-computer interaction (HCI) is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them. Interaction between users and computers occurs at the user interface (or simply interface), which includes both software and hardware. Students will learn material at the intersection of computer science, behavioral sciences, design and several other fields of study. The course will focus on important facets of design consideration for systems that offer a satisfying user experience. Topics will include human-computer interaction, HCI paradigms, requirements analysis, design, and validation of HCI systems. Credit, three hours.

CSCI-542. VIRTUAL WORLDS

Virtual worlds are interactive, simulated environments created by humans online. They have become an important and rapidly changing new mode of social and professional interaction. Virtual worlds have many practical applications such as tele-collaboration, computer-aided design and manufacturing, virtual tours, scientific modeling and visualization, and entertainment. Virtual worlds provide a very attractive area of research and development for computer scientists due to the plethora of computational issues related to an adequate design and implementation of such systems. Virtual worlds are also extensively studied by scientists in other disciplines, due to their significant impact on the relationship between technology, society, and economy, thus creating potential inter-disciplinary research opportunities. The course includes an overview of virtual worlds, with their history, technology, methodologies, and applications, as well as a discussion of the socio-economic impact of virtual worlds in everyday life. Credit, three hours.

CSCI-543. ADVANCED COMPUTER GRAPHICS

In this course we will survey classic papers and current research in computer graphics. Students will become acquainted with advanced topics in computer graphics; these include graphics pipelines, shading, texturing, illumination, anti-aliasing, perception, image accuracy, image-based rendering, non-photorealistic rendering, procedural modeling, simulation, texture synthesis, interaction, visualization, and virtual reality. Course activities include programming assignments, oral presentations and a term project. Credit, three hours.

CSCI-544. GAME PROGRAMMING

The Video Game industry is a fast growing, multi-billion-dollar industry. Video gaming is now one of the most popular forms of entertainment and a pervasive component of global culture. Academics have begun to recognize the ubiquity, cultural importance and growth of video gaming; as enriching tools for research and studies. In this course, students will gain experience in the engineering aspects, computer graphics methods and artificial intelligence techniques concerning the development of an interactive computer game. This provides students with an opportunity to bring together the theory of algorithms and data structures taught in early classes in an engaging and meaningful application. Credit, three hours.

CSCI-550. ADVANCED DATABASE MANAGEMENT SYSTEMS

Database management systems are important field of computer science with applications in business, science, homeland security, web design, etc. Proper use of the database technology can significantly improve productivity and lead to better use of resources. Databases are an irreplaceable tool of contemporary computer scientist who wants to be involved in cutting-edge research, development and implementations in one of aforementioned multidisciplinary fields. Main purpose of the course is to provide students with rigorous theoretical basis of databases and solid experience in applications so that they can actively join the work force in development and research in database management systems. Credit, three hours.

CSCI-551. DATA WAREHOUSING

Data warehousing is a discipline concerned with efficient storing and pre-processing (*i.e.*, cleaning, transforming, and cataloging) of corporate data to support managers and other business professionals in data mining, online analytical processing, market research, and decision-making. As the volumes of data stored by companies continue increasing dramatically, there is a perpetual need for skilled professionals capable of planning, implementing, and maintaining a data warehouse. This course provides students with the technical skills required to plan, implement, and maintain a data warehouse. Topics include data modeling for warehouses, data warehousing infrastructure and tool selection, data exploration, data synthesis and reduction, Online Analytical Processing (OLAP), organizational metadata, and data warehouse administration. Credit, three hours.

CSCI-552. DATA MINING AND VISUALIZATION

Data mining is active research area of computer science with substantial applications in sciences and commerce. Students in computer sciences need this course to become familiar with techniques that can be subsequently used for identifying interesting phenomena in observed data and/or for design and implementation of stand-alone real-time applications including applications in military and homeland security. This course provides the study of techniques for analysis and visualization of massive amounts of data. Includes hands-on experience in developing and using data mining software. Credit, three hours.

CSCI-554. PATTERN RECOGNITION

Pattern recognition is concerned with the design, development, and realization of algorithms that arrange data objects (images, records, sensor data) into groups. Students in this course will learn a number of algorithms and considerations for the design and development of pattern recognition systems. Topics include pattern recognition paradigms, supervised learning, feature extraction, feature selection, unsupervised learning, semi-supervised learning, feature spaces and transformations, kernels, support-vector machines, system design, model validation, and multivariate analysis. Students will gain experience from readings from texts, research literature, and a major semester project. Credit, three hours.

CSCI-555. ARTIFICIAL NEURAL NETWORKS

Artificial neural networks are important and emerging field of technology with applications in numerous fields such as classification, statistics, data processing, system identification and control, game-playing and decision making (backgammon, chess, racing), pattern recognition (radar systems, face identification, object recognition and more), sequence recognition (gesture, speech, handwritten text recognition), medical diagnosis, financial applications, etc. This course provides an overview of analysis and design principles for artificial neural networks. Topics include unsupervised and supervised learning, recurrent networks, as well as applications in various fields. Credit, three hours.

CSCI-556. EMERGENT ALGORITHMS

An emergent behavior (process) or emergent property can appear when a number of simple entities operate in an environment, forming more complex behaviors as a collective. In other words, high-level behavior resulting from low-level interaction of simpler building blocks. Emergent phenomenon can be seen in many places, such as snowflakes, sand dunes, flocking of birds, ant colony, traffic patterns, stock market, and evolution. Many of these phenomena can be studied with the model consisting of many autonomous agents, each with simple local rules (algorithm) controlling agent behavior relative to closest neighboring agents. An emergent algorithm is an algorithm that has the following characteristics: 1) it achieves predictable global effects, 2) it does not require global visibility, 3) it does not assume any kind of centralized control, and 4) it is self-stabilizing. Such algorithms typically are stochastic, involve parallel processing and iterative progress. The course includes a discussion of examples of emergence and self-organization in nature and human society, as well as an examination and implementation of selected emergent algorithms and models. Credit, three hours.

CSCI-557. EXPERT SYSTEMS

Expert systems have been applied to virtually every field of knowledge (e.g., chemistry, electronics, medicine, engineering, geology, computers, military) to perform various task including diagnostics, instruction, interpretation, monitoring, planning, prognosis, treatment and control. This course is designed to provide necessary theoretical foundation and hands-on experience for graduate students so that they can actively join the work force in further development and launching of the expert systems for commercial, scientific and military applications. Credit, three hours.

CSCI-558. EVOLUTIONARY COMPUTATION

Main purpose of the course is to provide students with systematic overview of techniques for analysis and design of algorithms of evolutionary computation (genetic algorithms, evolution strategies, evolutionary programming, and genetic programming) and to familiarize the students with notions related to their foundations and applications. This way, the students will become more capable of designing efficient genetic algorithm solutions for specific tasks in computer sciences and their applications, including but not data mining, engineering and optimization techniques.

CSCI-570. COMPUTER VISION

Computer vision is the study of systems that derive information from visual data (pictures, video, sensors). This course is a graduate introduction to computer visual algorithms, models, and techniques. Topics include image formation, projective geometry, color spaces and representations, kernels and visual features, segmentation, motion estimation, video feature, considerations for practical systems, models, and case studies. Credit, three hours.

CSCI-571. ROBOTICS

Robotics is unique among computer science sub-disciplines in that it draws from all three areas of computer science (Systems, Theory, Computational Intelligence/Informatics). Robotics has been identified as one of the next big growth industries in the United States. In order to prepare our students to become innovators and leaders in this field, they will need to have a rigorous grounding in the underlying concepts, tools, and techniques across robotics. This class will expose graduate students/advanced senior undergraduate students to fundamental issues related to the research and applications of robotic systems. This course will cover both manipulators and mobile robots. Students will learn the mathematical tools for modeling, analysis, and control of a robotic system. Credit, three hours.

CSCI-580. BIOINFORMATICS

The emerging field of bioinformatics has been consistently growing in importance over the past few decades. As an inherently interdisciplinary field situated at the intersection of biology, information technology, computer science, mathematics, and statistics, bioinformatics provides a vast range of career opportunities. In the face of ever-growing amounts of biological and biomedical data, there is a tremendous need for skilled computer scientists capable of fostering the advancement of computational techniques to solve various problems arising from the management and analysis of those data. This course provides an introduction of the most important and basic concepts, methods, and tools used in bioinformatics such as bioinformatics databases, sequence and structure alignment, protein structure prediction, protein folding, protein-protein interaction. Credit, three hours.

CSCI-585. MEDICAL INFORMATICS / CSCI-585

Medical Informatics (or Health Informatics) is an emerging, inter-disciplinary field concerned with the collection, storage, retrieval, communication, and optimal use of health-related data, information, and knowledge. It utilizes methods from various spheres of science and technology, such as computer science, information technology, bioinformatics, biomedicine, and social sciences. In the climate of a strong push towards a health-care reform and digitization of medical records in the United States, there is an ever-growing need for skilled computer scientists experienced in medical information systems design and engineering, as well as medical decision support methods. This course provides an interdisciplinary introduction to the technological advances in the field of medical informatics and their applications at the intersection of computer science and biomedical research. Credit, three hours.

CSCI-590. INFORMATICS FOR HOMELAND SECURITY

In the post-9/11 world, Homeland Security is one of the top priorities of the U.S. government. Within the scope of the War on Terror, various government agencies place an increasing emphasis on the efficient use of informatics for the purpose of prevention or management of threats of terrorist attacks. Therefore, there is an ever-growing need for professionals skilled in utilizing informatics methodologies for the purpose of intelligent data mining and analysis (e.g., threat detection), audio/video surveillance, or security-centered information system design and development.

The course provides an introduction to issues and policies related to Homeland Security (HS) in the United States, as well as an overview of applications of informatics to HS-related problems such as detection of threats of terrorist attacks, audio/video surveillance, and design of reliable security-centered information systems. Credit, three hours.

CSCI-691. GRADUATE SEMINAR: SURVEY / CSCI-691

In this seminar we survey across a number of research areas in Computer Science in order to give student knowledge and breadth in understanding the discipline. This will help students in selecting a research topic for their graduate degree program. Credit, one hour.

CSCI-692. GRADUATE SEMINAR: CRITICAL ANALYSIS

In this seminar we cover research problem formulation, experimental design, and empirical methods Computer Science in order to train students in the scientific method as it pertains to computer science. At the end of this seminar, students will have begun identifying and formulating a research topic for their M.S. degree program. This seminar will train students in research problem formulation, experimental design, and empirical methods in Computer Science. Credit, one hour.

CSCI-695. THESIS/PROJECT SUSTAINING / CSCI-695

This course is used to maintain registration until graduation upon completion of all courses and research. Credit, three hours.

PROGRAM: MASTERS IN COMPUTER SCIENCE

Year I Semester I			Year I Semester II		
Course	Course Name	Cr	Course	Course Name	Cr
CSCI-501	Algorithmic*	3	CSCI-502	Theory of Computing*	3
CSCI-510	Advanced Operating Systems*	3	CSCI-520	Advanced Computer Networking and Communications*	3
CSCI-530	Computational Intelligence and Informatics*	3	CSCI-540	Machine Learning*	3
CSCI-691	Graduate Seminary — Survey*	1	CSCI-692	Graduate Seminar — Critical Analysis*	1
	Total Credits	10		Total Credits	10

Year II Semester III			Year II Semester IV		
Course	Course Name	Cr	Course	Course Name	Cr
CSCI-695	Thesis or Research Project*	3	CSCI-695	Thesis or Research Project*	3
CSCI-5XX	Elective 1 ⁺	3	CSCI-5XX	Elective 2 ⁺	3
	Total Credits	6		Total Credits	6
			Total Credits: 32		

*Denotes a Core Requirement

+Denotes an elective

Total Core Credits = 26

Total Elective Credits = 6

Candidacy Requirement: course work, select committee, proposal and oral proposal defense

Capstone or Culminating Experience: thesis or project

List of Approved Electives

Group: Theory

CSCI-560 Numerical Analysis
CSCI-561 Computational Geometry
CSCI-562 Computer Simulation
CSCI-563 Scientific Computing
CSCI-564 Graph Theory
CSCI-565 Computational Learning Theory
CSCI-566 Advanced Statistics

Group: Systems

CSCI-511 Distributed Systems and Parallel Computing
CSCI-512 Computer and Network Security
CSCI-521 Mobile Networking and Computing
CSCI-531 Software Engineering
CSCI-541 Human-Computer Interaction
CSCI-542 Virtual Worlds
CSCI-543 Advanced Computer Graphics
CSCI-544 Game Programming
CSCI-550 Advanced Database Management Systems

Group: Computational Intelligence and Informatics

CSCI-551 Data Warehousing
CSCI-552 Data Mining and Visualization
CSCI-554 Pattern Recognition
CSCI-555 Artificial Neural Networks
CSCI-556 Emergent Algorithms
CSCI-557 Expert Systems
CSCI-558 Evolutionary Computation
CSCI-567 Image Processing
CSCI-570 Computer Vision
CSCI-571 Robotics
CSCI-580 Bioinformatics
CSCI-585 Medical Informatics
CSCI-590 Informatics for Homeland Security
CSCI-599 Topics in Computer Science

MASTER OF SCIENCE IN MATHEMATICS

Concentration: Applied Mathematics

PROGRAM OBJECTIVES AND GOALS

The master's programs in the Mathematical Sciences are flexible enough to accommodate students with diversified background training. In consultation with the Graduate Committee, each student develops a course of study in mathematics areas most relevant to his or her professional and career objectives.

STUDENT LEARNING OUTCOMES

Students will apply mathematics in novel situations that may require the development and acquisition of new skills.

Students will demonstrate the ability to read, comprehend and communicate abstract mathematical concepts and procedures.

Students will be able to read, comprehend, and communicate (written/verbal) abstract proofs.

Students will make conjectures and prove or disprove the conjecture by providing a counter example or a well-organized and logical proof.

Students will be able to interpret real life industrial problems, convert them into mathematical language, and use advanced mathematical techniques to solve them.

Students will be able to assess and synthesize mathematics research literature to develop a research plan and incorporate into their research.

ADMISSION DEADLINES AND DEGREE REQUIREMENTS

Application Deadlines:

Fall – April 15

Spring – November 1

International Admission Deadlines:

Fall – April 15

Spring – November 1

Required of all applicants:

- Earned Baccalaureate degree.
- Must possess the ability to carry out graduate work of high quality.
- Applicants for degree status should have a minimum cumulative undergraduate grade point average of 2.50 (on a 4-point scale) and a scholastic average of 3.00 in their undergraduate major. They should have successfully completed specific courses at the undergraduate level in the field in which they plan to pursue a graduate degree and a minimum number of courses in a designated area approved by the specific department.
- Applicants who have not taken the required test(s) can be admitted provisionally, but must satisfy this requirement during the first semester of graduate study in order to continue.

- Official scores on the Graduate Record Examination (GRE) are required. Testing must be within five years of application.
- Complete an application for admission.
- Submit official transcript(s).
- Submit two letters of recommendation from professionals in the area of interest.
- International applicants must meet all requirements.

DEGREE REQUIREMENTS

Each student must take 15 credit hours of required courses, and complete an additional 18 hours either in the Thesis Option or the Non-Thesis Option. The students who select Thesis Option must defend their thesis before the Department Graduate Committee. A student must complete a 6 hour research thesis.

The student who selects either one of the following non-thesis options must pass a written examination within two attempts. The written examination is administered in February. A student must pass the written exam by the beginning of his or her 6th semester of study. A second and final attempt is permitted in the following August. In the examination a student must choose two topics from Algebra, Analysis, and Applied Mathematics. The exam is based on both MTSC-561 for Analysis, MTSC-511 for Algebra, and (or) MTSC-651 and MTSC-643 for Applied Mathematics. Another topic, such as Ordinary Differential Equations, Partial Differential Equations, or Statistics, may be substituted for one of the above by petition to the Graduate Committee based on two graduate-level courses and supported by a faculty member.

FACULTY

Dr. Nicola Edwards	Chairperson	Mathematics Education
Dr. Fengshan Liu	Professor	Applied Mathematics
Dr. Dawn Lott	Professor	Applied Mathematics
Dr. Mazen Shahin	Professor	Mathematics
Dr. Xiquan Shi	Professor	Applied Mathematics
Dr. Jinjie Liu	Associate Professor	Computational Applied Mathematics
Dr. Delayne Johnson	Assistant Professor	Education
Dr. Sokratis Makrogiannis	Assistant Professor	Physics
Dr. Matthew Tanzy	Assistant Professor	Applied Mathematics
Dr. O. Yavuz	Assistant Professor	Mathematics
Dr. Sharon Smith	Lecturer	Mathematics
Dr. L. Girgis	Lecturer	Mathematics
Dr. Ellen Carr	Lecturer	Mathematics

RESEARCH AREAS

- BIOMATHEMATICS
- COMPUTATIONAL ELECTRODYNAMICS
- COMPUTATIONAL FLUID DYNAMICS
- COMPUTATIONAL GEOMETRY
- GROUND PENETRATING RADAR
- NUMERICAL ANALYSIS
- IMAGE AND SIGNAL PROCESSING
- THEORY OF SOLITONS

MASTER OF SCIENCE IN APPLIED MATHEMATICS THESIS AND NON-THESIS OPTION:

COURSE NO.	CREDITS	COURSE NAME
MTSC-500	3	Foundations of Mathematics*
MTSC-511	3	Introduction to Abstract Algebra*
MTSC-561	3	Real Analysis I*
MTSC-562	3	Real Analysis II*
MTSC-571	3	Complex Analysis*
MTSC-541	3	Advanced Probability Theory°
MTSC-521	3	General Topology°
MTSC-xxx	6	Applied Mathematics Electives
xx-xxx	3	Pure or Applied Mathematics Electives (or other Graduate level courses with advisor approval)
THESIS OPTION		
MTSC-699	6	Thesis or Directed Project 6
NON-THESIS OPTION		
xx-xxx	6	Pure or Applied Mathematics Electives (or other level courses with Graduate advisor approval)
TOTAL CREDIT HOURS: 33		
°Select one of these courses. *Each of these courses is required.		

COURSE DESCRIPTIONS

MATHEMATICAL SCIENCES (MTSC) (25)

MTSC-500. FOUNDATIONS OF MATHEMATICS

This course is specifically designed to bridge undergraduate and graduate study in mathematics. It is an introduction to abstract ideas, proofs, set theory, relations, and number systems and their connections. Prerequisites: MTSC-252. Credit, three hours.

MTSC-503. MATHEMATICS TEACHING METHODS I

This course is the first of a two-part sequence designed to provide weighty consideration of some of the major topics in middle and secondary school mathematics education. Emphasis will be on epistemological, pedagogical, social, psychological, effective teaching, classroom management, and cultural concerns as well as the teaching profession. This course is also a study of methods and materials used in teaching mathematics and will expose students to current educational theory and reform organizations. Through research, practice, and presentations, students will take an active role in the instruction and development of materials for this course.

Prerequisites: MTSC-252, MTSC-313, MTSC-341, MTSC-241 and MTSC-203. Credit, three hours.

MTSC-504. MODERN GEOMETRY

The course covers Menelaus and Ceva's Theorem, Cross Ratio, Elementary Transformations, Euclidean Constructions, and Non-Euclidean Geometry. The course illustrates to the students the strength of deductive reasoning in proofs involving Euclidean axioms and transformation theory. The student will also be familiar with Non-Euclidean Geometry.

Prerequisites: MTSC-303 with minimum grade of "C". Credit, three hours.

MTSC-505. MATHEMATICAL LOGIC

The course is designed to examine the logical foundations of mathematics. Formal systems are shown to model real life relationships, and these formal systems are studied and analyzed using mathematical methods and rigor. The results of the study show both the inherent limitation of reasoning and at the same time the richness of what can be expressed and proven.

Prerequisites: MTSC-251, MTSC-313. Credit, three hours.

MTSC-511. INTRODUCTION TO ABSTRACT ALGEBRA

The course is concerned with the basic theory of some of the important algebraic systems such as groups, rings and fields with emphasis on homomorphism, isomorphism, integral domain, extension fields, and Galois groups. Credit, three hours.

MTSC-521. GENERAL TOPOLOGY

The purpose of the course is to give the students the basic concepts of topology and lead them to algebraic topology.

The course also presents as a related discipline to the proper understanding of various branches of analysis and geometry.

The students should become familiar with topological spaces, point-set topology and homotopy theory. Prerequisites: MTSC-451, MTSC-452. Credit, three hours.

MTSC-531. NUMBER THEORY

The course, Number Theory, is an introduction to the study of basic properties of integers which allows one to demonstrate how various areas of mathematics play a role in the study of properties of natural numbers. The course is flexible and fundamental enough to be taken by Math and Math Ed Majors. Credit, three hours.

MTSC-541. ADVANCED PROBABILITY THEORY

The course covers the mathematical structure of probability theory with applications of the theory from a wide variety of experimental situations.

Prerequisites: MTSC-253 with a minimum grade of "C". Credit, three hours

MTSC-551. ORDINARY DIFFERENTIAL EQUATIONS

The purpose of the course is to present techniques of solving ordinary differential equations. The students should become familiar with Boundary Value Problems, Systems of Ordinary Differential Equations, Phase Diagrams, and Stability.

Prerequisites: MTSC-351. Credit, three hours.

MTSC-561. REAL ANALYSIS I

The purpose of the course is to cover the basic material that every graduate should know in the classical theory of functions of a real variable and in measure and integration theory. To provide the students with the background in those parts of modern mathematics which have their roots in the classical theory of functions of a real variable. These include the classical theory of functions of a real variable itself, measure and integration, point-set topology, and the theory of normed linear space.

Prerequisites: MTSC-402 with a minimum grade of "C", or its equivalent. Credit, three hours.

MTSC-562. REAL ANALYSIS II

This course is the extension of real analysis I. The purpose of the course is to further provide students the background of modern mathematics. The course is to cover the theories of (improper) Riemann integrals and a brief introduction of Lebesgue integrals, the theories of pointwise and uniform convergence of sequences of functions, and the theories of infinite series of functions.

Prerequisites: MTSC-561 with minimum grade of "C", or its equivalent. Credit, three hours.

MTSC-571. COMPLEX ANALYSIS

This is a first-semester course at the graduate level, in the field of Functions of one Complex Variable. The rigorous approach adopted herein will set a firm foundation for leading the students to the next level of Complex Analysis. To prepare the student for further studies in the field of Complex Analysis. To provide the students with sufficient background for various applications of Complex Analysis physical and engineering disciplines. Prerequisites: MTSC-471. Credit, three hours.

MTSC-621. FUNCTIONAL ANALYSIS

The course gives students an introduction to Metric Spaces, Hilbert Spaces, and Banach Spaces with emphasis on Hilbert Spaces.

Prerequisites: MTSC-561. Credit, three hours.

MTSC-631. OPERATIONS RESEARCH

The course is designed to expose students in computer science to linear, nonlinear, and integer programming, simplex method, duality theorem, transport and other application problems, and different optimization methods and techniques.

The topics to be covered include: Optimization problems; the subject of Operations Research; Linear programming; Simplex method and duality theorem; Integer programming; Nonlinear programming; Optimization techniques; Applications; and MATLAB Optimization Toolbox. Credit, three hours.

MTSC-641. COMBINATORICS

The student will be introduced to the theory involved in combinatorial reasoning. The two combinatorial theories of enumeration and graph theory will be developed. Students will apply combinatorial reasoning to problems in the analysis of computer systems, in discrete operations research and in finite probability. Credit, three hours.

MTSC-643. STATISTICS

The course provides students with the fundamental theory of statistics. The students will be familiar with descriptive and inferential statistical methods, theory, and applications. Prerequisites: MTSC-541 with minimum grade of "C". Credit, three hours.

MTSC-651. PARTIAL DIFFERENTIAL EQUATIONS

The course is designed to acquaint students to Classifications of Partial Differential Equations, Methods of Solution for the Wave Equation, Laplace's Equation, and the Heat Equation. Prerequisites: A second course in Ordinary Differential Equations. Credit, three hours.

MTSC-661. NUMERICAL ANALYSIS

The student should become familiar with advanced techniques for solving numerically large problems in Linear Algebra. In particular, students should become familiar with the effects of ill conditioning, and of ways in which special information about matrices, such as sparsity can be used. An important part of all of this is the consideration of error from various sources and ways of controlling its accumulation. Prerequisites: MTSC-313. Credit, three hours.

MTSC-699. THESIS OR DIRECTED PROJECT 6

A student may register three (3) or six (6) hours thesis with the approval of his/her thesis advisor. Credit, three to six hours.

**PROGRAM: MS PROGRAM IN APPLIED MATH
(NON-THESIS OPTION)**

First Year Fall Semester			First Year Spring Semester		
Course	Course Name	Cr	Course	Course Name	Cr
MTSC 500	Foundations of Math *	3	MTSC 571	Complex Analysis *	3
MTSC 511	Intro to Abstract Algebra *	3	MTSC 541	Advanced Probability Theory *	3
MTSC 561	Real Analysis I *	3	MTSC 562	Real Analysis II *	3
	Total Credits	9		Total Credits	9

Second Year Fall Semester			Second Year Spring Semester		
Course	Course Name	Cr	Course	Course Name	Cr
MTSC-xxx	Mathematics Elective +	3	MTSC-xxx	Mathematics Elective +	3
MTSC-xxx	Mathematics Elective +	3	MTSC-xxx	Mathematics Elective +	3
MTSC-xxx	Mathematics Elective +	3			
	Total Credits	9		Total Credits	6

	Total Credits: 33
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*Denotes a Core Requirement

+Denotes an elective

Total Core Credits = 18

Total Elective Credits = 15

Candidacy Requirements: Complete 9 hours with minimum GPA 3.0.

Capstone or Culminating Experience:

Pass a written examination within two attempts. In the examination a student must choose two topics from Algebra, Analysis, and Applied Mathematics.

Submission of Outcomes report to Graduate Studies and Research prior to graduation

**PROGRAM: MS PROGRAM IN APPLIED
MATH (THESIS OPTION)**

First Year Fall Semester			First Year Spring Semester		
Course	Course Name	Cr	Course	Course Name	Cr
MTSC 500	Foundations of Math *	3	MTSC 571	Complex Analysis *	3
MTSC 511	Intro to Abstract Algebra *	3	MTSC 541	Advanced Probability Theory *	3
MTSC 561	Real Analysis I *	3	MTSC 562	Real Analysis II *	3
	Total Credits	9		Total Credits	9

Second Year Fall Semester			Second Year Spring Semester		
Course	Course Name	Cr	Course	Course Name	Cr
MTSC-xxx	Mathematics Elective +	3	MTSC-xxx	Mathematics Elective +	3
MTSC-xxx	Mathematics Elective +	3	MTSC-699	Thesis	3
MTSC-699	Thesis	3			
	Total Credits	9		Total Credits	6

	Total Credits: 33
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*Denotes a Core Requirement

+Denotes an elective

Total Core Credits = 18

Total Elective Credits = 9

Candidacy Requirement: Complete 9 hours with minimum GPA 3.0 along with submission of research plan.

Submission of plan along with Candidacy Application to Graduate Studies and Research.

Capstone or Culminating Experience: Successful completion of 6 credit hours of MTSC-699 thesis; to write and successfully defend the thesis.

MASTER OF SCIENCE MATHEMATICS

Concentration: Pure Mathematics

PROGRAM OBJECTIVES AND GOALS

The master's programs in Mathematical Sciences are flexible enough to accommodate students with diversified background training. In consultation with the Graduate Committee, each student develops a course of study in mathematics areas most relevant to his or her professional and career objectives. Each student must take 15 credit hours of required courses, and complete an additional 18 hours either in the Thesis Option or the Non-Thesis Option.

STUDENT LEARNING OUTCOMES

Students will apply mathematics in novel situations that may require the development and acquisition of new skills.

Students will demonstrate the ability to read, comprehend and communicate abstract mathematical concepts and procedures.

Students will be able to read, comprehend, and communicate (written/verbal) abstract proofs.

Students will make conjectures and prove or disprove the conjecture by providing a counter example or a well-organized and logical proof.

Students will be able to interpret real-life industrial problems, convert them into mathematical language, and use advanced mathematical techniques to solve them.

Students will be able to assess and synthesize mathematics research literature to develop a research plan and incorporate into their research.

ADMISSION DEADLINES AND DEGREE REQUIREMENTS

Application Deadlines:

Fall – April 15

Spring – November 1

International Admission Deadlines:

Fall – April 15

Spring – November 1

Required of all applicants:

- Earned Baccalaureate degree.
- Must possess the ability to carry out graduate work of high quality.
- Applicants for degree status should have a minimum cumulative undergraduate grade point average of 2.50 (on a 4-point scale) and a scholastic average of 3.00 in their undergraduate major. They should have successfully completed specific courses at the undergraduate level in the field in which they plan to pursue a graduate degree and a minimum number of courses in a designated area approved by the specific department.

- Applicants who have not taken the required test(s) can be admitted provisionally, but must satisfy this requirement during the first semester of graduate study in order to continue.
- Official scores on the Graduate Record Examination (GRE) are required. Testing must be within five years of application.
- Complete an application for admission.
- Submit official transcript(s).
- Submit three letters of recommendation from professionals in the area of interest.
- International applicants must meet all requirements.

DEGREE REQUIREMENTS

Each student must take 15 credit hours of required courses, and complete an additional 18 hours either in the Thesis Option or the Non-Thesis Option. The students who select thesis option must defend their thesis before the Department Graduate Committee. A student must complete a 6 hour research thesis.

The student who selects either one of the following non-thesis options must pass a written examination within two attempts. The written examination is administered in February. A student must pass the written exam by the beginning of his or her 6th semester of study. A second and final attempt is permitted in the following August. In the examination a student must choose two topics from *Algebra*, *Analysis*, and *Applied Mathematics*. The exam is based on both MTSC-561 for Analysis, MTSC-511 for Algebra, and (or) MTSC-651 and MTSC-643 for Applied Mathematics. Another topic, such as Ordinary Differential Equations, Partial Differential Equations, or Statistics, may be substituted for one of the above by petition to the Graduate Committee based on two graduate-level courses and supported by a faculty member.

FACULTY

Dr. Nicola Edwards	Chairperson	Mathematics Education
Dr. Fengshan Liu	Professor	Applied Mathematics
Dr. Dawn Lott	Professor	Applied Mathematics
Dr. Mazen Shahin	Professor	Mathematics
Dr. Xiquan Shi	Professor	Applied Mathematics
Dr. Jinjie Liu	Associate Professor	Computational Applied Mathematics
Dr. Delayne Johnson	Assistant Professor	Education
Dr. Sokratis Makrogiannis	Assistant Professor	Physics
Dr. Matthew Tanzy	Assistant Professor	Applied Mathematics
Dr. O. Yavuz	Assistant Professor	Mathematics
Dr. Sharon Smith	Lecturer	Mathematics
Dr. L. Girgis	Lecturer	Mathematics
Dr. Ellen Carr	Lecturer	Mathematics

RESEARCH AREAS

- BIOMATHEMATICS
- COMPUTATIONAL ELECTRODYNAMICS
- COMPUTATIONAL FLUID DYNAMICS
- COMPUTATIONAL GEOMETRY
- GROUND PENETRATING RADAR
- NUMERICAL ANALYSIS
- IMAGE AND SIGNAL PROCESSING
- THEORY OF SOLITONS

MASTER OF SCIENCE IN PURE MATHEMATICS THESIS AND NON-THESIS OPTION

COURSE NO.	CREDITS	COURSE TITLE
MTSC-500	3	Foundations of Mathematics*
MTSC-511	3	Introduction to Abstract Algebra*
MTSC-561	3	Real Analysis I*
MTSC-562	3	Real Analysis II*
MTSC-571	3	Complex Analysis*
MTSC-541	3	Advanced Probability Theory°
MTSC-521	3	General Topology°
xx-xxx	3	Pure or Applied Mathematics Electives (or other level graduate courses with advisor approval)
Electives (Select 6 credit hours)		
MTSC-525	3	Logic
MTSC-531	3	Number Theory
MTSC-621	3	Introduction to Functional Analysis
MTSC-504	3	Modern Geometry
MTSC-611	3	Topics in Pure Mathematics
THESIS OPTION		
MTSC-699	6	Thesis or Directed Project 6
NON-THESIS OPTION		
xx-xxx	6	Pure or Applied Mathematics Electives (or other level graduate courses with advisor approval)
TOTAL CREDIT HOURS: 33		
°Select one of these courses. *Each of these courses is required.		

COURSE DESCRIPTIONS

MATHEMATICAL SCIENCES (MTSC) (25)

MTSC-500. FOUNDATIONS OF MATHEMATICS

This course is specifically designed to bridge undergraduate and graduate study in mathematics. It is an introduction to abstract ideas, proofs, set theory, relations, and number systems and their connections. Prerequisites: MTSC-252. Credit, three hours.

MTSC-503. MATHEMATICS TEACHING METHODS I

This course is the first of a two-part sequence designed to provide weighty consideration of some of the major topics in middle and secondary school mathematics education. Emphasis will be on epistemological, pedagogical, social, psychological, effective teaching, classroom management, and cultural concerns as well as the teaching profession. This course is also a study of methods and materials used in teaching mathematics and will expose students to current educational theory and reform organizations. Through research, practice, and presentations, students will take an active role in the instruction and development of materials for this course.

Prerequisites: MTSC-252, MTSC-313, MTSC-341, MTSC-241 and MTSC-203. Credit, three hours.

MTSC-504. MODERN GEOMETRY

The course covers Menelaus and Ceva's Theorem, Cross Ratio, Elementary Transformations, Euclidean Constructions, and Non-Euclidean Geometry. The course illustrates to the students the strength of deductive reasoning in proofs involving Euclidean axioms and transformation theory. The student will also be familiar with Non-Euclidean Geometry.

Prerequisites: MTSC-303 with minimum grade of "C". Credit, three hours.

MTSC-505. MATHEMATICAL LOGIC

The course is designed to examine the logical foundations of mathematics. Formal systems are shown to model real life relationships, and these formal systems are studied and analyzed using mathematical methods and rigor. The results of the study show both the inherent limitation of reasoning and at the same time the richness of what can be expressed and proven.

Prerequisites: MTSC-251, MTSC-313. Credit, three hours.

MTSC-511. INTRODUCTION TO ABSTRACT ALGEBRA

The course is concerned with the basic theory of some of the important algebraic systems such as groups, rings and fields with emphasis on homomorphism, isomorphism, integral domain, extension fields, and Galois groups. Credit, three hours.

MTSC-521. GENERAL TOPOLOGY

The purpose of the course is to give the students the basic concepts of topology and lead them to algebraic topology.

The course also presents as a related discipline to the proper understanding of various branches of analysis and geometry.

The students should become familiar with topological spaces, point-set topology and homotopy theory. Prerequisites: MTSC-451, MTSC-452. Credit, three hours.

MTSC-531. NUMBER THEORY

The course, Number Theory, is an introduction to the study of basic properties of integers which allows one to demonstrate how various areas of mathematics play a role in the study of properties of natural numbers. The course is flexible and fundamental enough to be taken by Math and Math Ed Majors. Credit, three hours.

MTSC-541. ADVANCED PROBABILITY THEORY

The course covers the mathematical structure of probability theory with applications of the theory from a wide variety of experimental situations.

Prerequisites: MTSC-253 with a minimum grade of "C". Credit, three hours

MTSC-551. ORDINARY DIFFERENTIAL EQUATIONS

The purpose of the course is to present techniques of solving ordinary differential equations. The students should become familiar with Boundary Value Problems, Systems of Ordinary Differential Equations, Phase Diagrams, and Stability.

Prerequisites: MTSC-351. Credit, three hours.

MTSC-561. REAL ANALYSIS I

The purpose of the course is to cover the basic material that every graduate should know in the classical theory of functions of a real variable and in measure and integration theory. To provide the students with the background in those parts of modern mathematics which have their roots in the classical theory of functions of a real variable. These include the classical theory of functions of a real variable itself, measure and integration, point-set topology, and the theory of normed linear space.

Prerequisites: MTSC-402 with a minimum grade of "C", or its equivalent. Credit, three hours.

MTSC-562. REAL ANALYSIS II

This course is the extension of real analysis I. The purpose of the course is to further provide students the background of modern mathematics. The course is to cover the theories of (improper) Riemann integrals and a brief introduction of Lebesgue integrals, the theories of pointwise and uniform convergence of sequences of functions, and the theories of infinite series of functions.

Prerequisites: MTSC-561 with minimum grade of "C", or its equivalent. Credit, three hours.

MTSC-571. COMPLEX ANALYSIS

This is a first-semester course at the graduate level, in the field of Functions of one (1) Complex Variable. The rigorous approach adopted herein will set a firm foundation for leading the students to the next level of Complex Analysis. To prepare the student for further studies in the field of Complex Analysis. To provide the students with sufficient background for various applications of Complex Analysis physical and engineering disciplines. Prerequisites: MTSC-471.

Credit, three hours.

MTSC-621. FUNCTIONAL ANALYSIS

The course gives students an introduction to Metric Spaces, Hilbert Spaces, and Banach Spaces with emphasis on Hilbert Spaces.

Prerequisites: MTSC-561. Credit, three hours.

MTSC-631. OPERATIONS RESEARCH

The course is designed to expose students in computer science to linear, nonlinear, and integer programming, simplex method, duality theorem, transport and other application problems, and different optimization methods and techniques.

The topics to be covered include: Optimization problems; the subject of Operations Research; Linear programming; Simplex method and duality theorem; Integer programming; Nonlinear programming; Optimization techniques; Applications; and MATLAB Optimization Toolbox. Credit, three hours.

MTSC-641. COMBINATORICS

The student will be introduced to the theory involved in combinatorial reasoning. The two (2) combinatorial theories of enumeration and graph theory will be developed. Students will apply combinatorial reasoning to problems in the analysis of computer systems, in discrete operations research and in finite probability. Credit, three hours.

MTSC-643. STATISTICS

The course provides students with the fundamental theory of statistics. The students will be familiar with descriptive and inferential statistical methods, theory, and applications. Prerequisites: MTSC-541 with minimum grade of "C". Credit, three hours.

MTSC-651. PARTIAL DIFFERENTIAL EQUATIONS

The course is designed to acquaint students to Classifications of Partial Differential Equations, Methods of Solution for the Wave Equation, Laplace's Equation, and the Heat Equation. Prerequisites: A second course in Ordinary Differential Equations. Credit, three hours.

MTSC-661. NUMERICAL ANALYSIS

The student should become familiar with advanced techniques for solving numerically large problems in Linear Algebra. In particular, students should become familiar with the effects of ill conditioning, and of ways in which special information about matrices, such as sparsity can be used. An important part of all of this is the consideration of error from various sources and ways of controlling its accumulation. Prerequisites: MTSC-313. Credit, three hours.

MTSC-699. THESIS OR DIRECTED PROJECT 6

A student may register three (3) or six (6) hours thesis with the approval of his/her thesis advisor. Credit, three to six hours.

**PROGRAM: MS PROGRAM IN PURE MATH
(NON-THESIS OPTION)**

First Year Fall Semester			First Year Spring Semester		
Course	Course Name	Cr	Course	Course Name	Cr
MTSC 500	Foundations of Math *	3	MTSC 571	Complex Analysis *	3
MTSC 511	Intro to Abstract Algebra *	3	MTSC 541	Advanced Probability Theory *	3
MTSC 561	Real Analysis I *	3	MTSC 562	Real Analysis II *	3
	Total Credits	9		Total Credits	9

Second Year Fall Semester			Second Year Spring Semester		
Course	Course Name	Cr	Course	Course Name	Cr
MTSC-xxx	Mathematics Elective +	3	MTSC-xxx	Mathematics Elective +	3
MTSC-xxx	Mathematics Elective +	3	MTSC-xxx	Mathematics Elective +	3
MTSC-xxx	Mathematics Elective +	3			
	Total Credits	9		Total Credits	6

	Total Credits: 33
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*Denotes a Core Requirement

+Denotes an elective

Total Core Credits = 18

Total Elective Credits = 15

Candidacy Requirements: Complete 9 hours with minimum GPA 3.0.

Capstone or Culminating Experience: Pass a written examination within two attempts. In the examination a student must choose two topics from Algebra, Analysis, and Applied Mathematics.

Submission of Outcomes report to Graduate Studies and Research prior to graduation

**PROGRAM: MS PROGRAM IN PURE MATH
(THESIS OPTION)**

First Year Fall Semester			First Year Spring Semester		
Course	Course Name	Cr	Course	Course Name	Cr
MTSC 500	Foundations of Math *	3	MTSC 571	Complex Analysis *	3
MTSC 511	Intro to Abstract Algebra *	3	MTSC 541	Advanced Probability Theory *	3
MTSC 561	Real Analysis I *	3	MTSC 562	Real Analysis II *	3
	Total Credits	9		Total Credits	9

Second Year Fall Semester			Second Year Spring Semester		
Course	Course Name	Cr	Course	Course Name	Cr
MTSC-xxx	Mathematics Elective +	3	MTSC-xxx	Mathematics Elective +	3
MTSC-xxx	Mathematics Elective +	3	MTSC-699	Thesis	3
MTSC-699	Thesis	3			
	Total Credits	9		Total Credits	6

	Total Credits: 33
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*Denotes a Core Requirement

+Denotes an elective

Total Core Credits = 18

Total Elective Credits = 9

Candidacy Requirement: Complete 9 hours with minimum GPA 3.0 along with submission of research plan with candidacy application to Graduate Studies and Research.

Capstone or Culminating Experience: Successful completion of 6 credit hours of MTSC-699 thesis; write and successfully defend the thesis

DOCTOR OF PHILOSOPHY IN INTERDISCIPLINARY APPLIED MATHEMATICS AND MATHEMATICAL PHYSICS

PROGRAM OBJECTIVES AND GOALS

This program is designed for students interested in research careers in mathematics in the military, industry or government. It also prepares individuals to teach and/or do research at a college. The Ph.D. program in Interdisciplinary Applied Mathematics and Mathematical Physics is flexible enough to accommodate students with diversified backgrounds. Each student develops a course of study in the Applied Mathematics concentration or Mathematical Physics concentration, whichever is most relevant to his or her professional and career objectives.

STUDENT LEARNING OUTCOMES

Students will become experts at creating advanced and fully detailed proofs in a specialized area.

Students will be able to assess and synthesize mathematics research literature to develop a research plan and incorporate into their research.

Students will be able to present a mathematics paper to a mathematically informed audience (i.e., professional mathematician).

Students will make an original contribution to the discipline by writing a publishable quality research document.

ADMISSION DEADLINES AND DEGREE REQUIREMENTS

Application Deadlines:

Fall – April 15

Spring – November 1

International Admission Deadlines:

Fall – April 15

Spring – November 1

Required of all applicants:

- Earned Baccalaureate degree.
- Minimum cumulative undergraduate grade point average of 2.50 (on a 4-point scale) and a GPA of 3.0 in the courses related to the field of the Ph.D.
- Provide official scores on the Graduate Record Examination (GRE). Testing must be within five years of application.
- Complete an application for admission.
- Submit a resume.
- Submit official transcript(s).
- Submit three letters of recommendation from professionals in the area of interest.

DEGREE REQUIREMENTS

APPLIED MATHEMATICS CONCENTRATION

A student who enters the program with a baccalaureate degree must complete his or her master's degree before his or her Ph.D. study, so he or she must complete 72 credit hours of graduate-level credits (33 credits at MS level and 39 credits at Ph.D. level).

Students who have master's degrees with no prior Ph.D. graduate course work must complete 30 credit hours of graduate-level courses listed below. In addition, at least 9 credit hours of research on dissertation are required. A GPA of 3.0 on a 4.0 scale or above must be maintained. The program requires the Ph.D. candidate to have reading knowledge of at least one foreign language approved by the Director of Graduate Programs.

QUALIFYING EXAMINATIONS

Upon completing the course requirement, each student must successfully pass two written examinations.

One examination is based on two courses selected by the student from Functional Analysis, Real Analysis, and Complex Analysis. The other examination is based on two courses selected by the student from Image Processing, Mathematical Methods, Advanced Electromagnetic Theory, Computational Geometry, Wavelet Analysis, Numerical Analysis and Scientific Computation I, and courses approved by the Graduate Committee. A student must pass an oral examination on a subject area directly related to his or her dissertation.

CANDIDACY REQUIREMENTS

- Complete at least 30 credits of graduate Ph.D.-level course work
- A cumulative GPA of at least 3.0 on all graduate-level course work with no grade below a C
- Pass the written Qualifying Examinations
- Submission of Research Plan
- Oral Defense of Research Plan

DOCTOR OF PHILOSOPHY IN INTERDISCIPLINARY APPLIED MATHEMATICS AND MATHEMATICAL PHYSICS

APPLIED MATHEMATICS CONCENTRATION

Required Courses: (12 credit hours)		
COURSE NO.	CREDITS	COURSE TITLE
MTSC-863	3	Functional Analysis
MTSC-861	3	Real Analysis
MTSC-871	3	Complex Analysis
MTSC-887	3	Image Processing OR
MTSC-821	3	Scientific Computation I
MTSC-890	9	Dissertation
Elective: (Select 18 credit hours)		
MTSC-821	3	Scientific Computation I
MTSC-822	3	Scientific Computation II
MTSC-833	3	Stochastic Processes
MTSC-853	3	Partial Differential Equations
MTSC-867	3	Numerical Analysis
MTSC-851	3	Ordinary Differential Equations
MTSC-885	3	Computational Geometry*
MTSC-857	3	Integral Equations
MTSC-875	3	Inverse Problems
MTSC-887	3	Image Processing
MTSC-811	3	Abstract Algebra
PHYS-655	3	Computational Methods
PHYS-665	3	Statistical Mechanics
PHYS-671	3	Advanced Electromagnetic Theory I*
PHYS-672	3	Advanced Electromagnetic Theory II
PHYS-652	3	Classical Mechanics
PHYS-667	3	Mathematical Methods IV*
PHYS-661	3	Solid State Physics
PHYS-675	3	Quantum Mechanics I
MTSC-883	3	Wavelet Analysis*
MTSC-845	3	Theory of Solitons
MTSC-852	3	Pattern Recognition
MTSC-787	3	Digital Signal Processing
MTSC-850	3	Mathematical Theory of Algorithms
MTSC-854	3	Numerical Methods for Partial Differential Equations
MTSC-843	3	Advanced Statistics
MTSC-835	3	Advanced Perturbation Theory
MTSC-889	3	Topics in Applied Mathematics
TOTAL CREDIT HOURS: 39^		
*Students must take any two of these courses.		

^ A student who enters the program with a baccalaureate degree must complete his/her master's degree before his/her Ph.D. study, so he/she must complete a total of 72 credit hours of graduate-level credits (33 credits at MS level and 39 credits at Ph.D. level).

MATHEMATICAL PHYSICS CONCENTRATION

DEGREE REQUIREMENTS

A student who enters the program with a baccalaureate degree must complete his or her master's degree before his or her Ph.D. study, so he or she must complete 72 credit hours of graduate-level credits (33 credits at MS level and 39 credits at Ph.D. level).

Students who have master's degrees with no prior Ph.D. graduate course work must complete 30 credit hours of graduate level courses listed below. In addition, at least 9 credit hours of research and dissertation are required. A GPA of 3.0 on a 4.0 scale or above must be maintained. The program requires the Ph.D. candidate to have reading knowledge of at least one foreign language approved by the Director of Graduate Programs.

A sequence of core courses required by all Ph.D. candidates includes the following: PHYS-665 Statistical Mechanics, PHYS-672 Advanced Electromagnetic Theory, PHYS-676 Quantum Mechanics II, PHYS-655 Computational Methods, MTSC-863 Functional Analysis or MTSC-857 Integral Equations, and MTSC- 871 Complex Analysis. Any student found deficient in any of these areas may be required to take appropriate courses to remove that deficiency.

QUALIFYING EXAMINATIONS

Each student must successfully pass the written general examination in physics which encompasses the areas of Thermodynamics and Kinetic Theory, Classical Mechanics, Advanced Electromagnetic Theory, and Quantum Mechanics. In addition, a student must pass an oral examination in a subject area chosen by his or her advisor.

CANDIDACY REQUIREMENTS

- Complete at least 30 credits of graduate Ph.D.-level course work
- A cumulative GPA of at least 3.0 on all graduate-level course work with no grade below a C
- Pass the written Qualifying Examinations
- Submission of Research Plan
- Oral Defense of Research Plan

DOCTOR OF PHILOSOPHY IN INTERDISCIPLINARY APPLIED MATHEMATICS AND MATHEMATICAL PHYSICS

MATHEMATICAL PHYSICS CONCENTRATION

REQUIRED COURSES (18 credits hours)		
COURSE NO.	CREDITS	COURSE TITLE
PHYS-665	3	Statistical Mechanics
PHYS-672	3	Advanced Electromagnetic Theory
PHYS-676	3	Quantum Mechanics II
PHYS-655	3	Computational Methods
MTSC-871	3	Complex Analysis
MTSC-863	3	Functional Analysis OR
MTSC-857	3	Integral Equations
MTSC-890	9	Dissertation
ELECTIVES (Select 12 credit hours)		
MTSC-821	3	Scientific Computation I
MTSC-822	3	Scientific Computation II
MTSC-833	3	Stochastic Processes
MTSC-853	3	Partial Differential Equations
MTSC-867	3	Numerical Analysis
MTSC-851	3	Ordinary Differential Equations
MTSC-885	3	Computational Geometry
MTSC-857	3	Integral Equations
MTSC-875	3	Inverse Problems
MTSC-887	3	Image Processing
MTSC-811	3	Abstract Algebra
PHYS-655	3	Computational Methods
PHYS-665	3	Statistical Mechanics
PHYS-671	3	Advanced Electromagnetic Theory I
PHYS-672	3	Advanced Electromagnetic Theory II
PHYS-652	3	Classical Mechanics
PHYS-667	3	Mathematical Methods IV
PHYS-661	3	Solid State Physics
PHYS-675	3	Quantum Mechanics I
MTSC-883	3	Wavelet Analysis
MTSC-845	3	Theory of Solitons
MTSC-852	3	Pattern Recognition
MTSC-787	3	Digital Signal Processing
MTSC-850	3	Mathematical Theory of Algorithms
MTSC-854	3	Numerical Methods for Partial Differential Equations
MTSC-843	3	Advanced Statistics
MTSC-835	3	Advanced Perturbation Theory
MTSC-889	3	Topics in Applied Mathematics
TOTAL CREDIT HOURS: 39^		

^ A student who enters the program with a baccalaureate degree must complete his/her Master's degree before his/her Ph.D. study, so he/she must complete a total of 72 credit hours of graduate level credits (33 credits at MS level and 39 credits at Ph.D. level).

COURSE DESCRIPTIONS

PHYSICS (PHYS)

PHYS-652. CLASSICAL MECHANICS

Lagrangian formulation, the Kepler problem, Rutherford scattering, rotating coordinate systems, rigid body motion, small oscillations, stability problems, and Hamiltonian formulation. Credit, three hours.

PHYS-655. COMPUTATIONAL METHODS

Designed to familiarize students with the use of computers in pursuing theoretical research. Numerical analysis techniques and computational methods employed in the study of physical models will be studied. Credit, three hours.

PHYS-661. SOLID STATE PHYSICS

An introductory study of the structure and physical properties of crystalline solids. Included are topics in crystal structure, lattice vibrations, thermal properties of solids, x-ray diffraction, free electron theory and energy-based theory. Credit, three hours.

PHYS-665. STATISTICAL MECHANICS

Laws of thermodynamics, Boltzmann and quantum statistical distributions, with applications to properties of gases, specific heats of solids, paramagnetism, black body radiation and Bose-Einstein condensation. Credit, three hours.

PHYS-667. MATHEMATICAL METHODS OF PHYSICS IV

An advanced treatment of mathematical topics including operators, matrix mathematics, complex variables and eigenvalue problems. Credit, three hours.

PHYS-671. ADVANCED ELECTROMAGNETIC THEORY I

Treatment of boundary value problems of electrostatics and magnetostatics, electromagnetic radiation, radiating systems, wave guides, resonating systems and multipole fields. Credit, three hours.

PHYS-672. ADVANCED ELECTROMAGNETIC THEORY II

Treatment of boundary value problems of electrostatics and magnetostatics, electromagnetic radiation, radiating systems, wave guides, resonating systems and multipole fields. Credit, three hours.

PHYS-675. QUANTUM MECHANICS I

A study of the Schroedinger wave equation, operators and matrices, perturbation theory, collision and scattering problems classification of atomic states, and introduction to field quantization. Credit, three hours.

PHYS-676. QUANTUM MECHANICS II

Quantum Mechanics of molecules and solid state. Relativistic quantum mechanics. Field quantization. Quantum theory of light. Basics of quantum electrodynamics. Credit, three hours.

PHYS-691. RESEARCH I

Independent student research or laboratory work in a specialized field of interest. Credit, three hours.

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PHYS-692. RESEARCH II

Independent student research or laboratory work in a specialized field of interest. Credit, three hours.

PHYS-695. MASTER'S THESIS

A research problem in a selected physics topic resulting in a written thesis. Credit, one to six hours.

PHYS-800. MODERN LASER SPECTROSCOPIC METHODS

Basics of laser spectroscopic techniques and instrumentation.

Topics include: ultra violet and visible (uv-vi) absorption spectroscopy; Fourier transform infrared spectroscopy; Raman, fluorescence, and saturation spectroscopy; polarization, correlation, and ultra-fast spectroscopy.

Prerequisites: PHYS-600, PHYS-601, PHYS-605. Credit, three hours.

PHYS-801. QUANTUM THEORY OF LIGHT

Quantum mechanical description of light matter interaction. Presentation of basic quantum mechanics and quantum mechanical treatment of light and atoms. Prerequisites: Consent of the Instructor.

Credit, three hours.

PHYS-802. THEORY OF LIGHT SCATTERING

An advanced electricity and magnetism course focused on light interactions with small particles. Topics include Raleigh and Mie scattering, optical properties of nanoparticles and surface plasmon resonance. Credit, three hours.

PHYS-803. MODERN LASER SPECTROSCOPIC METHODS

The laser revolution in spectroscopy. Absorption within the Doppler line, Doppler-free broadening spectroscopy, saturation spectroscopy, multiphoton spectroscopy, laser fluorescence, laser Raman, coherent stokes and antistokes Raman spectroscopy, photon echo and coherent spectroscopy. Ultrafast spectroscopy. Modern trends in spectroscopy.

Credit, three hours.

PHYS-804. PRINCIPLES OF PHOTOCHEMISTRY AND PHOTOBIOLOGY

Review of the main phenomena related to the interaction of light with matter that results in chemical or biological activity. The study of inorganic and organic photochemistry, environmental aspects of photochemistry, atmospheric photochemistry, photosynthesis, visual processing, bio-luminescence, interaction of light with bio-organisms, photo- medicine, and phototherapy. Credit, three hours.

PHYS-805. PHOTOACOUSTIC AND THERMAL SPECTROSCOPY

Fundamentals of photo-acoustic and photo-thermal interaction of light with optical samples. Examination of basic instrumentations and their applications for characterization of complex samples including biological samples. Credit, three hours.

PHYS-806. MOLECULAR BIOPHYSICS

An overview of the physics of bio-molecular interactions. Topics will include physical models for DNA and protein systems. Credit, three hours.

PHYS-807. OPTICAL SOLITONS

Basic concepts of the mathematical aspects of optical solitons. Presentation of optical waveguides, the nonlinear Schrodinger's equation, laws of nonlinearity, soliton perturbation, soliton-soliton interactions, Stochastic perturbation of optical solitons, optical couplers, optical switching, magneto-optic waveguides and optical bullets. Prerequisites: PHYS-601, MTSC-853, MTSC-845.

Credit, three hours.

PHYS-808. FIBER OPTICS AND FIBER OPTICS COMMUNICATION

Light propagation in fiber, its dispersion and nonlinear characteristics that play an important role in light communication. Types of fiber-optic devices and their applications to communication. Wavelength division multiplexing. Credit, three hours.

PHYS-809. PHOTONICS AND INFORMATION PROCESSING

Wave propagation in linear optical systems and optical information processing. Topics include fundamentals of optical propagation, diffraction, optical imaging, Fourier transform, wave-front modulation, signal processing, and basics of optical processing devices. Credit, three hours.

PHYS-810. CURRENT TOPICS IN OPTICS I

Current topics in optics and spectroscopy. Credit, three hours.

PHYS-811. CURRENT TOPICS IN OPTICS II

Current topics in optics and spectroscopy. Credit, three hours.

PHYS-820. DISSERTATION RESEARCH

The course is for Ph.D. students in the optics program working on their dissertation research project. Credit, two to eight hours.

PHYS-890. DISSERTATION

Written work that describes the main research results obtained during the completion of the graduate program. The format must comply with the requirements of the College for thesis and dissertations. Credit, three to nine hours.

PHYS-999. DOCTORAL SUSTAINING

Public oral defense of the thesis that includes presentation of the main research results obtained during the completion of the graduate program. It takes place after evaluation of the written dissertation by the members of the corresponding academic committee. Credit, none.

MATHEMATICAL SCIENCES (MTSC) (25)**MTSC-787. DIGITAL SIGNAL PROCESSING**

The goal of the course is to provide the student with the mathematical tools and techniques for analyzing, modeling, and implementing digital signal processing systems. The course also provides the relevant background knowledge to students of applied mathematics and theoretical physics who need the signal processing tools for the analysis of data obtained during research in their fields. Credit, three hours.

MTSC-811. ABSTRACT ALGEBRA

The student should understand the theory of groups, rings and fields. Credit, three hours.

MTSC-821. SCIENTIFIC COMPUTATION I

The student should become familiar with matrix analysis and matrix computation. Credit, three hours.

MTSC-822. SCIENTIFIC COMPUTATION II

The student should become familiar with numerical approximations such as finite element methods in computational electromagnetism. Credit, three hours.

MTSC-833. STOCHASTIC PROCESSES

The student should become familiar with the theory and applications of Stochastic processes. Credit, three hours.

MTSC-843. ADVANCED STATISTICS

Main purpose of the course is to provide students with systematic overview of advanced statistical techniques that can be useful in their research and future careers. The statistical techniques are applicable in various fields including video surveillance analysis, data mining, natural resources, finance, etc. Credit, three hours.

MTSC-845. THEORY OF SOLITONS

The aim of the course is to introduce the basic concepts of the mathematical aspects of Soliton Theory. This will include the derivation and the introduction to the Korteweg-de Vries equation; the travelling wave solution; Inverse Scattering Transform; N-soliton solution; Lax pair; Integrals of Motion; Hirota's bilinear method; Backlund Transform; AKNS (Ablowitz, Kaup, Newell and Segur) scheme; Zakharov-Shabat scheme; Painleve transcendents; Painleve conjecture; perturbation of solitons; adiabatic parameter dynamics; Topological solitons, kinks and anti-kinks, breathers, phonons, skyrimions; Chiral solitons. Credit, three hours.

MTSC-850. MATHEMATICAL THEORY OF ALGORITHMS

Main purpose of the course is to provide students with systematic overview about techniques for analysis and design of algorithms and to familiarize the students with notions related to computational complexity, intractability and approximation algorithms. This way, the students will become more capable of designing efficient algorithms for specific tasks in applied mathematics, included but not limited to computational geometry, image processing, video surveillance analysis, data mining, etc. Credit, three hours.

MTSC-851. ORDINARY DIFFERENTIAL EQUATIONS

The purpose of the course is to present techniques of solving ordinary differential equations. The students should become familiar with Boundary Value Problems, Systems of Ordinary Differential Equations, and Phase Diagrams and Stability. Credit, three hours.

MTSC-852. PATTERN RECOGNITION

Pattern recognition is integral part of image processing, video surveillance and data mining, which are research areas at Delaware State University. Potential junior researchers in applied mathematics and/or applied optics field need this course to become familiar with techniques that can be subsequently used for identifying interesting phenomena in observed data and/or for design and implementation of stand-alone real-time applications for military and homeland security. Credit, three hours.

MTSC-853. PARTIAL DIFFERENTIAL EQUATIONS

The course is designed to acquaint students to Classifications of Partial Differential Equations, Methods of Solution for the Wave Equation, Laplace's Equation, and the Heat Equation. Credit, three hours.

MTSC-854. NUMERICAL METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS

Numerical methods for Partial Differential Equations (PDEs) are a part of the problem solving skills that are expected to be mastered by most of the university graduates working in a quantitative field. The same fundamental concepts of convection, diffusion, dispersion and nonlinearity are used to simulate applications in physics, economics, biology, engineering and social sciences. Quantitative answers for the real world can generally be obtained only from computations. The goal of this course is to provide a basic foundation in numerical methods for PDEs include finite difference method and finite element method. Credit, three hours.

MTSC-857. INTEGRAL EQUATIONS

The student should become familiar with the theory and applications of Integral Equations. Credit, three hours.

MTSC-860. ADVANCED PERTURBATION THEORY

The aim of the course is to lay an introduction to the perturbation theory to solve ordinary differential equations, partial differential equations as well as integral equations. Topics that will be covered in this course are Regular perturbations; Error Estimates; Periodic solutions and Lindstedt Series, Harmonic Resonance, Duffing's equation, Multiple Scales, Struble's Method, Averaging, Krylov-Bogoliubov Method of Averaging, Krylov-Bogoliubov- Mitropoloski generalized method of Averaging; Forced Duffing and Van der Pol's equations, Wentzel-Kramer- Brillouin-Jeffreys (WKBJ) Approximation, Fredholm's Alternative, Latta's method of composite expansion; Matched Asymptotic Expansion. The emphasis in this course is on the adaptation of these mathematical methods and techniques to their swift and effective application in solving advanced problems in applied mathematics and theoretical physics. Credit, three hours.

MTSC-861. REAL ANALYSIS

The course is to provide the students with the background in those parts of modern mathematics which have their roots in the classical theory of functions of a real variable. These include the classical theory of functions of a real variable itself, measure and integration, point-set topology, and the theory of normed linear space. Credit, three hours.

MTSC-863. FUNCTIONAL ANALYSIS

To provide students theories of Metric Spaces, Hilbert Spaces and Banach Spaces. Credit, three hours.

MTSC-867. NUMERICAL ANALYSIS

The student should become familiar with advanced techniques for solving numerically large problems in Linear Algebra. In particular, students should become familiar with the effects of ill conditioning, and of ways in which special information about matrices, such as sparsity can be used. An important part of all of this is the consideration of error from various sources and ways of controlling its accumulation. Credit, three hours.

MTSC-871. COMPLEX ANALYSIS

Upon successful completion of this course, the student will be familiar with Complex Analysis and various applications of Complex Analysis physical and engineering disciplines. Credit, three hours.

MTSC-875. INVERSE PROBLEMS

The student should become familiar with ill-posed problems, regularization methods, Tikhonov regularization, the discrepancy principle, and the regularization by discretization. Credit, three hours.

MTSC-883. WAVELET ANALYSIS

The student should become familiar with Wavelets and their applications in signal and image processing. Credit, three hours.

MTSC-885. COMPUTATIONAL GEOMETRY

The student should become familiar with communication complexity, pseudo-randomness, rapidly mixing Markov chains, points on a sphere, derandomization, convex hulls and Voronoi diagrams, linear programming, geometric sampling and VC- dimension theory, minimum spanning trees, circuit complexity, and multidimensional searching. Credit, three hours.

MTSC-887. IMAGE PROCESSING

The student should become familiar with Image Enhancement, Image Restoration, Wavelets and Multiresolution Processing, Image Compression, Morphological Image Processing, Image Segmentation, Representation and Description, and Object Recognition. Credit, three hours.

MTSC-889. TOPICS IN APPLIED MATHEMATICS

The topics of this course will be determined and the course will be offered whenever needed. Credit, three hours.

MTSC-890. DISSERTATION

A student may register 3-9 hours' dissertation with approval of his/her dissertation advisor each semester. Credit, three to nine hours.

**PROGRAM: PH.D. IN INTERDISCIPLINARY APPLIED
MATHEMATICS AND MATHEMATICAL PHYSICS
(MATHEMATICAL PHYSICS CONCENTRATION)**

First Year Fall Semester			First Year Spring Semester		
Course	Course Name	Cr	Course	Course Name	Cr
MTSC-871	Complex analysis *	3	MTSC-863	Functional Analysis *	3
PHYS-655	Computational Methods *	3	PHYS-672	Advanced EM Theory II *	3
PHYS-665	Statistical Mechanics *	3	PHYS-676	Quantum Mechanics II *	3
	Total Credits	9		Total Credits	9

Second Year Fall Semester			Second Year Spring Semester		
Course	Course Name	Cr	Course	Course Name	Cr
MTSC-8xx or PHYS-	Math or Physics Elective +	3	MTSC-8xx or PHYS-6xx/8xx	Math or Physics Elective +	3
MTSC-8xx or PHYS-	Math or Physics Elective +	3	MTSC-8xx or PHYS-6xx/8xx	Math or Physics Elective +	3
	Total Credits	6		Total Credits	6

Third Year Fall Semester			Third Year Spring Semester		
Course	Course Name	Cr	Course	Course Name	Cr
MTSC-890	Dissertation		MTSC-890	Dissertation	3/6
	Total Credits	3/6		Total Credits	3/6

NOTE: This information is on the next page after the 4th semester

**PROGRAM: PH.D. IN INTERDISCIPLINARY APPLIED
MATHEMATICS AND MATHEMATICAL PHYSICS
(MATHEMATICAL PHYSICS CONCENTRATION)**

(MATHEMATICAL PHYSICS CONCENTRATION) - Continued

Fourth Year Fall Semester			Fourth Year Spring Semester		
Course	Course Name	Cr	Course	Course Name	Cr
MTSC-890	Dissertation	3/6	MTSC-890	Dissertation	3/6
	Total Credits	3/6		Total Credits	3/6
			Total Credits: ≥ 39		

*Denotes a Core Requirement

+Denotes an elective

Total Core Credits = 12

Total Elective Credits = 18

Candidacy Requirement:

- Complete at least 30 credits of graduate-level course work beyond the master's degree
- A cumulative GPA of at least 3.0 on all graduate-level course work with no grade below a C
- Complete a MS degree
- Pass PhD Qualifying Exams
- Submission of a research plan along with candidacy application and qualifying exam results to Graduate Studies and Research
- Oral Defense of the Research Plan
- Capstone or Culminating Experience:
- Successful completion of at least 9 hours but not more than 18 hours of MTSC-890 dissertation
- Write and successfully defend the dissertation.

DOCTOR OF PHILOSOPHY IN OPTICS DEGREE

PROGRAM OBJECTIVES

The objectives of the Graduate Program in physics and optics aim at training future workforce and researchers in diverse fields of physics and optical sciences. Our educational activities are combined and integrated with our research focus, creating a stimulating and engaging environment for the students to achieve professional success and leadership status and opening opportunities to a highly demanding multidisciplinary market.

PROGRAM GOALS

The primary goals of the program are to: 1) prepare each graduate for success in professional careers in industry, research, government, or academia in the 21st century global society by providing them with necessary skills and knowledge in their area of study; 2) prepare each graduate to think critically to analyze and solve problems through research and/or course work; 3) produce graduates that have the broad-based knowledge and communication skills needed for success in the global society. The students will be educated and trained to be creative and productive scientists using state-of-the-art research and educational facilities. Each student will join a well-seasoned research group and focus his or her research activities in one or multiple areas of optics and its applications.

STUDENT LEARNING OUTCOMES

Students will learn advanced content needed to solve problems quantitatively using analytic and numerical methods to find their carriers in different organizations.

Students will engage in one or more research projects to learn laboratory techniques, research protocol, and appropriate behavior expected in a research environment by using instruments, computers and associated technologies.

Students will be able to integrate content knowledge and analytic thinking skills to collect, analyze and interpret a variety of problems and issues involving physical systems.

Students will be able to organize and conduct original investigations and reach scientifically appropriate conclusions.

Students will be capable of effectively communicating the results of their studies in a variety of formats, including written reports, poster presentations, and PowerPoint-like presentations to communicate orally with peers as colleagues in the scientific community using appropriate language skills and professional vocabulary.

Students will be able to use their knowledge to analyze and reflect on technical problems and issues that span more than a single discipline, including problems that have broad social and economic impact.

ADMISSION DEADLINES AND DEGREE REQUIREMENTS

Application Deadlines:

Fall – June 30

International Admission Deadlines:

Fall – May 1

All applicants are required to provide and/or meet:

- Earned Baccalaureate degree in physics or a related field.
- A sound background in intermediate level in mechanics, electricity and magnetism, and mathematical methods of physics. Any student found deficient in any of these areas may be required to take appropriate courses to remove that deficiency.

Recommendation will be made for the student to enter the M.S. program after evaluation of the candidate's documents.

- Official scores on the Graduate Record Examination (GRE).
- Completed application for admission.
- Official transcript(s).
- Two letters of recommendation completed by persons acquainted with their ability for graduate study.
- A Statement of Intent to include why research in Optics.
- All additional requirements if the applicant is international.

The Committee of the Graduate Program of the Department of Physics and Engineering will review the application materials of each applicant and make recommendation for acceptance into the Graduate Program to the Chair of the Department who, after his or her review, will send the Department recommendation to the Dean of the College of Agriculture, Science and Technology (CAST) and the Dean of Graduate Studies and Research, who extends the offer of admissions.

DEGREE REQUIREMENTS

Students in the Ph.D. degree program are required to complete 33 credits of core course work from the 600-level (or 500-level with consent from the Department). For electives, the student may take other 600-level courses offered by the Department of Physics & Engineering, or similar level courses offered by other departments in the College of Agriculture, Science & Technology with the consent of the Department. A master's student may also take 800-level optics courses with approval of the instructor and student's advisor.

Special Topics are noted below:

PHYS 691 Research I

PHYS 692 Research II

PHYS 810 Current Topics in Optics I

PHYS 811 Current Topics in Optics II

All students will be required to take and pass a Ph.D. qualifier exam upon completion of the necessary courses. All students must develop their research prospectus into a full research project either theoretical or experimental and documented in a thesis format which meets the standards established by CAST and Graduate Studies and Research.

The completed thesis will be submitted to the Thesis Advisory Committee for review and if deemed acceptable, an oral examination, consisting principally of a defense of the thesis, will be scheduled. After the thesis has been read and approved by the Thesis Advisory Committee, it must be submitted to the Dean of CAST and finally to the Dean, Graduate Studies and Research. The Thesis Advisory Committee is uniquely qualified to approve the thesis and its defense. If denied, the candidate will not be recommended for graduation. In this event, the student may be re-examined at a later period as determined by the Thesis Committee.

Required Core Course Work:

Students enrolled in the graduate program are required to complete a minimum of 30 required courses:

PHYS-600: Modern Optics
PHYS-671 and PHYS 672: Advanced Electromagnetic Theory I & II
PHYS 601: Nonlinear Optics
PHYS 563 and PHYS 667: Mathematical Methods of Physics III and IV
PHYS 605: Principles of Lasers & Optical Devices
PHYS 675 and PHYS 676: Quantum Mechanics I & II
PHYS 665: Statistical Mechanics

FACULTY

All faculty members in the graduate programs of physics and engineering have terminal degrees in physics or a related field, are dedicated to their respective fields of study and research, and have a diverse background. Specific areas of research interest include optical physics, spectroscopy, soft-matter physics and biophysics, space exploration, medical optics, photonics, imaging, and computational physics. Active research projects exist within these areas and offer graduate students many opportunities for active learning and discovery.

PROGRAM FACULTY

Dr. Hacene Boukari, Associate Professor – Chemical Physics
Dr. Gabriel Gwanmesia, Professor – Earth and Space Sciences
Dr. Mohamed A. Khan, Assistant Professor – Electrical Engineering
Dr. Qi Lu, Assistant Professor – Physics
Dr. Aristides Marcano, Research Professor – Non-Linear Optics
Dr. Yuri Markushin, Assistant Research Professor – Biophysics/Biopolymers
Dr. Gour Pati, Associate Professor – Physics
Dr. Thomas Planchon, Associate Professor – Physics
Dr. Mukti Rana, Associate Professor – Electrical Engineering
Dr. Jen Ren, Assistant Professor – Electrical Engineering
Dr. Debora Santamore, Associate Professor – Applied Physics
Dr. Renu Tripathi, Associate Professor – Physics
Dr. Essaid Zerrad, Professor – Physics
Dr. Sokratis Makrogiannis, Assistant Professor – Physics

PhD in OPTICS

COURSE NO.	CREDITS	COURSE TITLE
PHYS-600*	4	Modern Optics
PHYS-671*	3	Advanced Electromagnetic Theory I
PHYS-563*	3	Mathematical Methods of Physics III
PHYS-601*	4	Nonlinear Optics
PHYS-672*	3	Advanced Electromagnetic Theory II
PHYS-667*	3	Mathematical Methods of Physics IV
PHYS-605*	4	Principles of Lasers & Optical Devices
PHYS-675*	3	Quantum Mechanics I
PHYS-676*	3	Quantum Mechanics II
PHYS-803+	3	Modern Laser Spectroscopic Methods
PHYS-665*	3	Statistical Mechanics
PHYS-6XX or 8XX	3	Elective
PHYS-6XX or 8XX	3	Elective
PHYS-691	3	Research I
PHYS-692	3	Research II
PHYS-810	3	Special Topics in Optics I
PHYS-811	3	Special Topics in Optics II
PHYS-820	Up to 9	Dissertation Research
PHYS-890*	Up to 9	Dissertation
TOTAL CREDIT HOURS : 72		

*Required Courses

+ Elective

COURSE DESCRIPTIONS

PHYSICS (PHYS)

PHYS-501. ELECTRICITY AND MAGNETISM I

An introductory course in the theory and applications of electricity and magnetism. Basic integral calculus is used throughout. Topics covered include electric fields and potentials, dc circuits, magnetic fields and magnetic materials. Credit, three hours. **3:3:0**

PHYS-502. ELECTRICITY AND MAGNETISM II

An introductory course in the theory and applications of electricity and magnetism. Basic integral calculus is used throughout. Topics covered include electric fields and potentials, dc circuits, magnetic fields, and magnetic materials. Credit, three hours. **3:3:0**

PHYS-505. MATHEMATICAL METHODS OF PHYSICS I

An introductory course in the applications of mathematics to the description of physical systems. Specific physical situations from the areas of mechanics, electricity and magnetism, optics, and thermodynamics are analyzed using the techniques of differential and integral calculus and vector analysis. Credit, three hours. **3:3:0**

PHYS-506. MATHEMATICAL METHODS OF PHYSICS II

An introductory course in the applications of mathematics to the description of physical systems. Specific physical situations from the areas of mechanics, electricity and magnetism, optics, and thermodynamics are analyzed using the techniques of differential and integral calculus and vector analysis. Credit, three hours. **3:3:0**

PHYS-511. MECHANICS I

Problems in statics, kinematics and dynamics; the study of equilibrium of forces, rectilinear and curvilinear motion, central forces, constrained motion, energy and momentum methods and rotational motion. Credit, three hours. **3:3:0**

PHYS-5EDUC. MECHANICS II

Problems in statics, kinematics and dynamics; the study of equilibrium of forces, rectilinear and curvilinear motion, central forces, constrained motion, energy and momentum methods and rotational motion. Credit, three hours. **3:3:0**

PHYS-516. LASER OPTICS

A study of geometric and physical optics with particular application to optical instruments and an introduction to lasers and holography. Credit, three hours. **3:3:0**

PHYS-523. MODERN PHYSICS

Important contributions to atomic and nuclear physics since 1900, including electrical discharges in gases, atomic spectra, Bohr's atom, Schrodinger's equation, natural radioactivity, and elementary relativity. Credit, three hours. **3:3:0**

PHYS-525. THERMAL AND KINETIC THEORY

Study of first and second laws of thermodynamics, general thermodynamic formulas with application to matter, kinetic theory of gases and Maxwell-Boltzmann statistics. Credit, three hours. **3:3:0**

PHYS-531. ENERGY SYSTEMS

Physical and chemical principles of energy conversion and their application to potential sources of power, fossil fuels, fission and fusion, fuel cells, photovoltaics, and photothermal systems. Credit, three hours. **3:3:0**

PHYS-535. METHODS OF EXPERIMENTAL PHYSICS I

Designed to acquaint students with the principles of basic experiments in all major branches of physics, stressing design of apparatus, procedures and analysis of projects involving mechanical, optical, electronic and thermal techniques, with microcomputers employed to collect and analyze experimental data. Credit, three hours. **3:3:0**

PHYS-536. METHODS OF EXPERIMENTAL PHYSICS II	3:3:0
Designed to acquaint students with the principles of basic experiments in all major branches of physics, stressing design of apparatus, procedures and analysis of projects involving mechanical, optical, electronic and thermal techniques, with microcomputers employed to collect and analyze experimental data. Credit, three hours.	
PHYS-563. MATHEMATICAL METHODS OF PHYSICS III	3:3:0
An intermediate course in applied mathematics. Topics covered include the solution of differential equations, vector calculus, Fourier series and Laplace transforms. Credit, three hours.	
PHYS-565. THERMAL PHYSICS	3:3:0
Statistical inference is used to deduce the fundamental principles of thermodynamics and kinetic theory. These principles are applied to ideal and real gases, solids, closed and open systems, and black body radiation. Credit, three hours.	
PHYS-567. INTERMEDIATE ELECTRICITY AND MAGNETISM I	3:3:0
A treatment of electrostatics, Dielectric Theory, magnetic phenomena, magnetic media, ac circuits and Maxwell's equations. Vector calculus is used throughout. Credit, three hours.	
PHYS-568. INTERMEDIATE ELECTRICITY AND MAGNETISM II	3:3:0
A treatment of electrostatics, Dielectric Theory, magnetic phenomena, magnetic media, ac circuits and Maxwell's equations. Vector calculus is used throughout. Credit, three hours.	
PHYS-574. SELECTED TOPICS FOR MIDDLE SCHOOL TEACHERS	3:3:0
A course that allows middle school teachers to pursue physics concepts as they relate to middle school science. Credit, three hours.	
PHYS-577. SELECTED TOPICS I	3:3:0
A course allowing practicing teachers to pursue independent study of a topic in physics and physical science at the graduate level. Credit, three hours.	
PHYS-578. SELECTED TOPICS II	3:3:0
A course allowing practicing teachers to pursue additional independent study of a topic in physics and physical science at the graduate level. Credit, three hours.	
PHYS-579. SELECTED TOPICS III	3:3:0
A course allowing practicing teachers to pursue additional independent study of a topic in physics and physical science at the graduate level. Credit, three hours.	
PHYS-600. MODERN OPTICS	4:4:0
Electromagnetic description of light and its interaction with matter. Topics include interference, coherence, diffraction, holography, dispersion, polarization, scattering, and confinement. Credit, four hours.	
PHYS-601. NONLINEAR OPTICS	4:4:0
Principles of nonlinear interaction of light and matter based on the semi-classical approximation. Definition of nonlinear induced polarization and nonlinear susceptibility. Basic model of the coherent interaction of light with a two-level system is included. Main nonlinear optical effects are studied: harmonic generation, optical parametric amplification, saturation effects, Kerr effect, coherent effects, stimulated light scattering including stimulated Raman scattering, self-focusing and self-defocusing effects, multi-photon ionization, multi-photon ionization, and other nonlinear optical effects. The course also discusses practical applications of the nonlinear optical phenomena and related technology. Prerequisites: PHYS-600. Credit, four hours.	
PHYS-602. BIOPHOTONICS I: PRINCIPLES OF LUMINESCENCE	4:4:0
A study of the physics behind light emitting molecules and their applications in biology. Credit, four hours.	

PHYS-603. BIOPHOTONICS II: INSTRUMENTATION	3:3:0
An overview of microscopes and other optical instruments used in the biomedical field. Credit, three hours.	
PHYS-604. APPLIED OPTICS IN BIOMEDICINE	3:3:0
A treatment of concepts of physics and optics applied to the medical field. Topics include DNA sequencing, in situ fluorescence, enzyme-based assays, glucose monitoring, HIV detection, and cancer diagnostics. Credit, three hours.	
PHYS-605. PRINCIPLES OF LASERS AND OPTICAL DEVICES	4:4:0
Treatment of basic principles of lasers and their applications. Topics to be covered include, fundamentals of quantum electronics, oscillator model, rate equations, stimulated transitions, population inversion, laser amplification, design of laser resonators, principles of q-switching, mode locking, injection locking and modern applications of lasers. Credit, four hours.	
PHYS-606. LABORATORY TECHNIQUES IN OPTICS AND SPECTROSCOPY	3:3:0
Modern spectroscopic methods. Human chromosomes, human leukocyte antigen (hla) haplotyping, enzyme-linked immune-assays (Elisa), diabetes testing and glucose monitoring, pregnancy testing, drug testing, HIV detection, and cancer diagnostics. Prerequisites: PHYS-602, PHYS-603. Credit, three hours.	
PHYS-607. INTRODUCTION TO LABVIEW	3:3:0
A hands-on approach to the national instruments labview programming language. Credit, three hours.	
PHYS-608. SELECTED TOPICS IN OPTICS AND SPECTROSCOPY I	3:3:0
Current research topics in optics and spectroscopy. Credit, three hours.	
PHYS-609. SELECTED TOPICS IN OPTICS AND SPECTROSCOPY II	3:3:0
Current research topics in optics and spectroscopy. Credit, three hours.	
PHYS-621. OPTICAL SYSTEM DESIGN	3:2:2
An advanced course in analysis and design of optical and photonic systems. The laboratory part of the course consists in learning and using optical design software for the assessment of optical system image quality. Credit, three hours. 2-hour lecture and 2-hour laboratory	
PHYS-633. SELECTED TOPICS IN SCIENCE EDUCATION	3:3:0
Current developments in physics education. Credit, three hours.	
PHYS-652. CLASSICAL MECHANICS	3:3:0
Lagrangian formulation, the Kepler problem, Rutherford scattering, rotating coordinate systems, rigid body motion, small oscillations, stability problems, and Hamiltonian formulation. Credit, three hours.	
PHYS-655. COMPUTATIONAL METHODS	3:3:0
Designed to familiarize students with the use of computers in pursuing theoretical research. Numerical analysis techniques and computational methods employed in the study of physical models will be studied. Credit, three hours.	
PHYS-661. SOLID STATE PHYSICS	3:3:0
An introductory study of the structure and physical properties of crystalline solids. Included are topics in crystal structure, lattice vibrations, thermal properties of solids, x-ray diffraction, free electron theory and energy based theory. Credit, three hours.	
PHYS-665. STATISTICAL MECHANICS	3:3:0
Laws of thermodynamics, Boltzmann and quantum statistical distributions, with applications to properties of gases, specific heats of solids, paramagnetism, black body radiation and Bose-Einstein condensation. Credit, three hours.	

PHYS-667. MATHEMATICAL METHODS OF PHYSICS IV	3:3:0
An advanced treatment of mathematical topics including operators, matrix mathematics, complex variables and eigenvalue problems. Credit, three hours.	
PHYS-671. ADVANCED ELECTROMAGNETIC THEORY I	3:3:0
Treatment of boundary value problems of electrostatics and magnetostatics, electromagnetic radiation, radiating systems, wave guides, resonating systems and multipole fields. Credit, three hours.	
PHYS-672. ADVANCED ELECTROMAGNETIC THEORY II	3:3:0
Treatment of boundary value problems of electrostatics and magnetostatics, electromagnetic radiation, radiating systems, wave guides, resonating systems and multipole fields. Credit, three hours.	
PHYS-675. QUANTUM MECHANICS I	3:3:0
A study of the Schroedinger wave equation, operators and matrices, perturbation theory, collision and scattering problems classification of atomic states, and introduction to field quantization. Credit, three hours.	
PHYS-676. QUANTUM MECHANICS II	3:3:0
Quantum Mechanics of molecules and solid state. Relativistic quantum mechanics. Field quantization. Quantum theory of light. Basics of quantum electrodynamics. Credit, three hours.	
PHYS-691. RESEARCH I	3:3:3
Independent student research or laboratory work in a specialized field of interest. Credit, three hours.	
PHYS-692. RESEARCH II	3:3:3
Independent student research or laboratory work in a specialized field of interest. Credit, three hours.	
PHYS-695. MASTER'S THESIS	6:6:6
A research problem in a selected physics topic resulting in a written thesis. Credit, one to six hours.	
PHYS-800. MODERN LASER SPECTROSCOPIC METHODS	3:3:0
Basics of laser spectroscopic techniques and instrumentation. Topics include: ultra violet and visible (uv-vi) absorption spectroscopy; Fourier transform infrared spectroscopy; Raman, fluorescence, and saturation spectroscopy; polarization, correlation, and ultra-fast spectroscopy. Prerequisites: PHYS-600, PHYS-601, PHYS-605. Credit, three hours.	
PHYS-801. QUANTUM THEORY OF LIGHT	3:3:0
Quantum mechanical description of light matter interaction. Presentation of basic quantum mechanics and quantum mechanical treatment of light and atoms. Prerequisites: Consent of the Instructor. Credit, three hours.	
PHYS-802. THEORY OF LIGHT SCATTERING	3:3:0
An advanced electricity and magnetism course focused on light interactions with small particles. Topics include Raleigh and Mie scattering, optical properties of nanoparticles and surface plasmon resonance. Credit, three hours.	
PHYS-803. MODERN LASER SPECTROSCOPIC METHODS	3:3:0
The laser revolution in spectroscopy. Absorption within the Doppler line, Doppler-free broadening spectroscopy, saturation spectroscopy, multiphoton spectroscopy, laser fluorescence, laser Raman, coherent stokes and antistokes Raman spectroscopy, photon echo and coherent spectroscopy. Ultrafast spectroscopy. Modern trends in spectroscopy. Credit, three hours.	
PHYS-804. PRINCIPLES OF PHOTOCHEMISTRY AND PHOTOBIOLOGY	3:3:0
Review of the main phenomena related to the interaction of light with matter that results in chemical or biological activity. The study of inorganic and organic photochemistry, environmental aspects of photochemistry, atmospheric photochemistry, photosynthesis, visual processing, bio-luminescence, interaction of light with bio-organisms, photo-medicine, and phototherapy. Credit, three hours.	

PHYS-805. PHOTOACOUSTIC AND THERMAL SPECTROSCOPY	3:3:0
Fundamentals of photo-acoustic and photo-thermal interaction of light with optical samples. Examination of basic instrumentations and their applications for characterization of complex samples including biological samples. Credit, three hours.	
PHYS-806. MOLECULAR BIOPHYSICS	3:3:0
An overview of the physics of bio-molecular interactions. Topics will include physical models for DNA and protein systems. Credit, three hours.	
PHYS-807. OPTICAL SOLITONS	3:3:0
Basic concepts of the mathematical aspects of optical solitons. Presentation of optical waveguides, the nonlinear Schrodinger's equation, laws of nonlinearity, soliton perturbation, soliton-soliton interactions, Stochastic perturbation of optical solitons, optical couplers, optical switching, magneto-optic waveguides and optical bullets. Prerequisites: PHYS- 601, MTSC-853, MTSC-845. Credit, three hours.	
PHYS-808. FIBER OPTICS AND FIBEROPTICS COMMUNICATION	3:3:0
Light propagation in fiber, its dispersion and nonlinear characteristics that play an important role in light communication. Types of fiber-optic devices and their applications to communication. Wavelength division multiplexing. Credit, three hours.	
PHYS-809. PHOTONICS AND INFORMATION PROCESSING	3:3:0
Wave propagation in linear optical systems and optical information processing. Topics include: fundamentals of optical propagation, diffraction, optical imaging, Fourier transform, wave-front modulation, signal processing, and basics of optical processing devices. Credit, three hours.	
PHYS-810. CURRENT TOPICS IN OPTICS I	3:3:0
Current topics in optics and spectroscopy. Credit, three hours.	
PHYS-811. CURRENT TOPICS IN OPTICS II	3:3:0
Current topics in optics and spectroscopy. Credit, three hours.	
PHYS-820. DISSERTATION RESEARCH	9:9:9
The course is for Ph.D. students in the optics program working on their dissertation research project. Credit, two to eight hours.	
PHYS-890. DISSERTATION	9:9:0
Written work that describes the main research results obtained during the completion of the graduate program. The format must comply with the requirements of the College for thesis and dissertations. Credit, three to nine hours.	
PHYS-999. DOCTORAL SUSTAINING	0:0:0
Public oral defense of the thesis that includes presentation of the main research results obtained during the completion of the graduate program. It takes place after evaluation of the written dissertation by the members of the corresponding academic committee. Credit, none	

PROGRAM: IN OPTICS
PHD

Year 1 / Semester 1			Year 1 / Semester 2		
Course	Course Name	Cr	Course	Course Name	Cr
PHYS-600*	Modern Optics	4	PHYS-601*	Nonlinear Optics	4
PHYS-671*	Advanced Electromagnetic Theory I	3	PHYS-672*	Advanced Electromagnetic Theory II	3
PHYS-663*	Mathematical Methods in Physics III	3	PHYS-667*	Mathematical Methods of Physics IV	3
Total Credits		10	Total Credits		10

Year 2 / Semester 3			Year 2 / Semester 4		
Course	Course Name	Cr	Course	Course Name	Cr
PHYS-605*	Principles of Lasers & Optical Devices	4	PHYS-676*	Quantum Mechanics II	3
PHYS-675*	Quantum Mechanics I	3	PHYS-803+	Modern Laser Spectroscopic Methods	3
PHYS 665*	Statistical Mechanics	3			
Total Credits		10	Total Credits		6

Year 3 / Semester 5			Year 3 / Semester 6		
Course	Course Name	Cr	Course	Course Name	Cr
PHYS 691^	Special Topics/Research I	3	PHYS 692^	Special Topics/Research II	3
PHYS 6xxx/8xxx+	Technical Elective	3	PHYS 6xxx/8xxx+	Technical Elective	3
Total Credits		6	Total Credits		6

Year 4 / Semester 7			Year 4 / Semester 8		
Course	Course Name	Cr	Course	Course Name	Cr
PHYS 810^	Current Topics in Optics I	3	PHYS 811^	Current Topics in Optics II	3
PHYS 820	Dissertation Research	3	PHYS 820	Dissertation Research	3
Total Credits		6	Total Credits		6

Year 5 / Semester 9			Year 5 / Semester 10		
Course	Course Name	Cr	Course	Course Name	Cr
PHYS 820 or PHYS 890	Dissertation Research	6	PHYS 820 or PHYS 890	Dissertation Research	6
Total Credits		6	Total Credits		6

Total Credits: 72

- *Denotes a Core Course
- +Denotes an elective
- ^Denotes a Special Topic
- Total Core Credits = 33 (Core Courses) + 12 (Special Topics) + 18 (Dissertation)
- Total Elective Credits = 9
- Candidacy Requirement: Ph.D. Qualifier, Submission of Candidacy Application and Research Plan to SGSR
- Capstone or Culminating Experience: Doctoral Dissertation

MASTER OF SCIENCE IN APPLIED OPTICS

PROGRAM OBJECTIVES

The objectives of the Graduate Program in physics and optics aim at training future workforce and researchers in diverse fields of physics and optical sciences. Our educational activities are combined and integrated with our research focus, creating a stimulating and engaging environment for the students to achieve professional success and leadership status and opening opportunities to a highly demanding multidisciplinary market.

PROGRAM GOALS

The primary goals of the program are to: 1) prepare each graduate for success in professional careers in industry, research, government, or academia in the 21st century global society by providing them with necessary skills and knowledge in their area of study; 2) prepare each graduate to think critically to analyze and solve problems through research and/or course work; 3) produce graduates that have the broad-based knowledge and communication skills needed for success in the global society. The students will be educated and trained to be creative and productive scientists using state-of-the-art research and educational facilities. Each student will join a well-seasoned research group and focus his or her research activities in one or multiple areas of optical physics and its applications, including fundamental spectroscopy, medical imaging, space exploration, and environmental science.

STUDENT LEARNING OUTCOMES

Students will learn advanced content needed to solve problems quantitatively using analytic and numerical methods to find their carriers in different organizations.

Students will engage in one or more research projects to learn laboratory techniques, research protocol, and appropriate behavior expected in a research environment by using instruments, computers and associated technologies.

Students will be able to integrate content knowledge and analytic thinking skills to collect, analyze and interpret a variety of problems and issues involving physical systems.

Students will be able to organize and conduct original investigations and reach scientifically appropriate conclusions.

Students will be capable of effectively communicating the results of their studies in a variety of formats, including written reports, poster presentations, and PowerPoint-like presentations to communicate orally with peers as colleagues in the scientific community using appropriate language skills and professional vocabulary.

Students will be able to use their knowledge to analyze and reflect on technical problems and issues that span more than a single discipline, including problems that have broad social and economic impact.

ADMISSION DEADLINES AND DEGREE REQUIREMENTS

Application Deadlines:

Fall – June 30

International Admission Deadlines:

Fall – May 1

All applicants are required to provide and/or meet:

- Earned Baccalaureate degree in physics or a related field.
- A sound background in intermediate level in mechanics, electricity and magnetism, thermal physics, and mathematical methods of physics. Any student found deficient in any of these areas may be required to take appropriate courses to remove that deficiency.

Recommendation will be made for the student to enter the M.S. program, after evaluation of the candidate's documents.

- Official scores on the Graduate Record Examination (GRE).
- Completed application for admission.
- Official transcript(s).
- Two letters of recommendation completed by persons acquainted with their ability for graduate study.
- A cover letter.
- A Statement of Intent.
- All additional requirements if the applicant is international.

The Committee of the Graduate Program of the Department of Physics and Engineering will review the application materials of each applicant and make recommendation for acceptance into the Graduate Program to the Chair of the Department who, after his or her review, will send the Department recommendation to the Dean of the College of Agriculture, Science and Technology (CAST) and the Dean of Graduate Studies and Research. The Dean of Graduate Studies and Research makes the final decision.

DEGREE REQUIREMENTS

M.S. Thesis and Non-Thesis Options:

The student has an option of earning the Master of Science degree in Physics on either a thesis or non-thesis option. If the non-thesis track is selected, the student must complete 30 credits of graduate course work of which 24 must be above the 600-level (or 500-level with consent from the Department). In the thesis option, the student must complete a minimum of 24 credits of graduate course work (all above the 600-level or 500-level with Department approval), at least 6 credits of thesis research, and submit and defend a written thesis. For both the thesis and non-thesis options, only a maximum of 6 credit hours of graduate credit may be granted for physics courses in the 500 level, or other graduate-level courses in the sciences with the approval of the Department Chair. A grade of "B" or better must be attained in each of the physics core courses taken, and a student must achieve a 3.0 overall GPA on a scale of 4.0 to receive a degree.

Students in the Master of Science are required to complete 21 credits of core course work from the 600-level. For electives, the student may take other 500 or 600 level courses offered by the Department of

Physics & Engineering, or similar level courses offered by other departments in the College of Agriculture, Science & Technology with the consent of the Department. A master's student may also take 800-level optics courses with approval of the Instructor and student's Advisor.

Foundation Courses are noted below:

Mathematical Methods of Physics
Advanced Electromagnetic Theory
Optics and Spectroscopy
Quantum Mechanics

M.S. Thesis Option:

Students selecting the thesis option are required to complete at least 30 credit hours of graduate-level course work which includes 6 credits of thesis work. All students selecting the thesis option must develop their research prospectus into a full research project either theoretical or experimental and documented in a thesis format which meets the standards established by CAST and Graduate Studies and Research. The completed thesis will be submitted to the Thesis Committee for review and if deemed acceptable, an oral examination, consisting principally of a defense of the thesis, will be scheduled. After the thesis has been read and approved by the Thesis Committee, it must be submitted to the Dean of CAST and finally to the Dean, Graduate Studies and Research. The Thesis Committee is uniquely qualified to approve the thesis and its defense. If denied, the candidate will not be recommended for graduation. In this event, the student may be re-examined at a later period as determined by the Thesis Committee.

M.S. Non-Thesis Option:

Students selecting a non-thesis option are required to complete at least 30 credit hours of graduate-level course work. Candidacy requirement requires successful completion of a directed project under PHYS 691.

Required Course Work:

Students enrolled in the Graduate Program are required to complete a minimum of 30:

Required courses are:

PHYS-600 – Modern Optics
PHYS-671 and PHYS 672: Advanced Electromagnetic Theory I & II
PHYS 601: Nonlinear Optics
PHYS 563 and PHYS 667: Mathematical Methods of Physics III and IV
PHYS 605: Principles of Lasers & Optical Devices
PHYS 675: Quantum Mechanics I

Transfer Credits: A maximum of 9 graduate credits may be transferred into the program from another accredited institution of higher learning provided that the following conditions apply: the course curriculum must have covered material equivalent to that of the substituted course within the program, the student must have earned a minimum grade of "B" for the course, the credit cannot have been used toward a prior degree, and the course must be approved by the Committee of the Graduate Program of the Department.

FACULTY

All faculty members in the graduate programs of physics and engineering have terminal degrees in physics or a related field, are dedicated to their respective fields of study and research, and have a

diverse background. Specific areas of research interest include optical physics, spectroscopy, soft-matter physics and biophysics, space exploration, medical optics, photonics, imaging, and computational physics. Active research projects exist within these areas and offer graduate students many opportunities for active learning and discovery.

PROGRAM FACULTY

Dr. Hacene Boukari, Associate Professor – Chemical Physics
Dr. Gabriel Gwanmesia, Professor – Earth and Space Sciences
Dr. Mohamed A. Khan, Assistant Professor – Electrical Engineering
Dr. Qi Lu, Assistant Professor – Physics
Dr. Aristides Marcano, Research Professor – Non-Linear Optics
Dr. Yuri Markushin, Assistant Research Professor – Biophysics/Biopolymers
Dr. Gour Pati, Associate Professor – Physics
Dr. Thomas Planchon, Associate Professor – Physics
Dr. Mukti Rana, Associate Professor – Electrical Engineering
Dr. Jen Ren, Assistant Professor – Electrical Engineering
Dr. Debora Santamore, Associate Professor – Applied Physics
Dr. Renu Tripathi, Associate Professor – Physics
Dr. Essaid Zerrad, Professor – Physics
Dr. Sokratis Makrogiannis, Assistant Professor – Physics

MASTER OF SCIENCE IN APPLIED OPTICS (Thesis Option)

COURSE NO.	CREDITS	COURSE TITLE
PHYS-600	4	Modern Optics
PHYS-671	3	Advanced Electromagnetic Theory I
PHYS-563	3	Mathematical Methods of Physics III
PHYS-601	4	Nonlinear Optics
PHYS-672	3	Advanced Electromagnetic Theory II
PHYS-667	3	Mathematical Methods of Physics IV
PHYS-605	4	Principles of Lasers & Optical Devices
PHYS-675	3	Quantum Mechanics I
PHYS-803	3	Modern Laser Spectroscopic Methods
PHYS-695	3	Thesis Research
TOTAL CREDIT HOURS : 33		

MASTER OF SCIENCE IN APPLIED OPTICS (Non-Thesis Option)

COURSE NO.	CREDITS	COURSE TITLE
PHYS-600	4	Modern Optics
PHYS-671	3	Advanced Electromagnetic Theory I
PHYS-563	3	Mathematical Methods of Physics III
PHYS-601	4	Nonlinear Optics
PHYS-672	3	Advanced Electromagnetic Theory II
PHYS-667	3	Mathematical Methods of Physics IV
PHYS-605	4	Principles of Lasers & Optical Devices
PHYS-675	3	Quantum Mechanics I
PHYS-803	3	Modern Laser Spectroscopic Methods
PHYS-691	3	Special Topics/Research
TOTAL CREDIT HOURS : 33		

COURSE DESCRIPTIONS

PHYSICS (PHYS)

PHYS-501. ELECTRICITY AND MAGNETISM I 3:3:0

An introductory course in the theory and applications of electricity and magnetism. Basic integral calculus is used throughout. Topics covered include electric fields and potentials, dc circuits, magnetic fields and magnetic materials. Credit, three hours.

PHYS-502. ELECTRICITY AND MAGNETISM II 3:3:0

An introductory course in the theory and applications of electricity and magnetism. Basic integral calculus is used throughout. Topics covered include electric fields and potentials, dc circuits, magnetic fields, and magnetic materials. Credit, three hours.

PHYS-505. MATHEMATICAL METHODS OF PHYSICS I 3:3:0

An introductory course in the applications of mathematics to the description of physical systems. Specific physical situations from the areas of mechanics, electricity and magnetism, optics, and thermodynamics are analyzed using the techniques of differential and integral calculus and vector analysis. Credit, three hours.

PHYS-506. MATHEMATICAL METHODS OF PHYSICS II 3:3:0

An introductory course in the applications of mathematics to the description of physical systems. Specific physical situations from the areas of mechanics, electricity and magnetism, optics, and thermodynamics are analyzed using the techniques of differential and integral calculus and vector analysis. Credit, three hours.

PHYS-511. MECHANICS I 3:3:0

Problems in statics, kinematics and dynamics; the study of equilibrium of forces, rectilinear and curvilinear motion, central forces, constrained motion, energy and momentum methods and rotational motion. Credit, three hours.

PHYS-5EDUC. MECHANICS II 3:3:0

Problems in statics, kinematics and dynamics; the study of equilibrium of forces, rectilinear and curvilinear motion, central forces, constrained motion, energy and momentum methods and rotational motion. Credit, three hours.

PHYS-516. LASER OPTICS 3:3:0

A study of geometric and physical optics with particular application to optical instruments and an introduction to lasers and holography. Credit, three hours.

PHYS-523. MODERN PHYSICS 3:3:0

Important contributions to atomic and nuclear physics since 1900, including electrical discharges in gases, atomic spectra, Bohr's atom, Schrodinger's equation, natural radioactivity, and elementary relativity. Credit, three hours.

PHYS-525. THERMAL AND KINETIC THEORY 3:3:0

Study of first and second laws of thermodynamics, general thermodynamic formulas with application to matter, kinetic theory of gases and Maxwell-Boltzmann statistics. Credit, three hours.

PHYS-531. ENERGY SYSTEMS 3:3:0

Physical and chemical principles of energy conversion and their application to potential sources of power, fossil fuels, fission and fusion, fuel cells, photovoltaics, and photothermal systems. Credit, three hours.

PHYS-535. METHODS OF EXPERIMENTAL PHYSICS I 3:3:0

Designed to acquaint students with the principles of basic experiments in all major branches of physics, stressing design of apparatus, procedures and analysis of projects involving mechanical, optical, electronic and thermal techniques, with microcomputers employed to collect and analyze experimental data. Credit, three hours.

PHYS-536. METHODS OF EXPERIMENTAL PHYSICS II 3:3:0

Designed to acquaint students with the principles of basic experiments in all major branches of physics, stressing design of apparatus, procedures and analysis of projects involving mechanical, optical, electronic and thermal techniques, with microcomputers employed to collect and analyze experimental data. Credit, three hours.

- PHYS-563. MATHEMATICAL METHODS OF PHYSICS III** 3:3:0
An intermediate course in applied mathematics. Topics covered include the solution of differential equations, vector calculus, Fourier series and Laplace transforms. Credit, three hours.
- PHYS-565. THERMAL PHYSICS** 3:3:0
Statistical inference is used to deduce the fundamental principles of thermodynamics and kinetic theory. These principles are applied to ideal and real gases, solids, closed and open systems, and black body radiation. Credit, three hours.
- PHYS-567. INTERMEDIATE ELECTRICITY AND MAGNETISM I** 3:3:0
A treatment of electrostatics, Dielectric Theory, magnetic phenomena, magnetic media, ac circuits and Maxwell's equations. Vector calculus is used throughout. Credit, three hours.
- PHYS-568. INTERMEDIATE ELECTRICITY AND MAGNETISM II** 3:3:0
A treatment of electrostatics, Dielectric Theory, magnetic phenomena, magnetic media, ac circuits and Maxwell's equations. Vector calculus is used throughout. Credit, three hours.
- PHYS-574. SELECTED TOPICS FOR MIDDLE SCHOOL TEACHERS** 3:3:0
A course that allows middle school teachers to pursue physics concepts as they relate to middle school science. Credit, three hours.
- PHYS-577. SELECTED TOPICS I** 3:3:0
A course allowing practicing teachers to pursue independent study of a topic in physics and physical science at the graduate level. Credit, three hours.
- PHYS-578. SELECTED TOPICS II** 3:3:0
A course allowing practicing teachers to pursue additional independent study of a topic in physics and physical science at the graduate level. Credit, three hours.
- PHYS-579. SELECTED TOPICS III** 3:3:0
A course allowing practicing teachers to pursue additional independent study of a topic in physics and physical science at the graduate level. Credit, three hours.
- PHYS-600. MODERN OPTICS** 4:4:0
Electromagnetic description of light and its interaction with matter. Topics include interference, coherence, diffraction, holography, dispersion, polarization, scattering, and confinement. Credit, four hours.
- PHYS-601. NONLINEAR OPTICS** 4:4:0
Principles of nonlinear interaction of light and matter based on the semi-classical approximation. Definition of nonlinear induced polarization and nonlinear susceptibility. Basic model of the coherent interaction of light with a two-level system is included. Main nonlinear optical effects are studied: harmonic generation, optical parametric amplification, saturation effects, Kerr effect, coherent effects, stimulated light scattering including stimulated Raman scattering, self-focusing and self-defocusing effects, multi-photon ionization, multi-photon ionization, and other nonlinear optical effects. The course also discusses practical applications of the nonlinear optical phenomena and related technology. Prerequisites: PHYS-600. Credit, four hours.
- PHYS-602. BIOPHOTONICS I: PRINCIPLES OF LUMINESCENCE** 4:4:0
A study of the physics behind light emitting molecules and their applications in biology. Credit, four hours.
- PHYS-603. BIOPHOTONICS II: INSTRUMENTATION** 3:3:0
An overview of microscopes and other optical instruments used in the biomedical field. Credit, three hours.
- PHYS-604. APPLIED OPTICS IN BIOMEDICINE** 3:3:0
A treatment of concepts of physics and optics applied to the medical field. Topics include DNA sequencing, in situ fluorescence, enzyme-based assays, glucose monitoring, HIV detection, and cancer diagnostics. Credit, three hours.

- PHYS-605. PRINCIPLES OF LASERS AND OPTICAL DEVICES** 4:4:0
Treatment of basic principles of lasers and their applications. Topics to be covered include, fundamentals of quantum electronics, oscillator model, rate equations, stimulated transitions, population inversion, laser amplification, design of laser resonators, principles of q-switching, mode locking, injection locking and modern applications of lasers. Credit, four hours.
- PHYS-606. LABORATORY TECHNIQUES IN OPTICS AND SPECTROSCOPY** 3:3:0
Modern spectroscopic methods. Human chromosomes, human leukocyte antigen (hla) haplotyping, enzyme-linked immune-assays (Elisa), diabetes testing and glucose monitoring, pregnancy testing, drug testing, HIV detection, and cancer diagnostics. Prerequisites: PHYS-602, PHYS-603. Credit, three hours.
- PHYS-607. INTRODUCTION TO LABVIEW** 3:3:0
A hands-on approach to the national instruments labview programming language. Credit, three hours.
- PHYS-608. SELECTED TOPICS IN OPTICS AND SPECTROSCOPY I** 3:3:0
Current research topics in optics and spectroscopy. Credit, three hours.
- PHYS-609. SELECTED TOPICS IN OPTICS AND SPECTROSCOPY II** 3:3:0
Current research topics in optics and spectroscopy. Credit, three hours.
- PHYS-621. OPTICAL SYSTEM DESIGN** 3:2:2
An advanced course in analysis and design of optical and photonic systems. The laboratory part of the course consists in learning and using optical design software for the assessment of optical system image quality. Credit, three hours. 2 hour lecture and 2 hour laboratory
- PHYS-633. SELECTED TOPICS IN SCIENCE EDUCATION** 3:3:0
Current developments in physics education. Credit, three hours.
- PHYS-652. CLASSICAL MECHANICS** 3:3:0
Lagrangian formulation, the Kepler problem, Rutherford scattering, rotating coordinate systems, rigid body motion, small oscillations, stability problems, and Hamiltonian formulation. Credit, three hours.
- PHYS-655. COMPUTATIONAL METHODS** 3:3:0
Designed to familiarize students with the use of computers in pursuing theoretical research. Numerical analysis techniques and computational methods employed in the study of physical models will be studied. Credit, three hours.
- PHYS-661. SOLID STATE PHYSICS** 3:3:0
An introductory study of the structure and physical properties of crystalline solids. Included are topics in crystal structure, lattice vibrations, thermal properties of solids, x-ray diffraction, free electron theory and energy based theory. Credit, three hours.
- PHYS-665. STATISTICAL MECHANICS** 3:3:0
Laws of thermodynamics, Boltzmann and quantum statistical distributions, with applications to properties of gases, specific heats of solids, paramagnetism, black body radiation and Bose-Einstein condensation. Credit, three hours.
- PHYS-667. MATHEMATICAL METHODS OF PHYSICS IV** 3:3:0
An advanced treatment of mathematical topics including operators, matrix mathematics, complex variables and eigenvalue problems. Credit, three hours.
- PHYS-671. ADVANCED ELECTROMAGNETIC THEORY I** 3:3:0
Treatment of boundary value problems of electrostatics and magnetostatics, electromagnetic radiation, radiating systems, wave guides, resonating systems and multipole fields. Credit, three hours.

- PHYS-672. ADVANCED ELECTROMAGNETIC THEORY II** 3:3:0
Treatment of boundary value problems of electrostatics and magnetostatics, electromagnetic radiation, radiating systems, wave guides, resonating systems and multipole fields. Credit, three hours.
- PHYS-675. QUANTUM MECHANICS I** 3:3:0
A study of the Schroedinger wave equation, operators and matrices, perturbation theory, collision and scattering problems classification of atomic states, and introduction to field quantization. Credit, three hours.
- PHYS-676. QUANTUM MECHANICS II** 3:3:0
Quantum Mechanics of molecules and solid state. Relativistic quantum mechanics. Field quantization. Quantum theory of light. Basics of quantum electrodynamics. Credit, three hours.
- PHYS-691. RESEARCH I** 3:3:3
Independent student research or laboratory work in a specialized field of interest. Credit, three hours.
- PHYS-692. RESEARCH II** 3:3:3
Independent student research or laboratory work in a specialized field of interest. Credit, three hours.
- PHYS-695. MASTER'S THESIS** 6:6:6
A research problem in a selected physics topic resulting in a written thesis. Credit, one to six hours.
- PHYS-800. MODERN LASER SPECTROSCOPIC METHODS** 3:3:0
Basics of laser spectroscopic techniques and instrumentation. Topics include: ultra violet and visible (uv-vi) absorption spectroscopy; Fourier transform infrared spectroscopy; Raman, fluorescence, and saturation spectroscopy; polarization, correlation, and ultra-fast spectroscopy. Prerequisites: PHYS-600, PHYS-601, PHYS-605. Credit, three hours.
- PHYS-801. QUANTUM THEORY OF LIGHT** 3:3:0
Quantum mechanical description of light matter interaction. Presentation of basic quantum mechanics and quantum mechanical treatment of light and atoms. Prerequisites: Consent of the Instructor. Credit, three hours.
- PHYS-802. THEORY OF LIGHT SCATTERING** 3:3:0
An advanced electricity and magnetism course focused on light interactions with small particles. Topics include Raleigh and Mie scattering, optical properties of nanoparticles and surface plasmon resonance. Credit, three hours.
- PHYS-803. MODERN LASER SPECTROSCOPIC METHODS** 3:3:0
The laser revolution in spectroscopy. Absorption within the Doppler line, Doppler-free broadening spectroscopy, saturation spectroscopy, multiphoton spectroscopy, laser fluorescence, laser Raman, coherent stokes and antistokes Raman spectroscopy, photon echo and coherent spectroscopy. Ultrafast spectroscopy. Modern trends in spectroscopy. Credit, three hours.
- PHYS-804. PRINCIPLES OF PHOTOCHEMISTRY AND PHOTOBIOLOGY** 3:3:0
Review of the main phenomena related to the interaction of light with matter that results in chemical or biological activity. The study of inorganic and organic photochemistry, environmental aspects of photochemistry, atmospheric photochemistry, photosynthesis, visual processing, bio-luminescence, interaction of light with bio-organisms, photo- medicine, and phototherapy. Credit, three hours.
- PHYS-805. PHOTOACOUSTIC AND THERMAL SPECTROSCOPY** 3:3:0
Fundamentals of photo-acoustic and photo-thermal interaction of light with optical samples. Examination of basic instrumentations and their applications for characterization of complex samples including biological samples. Credit, three hours.
- PHYS-806. MOLECULAR BIOPHYSICS** 3:3:0
An overview of the physics of bio-molecular interactions. Topics will include physical models for DNA and protein systems. Credit, three hours.

PHYS-807. OPTICAL SOLITONS	3:3:0
Basic concepts of the mathematical aspects of optical solitons. Presentation of optical waveguides, the nonlinear Schrodinger's equation, laws of nonlinearity, soliton perturbation, soliton-soliton interactions, Stochastic perturbation of optical solitons, optical couplers, optical switching, magneto-optic waveguides and optical bullets. Prerequisites: PHYS-601, MTSC-853, MTSC-845. Credit, three hours.	
PHYS-808. FIBER OPTICS AND FIBEROPTICS COMMUNICATION	3:3:0
Light propagation in fiber, its dispersion and nonlinear characteristics that play an important role in light communication. Types of fiber-optic devices and their applications to communication. Wavelength division multiplexing. Credit, three hours.	
PHYS-809. PHOTONICS AND INFORMATION PROCESSING	3:3:0
Wave propagation in linear optical systems and optical information processing. Topics include: fundamentals of optical propagation, diffraction, optical imaging, Fourier transform, wave-front modulation, signal processing, and basics of optical processing devices. Credit, three hours.	
PHYS-810. CURRENT TOPICS IN OPTICS I	3:3:0
Current topics in optics and spectroscopy. Credit, three hours.	
PHYS-811. CURRENT TOPICS IN OPTICS II	3:3:0
Current topics in optics and spectroscopy. Credit, three hours.	
PHYS-820. DISSERTATION RESEARCH	9:9:9
The course is for Ph.D. students in the optics program working on their dissertation research project. Credit, two to eight hours.	
PHYS-890. DISSERTATION	9:9:0
Written work that describes the main research results obtained during the completion of the graduate program. The format must comply with the requirements of the College for thesis and dissertations. Credit, three to nine hours.	
PHYS-999. DOCTORAL SUSTAINING	0:0:0
Public oral defense of the thesis that includes presentation of the main research results obtained during the completion of the graduate program. It takes place after evaluation of the written dissertation by the members of the corresponding academic committee. Credit, none	

MS IN APPLIED OPTICS –THESIS OPTION

Year 1 and Semester 1			Year 1 and Semester 2		
Course	Course Name	Cr	Course	Course Name	Cr
PHYS-600*	Modern Optics	4	PHYS-601*	Nonlinear Optics	4
PHYS-671*	Advanced Electromagnetic Theory I	3	PHYS-672*	Advanced Electromagnetic Theory II	3
PHYS-563*	Mathematical Methods in Physics III	3	PHYS-667*	Mathematical Methods of Physics IV	3
Total Credits		10	Total Credits		10

Year 2 and Semester 3			Year 2 and Semester 4		
Course	Course Name	Cr	Course	Course Name	Cr
PHYS-605*	Principles of Lasers & Optical Devices	4	PHYS-695*	Thesis Research	6
PHYS-675*	Quantum Mechanics I	3	PHYS-803*	Modern Laser Spectroscopic Methods	3
Total Credits		7	Total Credits		9

			Total Credits: 36		
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- *Denotes a Core Requirement
- +Denotes an elective
- Total Core Credits = 36
- Total Elective Credits = 0
- Candidacy Requirement: Complete 15 credits of course work with GPA ≥ 3.0 , submission of candidacy application with research proposal to Graduate Studies and Research.
- Capstone or Culminating Experience: Public Thesis presentation and oral defense of Research Thesis

MS IN APPLIED OPTICS – NON-THESIS OPTION

Year 1 and Semester 1			Year 1 and Semester 2		
Course	Course Name	Cr	Course	Course Name	Cr
PHYS-600*	Modern Optics	4	PHYS-601*	Nonlinear Optics	4
PHYS-671+	Advanced Electromagnetic Theory I	3	PHYS-672*	Advanced Electromagnetic Theory II	3
PHYS-563*	Mathematical Methods in Physics III	3	PHYS-667*	Mathematical Methods of Physics IV	3
		Total Credits			Total Credits
		10			10

Year 2 and Semester 3			Year 2 and Semester 4		
Course	Course Name	Cr	Course	Course Name	Cr
PHYS-605*	Principles of Lasers & Optical Devices	4	PHYS-691*	Special Topics/Research I (Directed Project)	3
PHYS-675*	Quantum Mechanics I	3	PHYS-803*	Modern Laser Spectroscopic Methods	3
		Total Credits			Total Credits
		7			6

			Total Credits: 33		
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- *Denotes a Core Requirement
- +Denotes an elective
- Total Core Credits = 33
- Total Elective Credits = 0
- **Candidacy Requirement:** Complete 15 credits of course work with GPA ≥ 3.0 , submission of candidacy application with research proposal to Graduate Studies and Research.
- **Capstone or Culminating Experience:** Presentation in PHYS691 class about directed project

MASTER OF SCIENCE IN PHYSICS

PROGRAM OBJECTIVES

The objectives of the M.S. degree in physics aim at training future workforce and researchers in the basic foundations of physics. Our educational activities are combined and integrated with our research focus, creating a stimulating and engaging environment for the students to achieve professional success and leadership status and opening opportunities to a highly demanding multidisciplinary market.

PROGRAM GOALS

The primary goals of the program are to: 1) prepare each graduate for success in professional careers in industry, research, government, or academia in the 21st century global society by providing them with necessary skills and knowledge in their area of study; 2) prepare each graduate to think critically to analyze and solve problems through research and/or course work; 3) produce graduates that have the broad-based knowledge and communication skills needed for success in the global society. The students will be educated and trained to be creative and productive scientists using state-of-the-art research and educational facilities. Each student will join a well-seasoned research group and focus his/her research activities in one or multiple areas of optical physics and its applications, including fundamental spectroscopy, medical imaging, space exploration, and environmental science.

STUDENT LEARNING OUTCOMES

Students will learn advanced content needed to solve problems quantitatively using analytic and numerical methods to find their carriers in different organizations.

Students will engage in one or more research projects to learn laboratory techniques, research protocol, and appropriate behavior expected in a research environment by using instruments, computers and associated technologies.

Students will be able to integrate content knowledge and analytic thinking skills to collect, analyze and interpret a variety of problems and issues involving physical systems.

Students will be able to organize and conduct original investigations and reach scientifically appropriate conclusions.

Students will be capable of effectively communicating the results of their studies in a variety of formats, including written reports, poster presentations, and PowerPoint-like presentations to communicate orally with peers as colleagues in the scientific community using appropriate language skills and professional vocabulary.

Students will be able to use their knowledge to analyze and reflect on technical problems and issues that span more than a single discipline, including problems that have broad social and economic impact.

ADMISSION DEADLINES AND DEGREE REQUIREMENTS

Application Deadlines:

Fall – April 15

International Admission Deadlines:

Fall – May 1

All applicants are required to provide and/or meet:

- Earned Baccalaureate degree in Physics or a related field.
- A sound background in intermediate level in mechanics, electricity and magnetism, thermal physics, and mathematical methods of physics. Any student found deficient in any of these areas may be required to take appropriate courses to remove that deficiency. Recommendation will be made for the student to enter the M.S. program, after evaluation of the candidate's documents.
- Official scores on the Graduate Record Examination (GRE).
- Completed application for admission.
- Official transcript(s).
- Two letters of recommendation completed by persons acquainted with their ability for graduate study.
- A cover letter.
- A Statement of Intent.
- All additional requirements if the applicant is international.

The Committee of the Graduate Program of the Department of Physics and Engineering will review the application materials of each applicant and make recommendation for acceptance into the Graduate Program to the Chair of the Department who, after his or her review, will send the Department recommendation to the Dean of CAST and the Dean of Graduate Studies and Research, who extends an offer of admission.

DEGREE REQUIREMENTS

MS Thesis and Non-Thesis Options -- The student has an option of earning the Master of Science degree in Physics on either a thesis or non-thesis option. If the non-thesis track is selected, the student must complete 30 credits of graduate course work of which 24 must be above the 600-level. In the thesis option, the student must complete a minimum of 24 credits of graduate course work (all above the 600-level or 500- level with Department approval), at least 6 credits of thesis research, and submit and defend a written thesis. For both the thesis and non-thesis options, only a maximum of 6 credit hours of graduate credit may be granted for physics courses in the 500 level, or other graduate-level courses in the sciences with the approval of the Department Chair. A grade of "B" or better must be attained in each of the physics core courses taken, and a student must achieve a 3.0 overall GPA on a scale of 4.0 to receive a degree.

Students in the Master of Science are required to complete 21 credits of core course work from the 600- level. For electives, the student may take other 500 or 600 level courses offered by the Department of Physics & Engineering, or similar level courses offered by other departments in CAST with the consent of the Department. A master's student may also take 800-level optics courses with approval of the Instructor and student's Advisor.

Foundation Courses are noted below:

Mathematical Methods of Physics
Advanced Electromagnetic Theory
Classical Mechanics
Quantum Mechanics
Statistical Mechanics

M.S. Thesis Option:

Students selecting the thesis option are required to complete at least 30 credit hours of graduate-level course work which includes 6 credits of thesis work. All students selecting the thesis option must develop their research prospectus into a full research project either theoretical or experimental and documented in a thesis format which meets the standards established by CAST and Graduate Studies and Research. The completed thesis will be submitted to the Thesis Committee for review and if deemed acceptable, an oral examination, consisting principally of a defense of the thesis, will be scheduled. After the thesis has been read and approved by the Thesis Committee, it must be submitted to the Dean of CAST and finally to the Dean, Graduate Studies and Research. The Thesis Committee is uniquely qualified to approve the thesis and its defense. If denied, the candidate will not be recommended for graduation. In this event, the student may be re-examined at a later period as determined by the Thesis Committee.

M.S. Non-Thesis Option:

Students selecting a non-thesis option are required to complete at least 30 credit hours of graduate-level course work. Candidacy requirement requires successful completion of a directed project under PHYS 691.

Required Course Work:

Students enrolled in the graduate program are required to complete a minimum of 30:

Required courses are:

PHYS-652 – Classical Mechanics
PHYS-671 and PHYS 672: Advanced Electromagnetic Theory I & II
PHYS 665: Statistical Mechanics
PHYS 563 and PHYS 667: Mathematical Methods of Physics III and IV
PHYS 675 & PHYS 676: Quantum Mechanics I and II

Transfer Credits: A maximum of 9 graduate credits may be transferred into the program from another accredited institution of higher learning provided that the following conditions apply:

The course curriculum must have covered material equivalent to that of the substituted course within the program, the student must have earned a minimum grade of "B" for the course, the credit cannot have been used toward a prior degree, and the course must be approved by the Committee of the Graduate Program of the Department.

FACULTY

All faculty members in the graduate programs of physics and engineering have terminal degrees in physics or a related field, are dedicated to their respective fields of study and research, and have a diverse background. Specific areas of research interest include optical physics, spectroscopy, soft-matter physics and biophysics, space exploration, medical optics, photonics, imaging, and computational physics. Active research projects exist within these areas and offer graduate students many opportunities for active learning and discovery.

PROGRAM FACULTY

Dr. Hacene Boukari, Associate Professor – Chemical Physics
Dr. Gabriel Gwanmesia, Professor – Earth and Space Sciences
Dr. Mohamed A. Khan, Assistant Professor – Electrical Engineering
Dr. Qi Lu, Assistant Professor – Physics
Dr. Aristides Marcano, Research Professor – Non-Linear Optics
Dr. Yuri Markushin, Assistant Research Professor – Biophysics/Biopolymers
Dr. Gour Pati, Associate Professor – Physics
Dr. Thomas Planchon, Associate Professor – Physics
Dr. Mukti Rana, Associate Professor – Electrical Engineering
Dr. Jen Ren, Assistant Professor – Electrical Engineering
Dr. Debora Santamore, Associate Professor – Applied Physics
Dr. Renu Tripathi, Associate Professor – Physics
Dr. Essaid Zerrad, Professor – Physics
Dr. Sokratis Makrogiannis, Assistant Professor – Physics

MASTER OF SCIENCE IN PHYSICS (Thesis Option)

COURSE NO.	CREDITS	COURSE TITLE
PHYS-652	3	Classical Mechanics
PHYS-671	3	Advanced Electromagnetic Theory I
PHYS-563	3	Mathematical Methods of Physics III
PHYS-665	3	Statistical Mechanics
PHYS-672	3	Advanced Electromagnetic Theory II
PHYS-667	3	Mathematical Methods of Physics IV
PHYS-675	3	Quantum Mechanics I
PHYS-676	3	Quantum Mechanics II
PHYS-695	6	Thesis Research
TOTAL CREDIT HOURS : 30		

MASTER OF SCIENCE IN PHYSICS (Non-Thesis Option)

COURSE NO.	CREDITS	COURSE TITLE
PHYS-652	3	Classical Mechanics
PHYS-671	3	Advanced Electromagnetic Theory I
PHYS-563	3	Mathematical Methods of Physics III
PHYS-665	3	Statistical Mechanics
PHYS-672	3	Advanced Electromagnetic Theory II
PHYS-667	3	Mathematical Methods of Physics IV
PHYS-6XX	3	Elective
PHYS-675	3	Quantum Mechanics I
PHYS-803	3	Quantum Mechanics II
PHYS-691	3	Special Topics/Research
TOTAL CREDIT HOURS : 30		

COURSE DESCRIPTIONS

PHYSICS (PHYS)

PHYS-501. ELECTRICITY AND MAGNETISM I 3:3:0

An introductory course in the theory and applications of electricity and magnetism. Basic integral calculus is used throughout. Topics covered include electric fields and potentials, dc circuits, magnetic fields and magnetic materials. Credit, three hours.

PHYS-502. ELECTRICITY AND MAGNETISM II 3:3:0

An introductory course in the theory and applications of electricity and magnetism. Basic integral calculus is used throughout. Topics covered include electric fields and potentials, dc circuits, magnetic fields, and magnetic materials. Credit, three hours.

PHYS-505. MATHEMATICAL METHODS OF PHYSICS I 3:3:0

An introductory course in the applications of mathematics to the description of physical systems. Specific physical situations from the areas of mechanics, electricity and magnetism, optics, and thermodynamics are analyzed using the techniques of differential and integral calculus and vector analysis. Credit, three hours.

PHYS-506. MATHEMATICAL METHODS OF PHYSICS II 3:3:0

An introductory course in the applications of mathematics to the description of physical systems. Specific physical situations from the areas of mechanics, electricity and magnetism, optics, and thermodynamics are analyzed using the techniques of differential and integral calculus and vector analysis. Credit, three hours.

PHYS-511. MECHANICS I 3:3:0

Problems in statics, kinematics and dynamics; the study of equilibrium of forces, rectilinear and curvilinear motion, central forces, constrained motion, energy and momentum methods and rotational motion. Credit, three hours.

PHYS-512. MECHANICS II 3:3:0

Problems in statics, kinematics and dynamics; the study of equilibrium of forces, rectilinear and curvilinear motion, central forces, constrained motion, energy and momentum methods and rotational motion. Credit, three hours.

PHYS-516. LASER OPTICS 3:3:0

A study of geometric and physical optics with particular application to optical instruments and an introduction to lasers and holography. Credit, three hours.

PHYS-523. MODERN PHYSICS 3:3:0

Important contributions to atomic and nuclear physics since 1900, including electrical discharges in gases, atomic spectra, Bohr's atom, Schrodinger's equation, natural radioactivity, and elementary relativity. Credit, three hours.

PHYS-525. THERMAL AND KINETIC THEORY 3:3:0

Study of first and second laws of thermodynamics, general thermodynamic formulas with application to matter, kinetic theory of gases and Maxwell-Boltzmann statistics. Credit, three hours.

PHYS-531. ENERGY SYSTEMS 3:3:0

Physical and chemical principles of energy conversion and their application to potential sources of power, fossil fuels, fission and fusion, fuel cells, photovoltaics, and photothermal systems. Credit, three hours.

PHYS-535. METHODS OF EXPERIMENTAL PHYSICS I 3:3:0

Designed to acquaint students with the principles of basic experiments in all major branches of physics, stressing design of apparatus, procedures and analysis of projects involving mechanical, optical, electronic and thermal techniques, with microcomputers employed to collect and analyze experimental data. Credit, three hours.

PHYS-536. METHODS OF EXPERIMENTAL PHYSICS II 3:3:0

Designed to acquaint students with the principles of basic experiments in all major branches of physics, stressing design of apparatus, procedures and analysis of projects involving mechanical, optical, electronic and thermal techniques, with microcomputers employed to collect and analyze experimental data. Credit, three hours.

PHYS-563. MATHEMATICAL METHODS OF PHYSICS III 3:3:0

An intermediate course in applied mathematics. Topics covered include the solution of differential equations, vector calculus, Fourier series and Laplace transforms. Credit, three hours.

PHYS-565. THERMAL PHYSICS 3:3:0

Statistical inference is used to deduce the fundamental principles of thermodynamics and kinetic theory. These principles are applied to ideal and real gases, solids, closed and open systems, and black body radiation. Credit, three hours.

PHYS-567. INTERMEDIATE ELECTRICITY AND MAGNETISM I 3:3:0

A treatment of electrostatics, Dielectric Theory, magnetic phenomena, magnetic media, ac circuits and Maxwell's equations. Vector calculus is used throughout. Credit, three hours.

PHYS-568. INTERMEDIATE ELECTRICITY AND MAGNETISM II 3:3:0

A treatment of electrostatics, Dielectric Theory, magnetic phenomena, magnetic media, ac circuits and Maxwell's equations. Vector calculus is used throughout. Credit, three hours.

PHYS-574. SELECTED TOPICS FOR MIDDLE SCHOOL TEACHERS 3:3:0

A course that allows middle school teachers to pursue physics concepts as they relate to middle school science. Credit, three hours.

PHYS-577. SELECTED TOPICS I 3:3:0

A course allowing practicing teachers to pursue independent study of a topic in physics and physical science at the graduate level. Credit, three hours.

PHYS-578. SELECTED TOPICS II 3:3:0

A course allowing practicing teachers to pursue additional independent study of a topic in physics and physical science at the graduate level. Credit, three hours.

PHYS-579. SELECTED TOPICS III 3:3:0

A course allowing practicing teachers to pursue additional independent study of a topic in physics and physical science at the graduate level. Credit, three hours.

PHYS-600. MODERN OPTICS 4:4:0

Electromagnetic description of light and its interaction with matter. Topics include interference, coherence, diffraction, holography, dispersion, polarization, scattering, and confinement. Credit, four hours.

PHYS-601. NONLINEAR OPTICS 4:4:0

Principles of nonlinear interaction of light and matter based on the semi-classical approximation. Definition of nonlinear induced polarization and nonlinear susceptibility. Basic model of the coherent interaction of light with a two-level system is included. Main nonlinear optical effects are studied: harmonic generation, optical parametric amplification, saturation effects, Kerr effect, coherent effects, stimulated light scattering including stimulated Raman scattering, self-focusing and self-defocusing effects, multi-photon ionization, multi-photon ionization, and other nonlinear optical effects. The course also discusses practical applications of the nonlinear optical phenomena and related technology. Prerequisites: PHYS-600. Credit, four hours.

PHYS-602. BIOPHOTONICS I: PRINCIPLES OF LUMINESCENCE 4:4:0

A study of the physics behind light emitting molecules and their applications in biology. Credit, four hours.

PHYS-603. BIOPHOTONICS II: INSTRUMENTATION 3:3:0

An overview of microscopes and other optical instruments used in the biomedical field. Credit, three hours.

- PHYS-604. APPLIED OPTICS IN BIOMEDICINE** 3:3:0
A treatment of concepts of physics and optics applied to the medical field. Topics include DNA sequencing, in situ fluorescence, enzyme-based assays, glucose monitoring, HIV detection, and cancer diagnostics. Credit, three hours.
- PHYS-605. PRINCIPLES OF LASERS AND OPTICAL DEVICES** 4:4:0
Treatment of basic principles of lasers and their applications. Topics to be covered include, fundamentals of quantum electronics, oscillator model, rate equations, stimulated transitions, population inversion, laser amplification, design of laser resonators, principles of q-switching, mode locking, injection locking and modern applications of lasers. Credit, four hours.
- PHYS-606. LABORATORY TECHNIQUES IN OPTICS AND SPECTROSCOPY** 3:3:0
Modern spectroscopic methods. Human chromosomes, human leukocyte antigen (hla) haplotyping, enzyme-linked immune-assays (Elisa), diabetes testing and glucose monitoring, pregnancy testing, drug testing, HIV detection, and cancer diagnostics. Prerequisites: PHYS-602, PHYS-603. Credit, three hours.
- PHYS-607. INTRODUCTION TO LABVIEW** 3:3:0
A hands-on approach to the national instruments labview programming language. Credit, three hours.
- PHYS-608. SELECTED TOPICS IN OPTICS AND SPECTROSCOPY I** 3:3:0
Current research topics in optics and spectroscopy. Credit, three hours.
- PHYS-609. SELECTED TOPICS IN OPTICS AND SPECTROSCOPY II** 3:3:0
Current research topics in optics and spectroscopy. Credit, three hours.
- PHYS-621. OPTICAL SYSTEM DESIGN** 3:2:2
An advanced course in analysis and design of optical and photonic systems. The laboratory part of the course consists in learning and using optical design software for the assessment of optical system image quality. Credit, three hours. 2 hour lecture and 2 hour laboratory
- PHYS-633. SELECTED TOPICS IN SCIENCE EDUCATION** 3:3:0
Current developments in physics education. Credit, three hours.
- PHYS-652. CLASSICAL MECHANICS** 3:3:0
Lagrangian formulation, the Kepler problem, Rutherford scattering, rotating coordinate systems, rigid body motion, small oscillations, stability problems, and Hamiltonian formulation. Credit, three hours.
- PHYS-655. COMPUTATIONAL METHODS** 3:3:0
Designed to familiarize students with the use of computers in pursuing theoretical research. Numerical analysis techniques and computational methods employed in the study of physical models will be studied. Credit, three hours.
- PHYS-661. SOLID STATE PHYSICS** 3:3:0
An introductory study of the structure and physical properties of crystalline solids. Included are topics in crystal structure, lattice vibrations, thermal properties of solids, x-ray diffraction, free electron theory and energy based theory. Credit, three hours.
- PHYS-665. STATISTICAL MECHANICS** 3:3:0
Laws of thermodynamics, Boltzmann and quantum statistical distributions, with applications to properties of gases, specific heats of solids, paramagnetism, black body radiation and Bose-Einstein condensation. Credit, three hours.
- PHYS-667. MATHEMATICAL METHODS OF PHYSICS IV** 3:3:0
An advanced treatment of mathematical topics including operators, matrix mathematics, complex variables and eigenvalue problems. Credit, three hours.

- PHYS-671. ADVANCED ELECTROMAGNETIC THEORY I** 3:3:0
Treatment of boundary value problems of electrostatics and magnetostatics, electromagnetic radiation, radiating systems, wave guides, resonating systems and multipole fields. Credit, three hours.
- PHYS-672. ADVANCED ELECTROMAGNETIC THEORY II** 3:3:0
Treatment of boundary value problems of electrostatics and magnetostatics, electromagnetic radiation, radiating systems, wave guides, resonating systems and multipole fields. Credit, three hours.
- PHYS-675. QUANTUM MECHANICS I** 3:3:0
A study of the Schroedinger wave equation, operators and matrices, perturbation theory, collision and scattering problems classification of atomic states, and introduction to field quantization. Credit, three hours.
- PHYS-676. QUANTUM MECHANICS II** 3:3:0
Quantum Mechanics of molecules and solid state. Relativistic quantum mechanics. Field quantization. Quantum theory of light. Basics of quantum electrodynamics. Credit, three hours.
- PHYS-691. RESEARCH I** 3:3:3
Independent student research or laboratory work in a specialized field of interest. Credit, three hours.
- PHYS-692. RESEARCH II** 3:3:3
Independent student research or laboratory work in a specialized field of interest. Credit, three hours.
- PHYS-695. MASTER'S THESIS** 6:6:6
A research problem in a selected physics topic resulting in a written thesis. Credit, one to six hours.
- PHYS-800. MODERN LASER SPECTROSCOPIC METHODS** 3:3:0
Basics of laser spectroscopic techniques and instrumentation. Topics include: ultra violet and visible (uv-vi) absorption spectroscopy; Fourier transform infrared spectroscopy; Raman, fluorescence, and saturation spectroscopy; polarization, correlation, and ultra-fast spectroscopy. Prerequisites: PHYS-600, PHYS-601, PHYS-605. Credit, three hours.
- PHYS-801. QUANTUM THEORY OF LIGHT** 3:3:0
Quantum mechanical description of light matter interaction. Presentation of basic quantum mechanics and quantum mechanical treatment of light and atoms. Prerequisites: Consent of the Instructor. Credit, three hours.
- PHYS-802. THEORY OF LIGHT SCATTERING** 3:3:0
An advanced electricity and magnetism course focused on light interactions with small particles. Topics include Raleigh and Mie scattering, optical properties of nanoparticles and surface plasmon resonance. Credit, three hours.
- PHYS-803. MODERN LASER SPECTROSCOPIC METHODS** 3:3:0
The laser revolution in spectroscopy. Absorption within the Doppler line, Doppler-free broadening spectroscopy, saturation spectroscopy, multiphoton spectroscopy, laser fluorescence, laser Raman, coherent stokes and antistokes Raman spectroscopy, photon echo and coherent spectroscopy. Ultrafast spectroscopy. Modern trends in spectroscopy. Credit, three hours.
- PHYS-804. PRINCIPLES OF PHOTOCHEMISTRY AND PHOTOBIOLOGY** 3:3:0
Review of the main phenomena related to the interaction of light with matter that results in chemical or biological activity. The study of inorganic and organic photochemistry, environmental aspects of photochemistry, atmospheric photochemistry, photosynthesis, visual processing, bio-luminescence, interaction of light with bio-organisms, photo- medicine, and phototherapy. Credit, three hours.
- PHYS-805. PHOTOACOUSTIC AND THERMAL SPECTROSCOPY** 3:3:0
Fundamentals of photo-acoustic and photo-thermal interaction of light with optical samples. Examination of basic instrumentations and their applications for characterization of complex samples including biological samples. Credit, three hours.

- PHYS-806. MOLECULAR BIOPHYSICS** 3:3:0
An overview of the physics of bio-molecular interactions. Topics will include physical models for DNA and protein systems. Credit, three hours.
- PHYS-807. OPTICAL SOLITONS** 3:3:0
Basic concepts of the mathematical aspects of optical solitons. Presentation of optical waveguides, the nonlinear Schrodinger's equation, laws of nonlinearity, soliton perturbation, soliton-soliton interactions, Stochastic perturbation of optical solitons, optical couplers, optical switching, magneto-optic waveguides and optical bullets. Prerequisites: PHYS-601, MTSC-853, MTSC-845. Credit, three hours.
- PHYS-808. FIBER OPTICS AND FIBEROPTICS COMMUNICATION** 3:3:0
Light propagation in fiber, its dispersion and nonlinear characteristics that play an important role in light communication. Types of fiber-optic devices and their applications to communication. Wavelength division multiplexing. Credit, three hours.
- PHYS-809. PHOTONICS AND INFORMATION PROCESSING** 3:3:0
Wave propagation in linear optical systems and optical information processing. Topics include: fundamentals of optical propagation, diffraction, optical imaging, Fourier transform, wave-front modulation, signal processing, and basics of optical processing devices. Credit, three hours.
- PHYS-810. CURRENT TOPICS IN OPTICS I** 3:3:0
Current topics in optics and spectroscopy. Credit, three hours.
- PHYS-811. CURRENT TOPICS IN OPTICS II** 3:3:0
Current topics in optics and spectroscopy. Credit, three hours.
- PHYS-820. DISSERTATION RESEARCH** 9:9:9
The course is for Ph.D. students in the optics program working on their dissertation research project. Credit, two to eight hours.
- PHYS-890. DISSERTATION** 9:9:0
Written work that describes the main research results obtained during the completion of the graduate program. The format must comply with the requirements of the College for thesis and dissertations. Credit, three to nine hours.
- PHYS-999. DOCTORAL SUSTAINING** 0:0:0
Public oral defense of the thesis that includes presentation of the main research results obtained during the completion of the graduate program. It takes place after evaluation of the written dissertation by the members of the corresponding academic committee. Credit, none

Year 1 / Semester 1			Year 1 / Semester 2		
Course	Course Name	Cr	Course	Course Name	Cr
PHYS-652*	Classical Mechanics	3	PHYS 672*	Advanced Electromagnetic Theory II	3
PHYS-671*	Advanced Electromagnetic Theory I	3	PHYS 667*	Mathematical Methods of Physics IV	3
PHYS-563*	Mathematical Methods in Physics III	3			
	Total Credits	9		Total Credits	6

Year 2 / Semester 3			Year 2 / Semester 4		
Course	Course Name	Cr	Course	Course Name	Cr
PHYS 665*	Statistical Mechanics	3	PHYS 695*	Thesis Research	6
PHYS 675*	Quantum Mechanics I	3	PHYS 676*	Quantum Mechanics II	3
	Total Credits	6		Total Credits	9
			Total Credits: 30		

*Denotes a Core Requirement

+Denotes an elective

Total Core Credits = 30

Total Elective Credits = 0

Candidacy Requirement: Proposal Defense with Thesis Committee; submission with Candidacy Application to Graduate Studies and Research

Capstone or Culminating Experience: Public Thesis presentation and oral defense of Research Thesis

PROGRAM: MS PHYSICS – NON-THESIS OPTION



Year 1 / Semester 1			Year 1 / Semester 2		
Course	Course Name	Cr	Course	Course Name	Cr
PHYS-652*	Classical Mechanics	3	PHYS 672*	Advanced Electromagnetic Theory II	3
PHYS-671*	Advanced Electromagnetic Theory I	3	PHYS 667*	Mathematical Methods of Physics IV	3
PHYS-563*	Mathematical Methods in Physics III	3	PHYS 6XX+	Technical Elective	3
	Total Credits	9		Total Credits	9

Year 2 / Semester 3			Year 2 / Semester 4		
Course	Course Name	Cr	Course	Course Name	Cr
PHYS 665*	Statistical Mechanics	3	PHYS 691*	Special Topics / Research (Directed project)	3
PHYS 675*	Quantum Mechanics I	3	PHYS 676*	Quantum Mechanics II	3
	Total Credits	6		Total Credits	6
			Total Credits: 30		

*Denotes a Core Requirement

+Denotes an elective

Total Core Credits = 27

Total Elective Credits = 3

Candidacy Requirement: Complete 15 credits of course work with GPA ≥ 3.0 Capstone or

Culminating Experience: Presentation in Special topics class about research topic

Outcomes report and rubric submitted to Graduate Studies and Research prior to graduation

COLLEGE OF BUSINESS



Department of Business Administration

Master of Business Administration

Concentrations in Business Analytics, CPA, Finance and Information Systems

Department of Sport Management

MS in Sport Administration

MASTER OF BUSINESS ADMINISTRATION (MBA)

PROGRAM OBJECTIVES

The Master of Business Administration (MBA) Degree Program is designed for working professionals and aspiring managers from a wide range of backgrounds who wish to advance their careers or acquire the knowledge and skills necessary to succeed as managers and leaders in the new economy. Candidates integrate and apply business and organizational concepts and techniques in the functional areas of organizational management. The program is flexible enough to accommodate both full-time and part-time (professional and accelerated) students. MBA candidates interested in pursuing a full-time accelerated program can complete the degree in 12 months by taking five courses (15 credit hours) per semester, while regular full-time students can complete the program over an 18-month period by taking two courses per term. MBA classes are offered during the evening hours and occasionally on the weekends. Those interested in part-time study can complete the degree requirements within two years by attending at least one summer session.

PROGRAM GOALS

The student learning goals for Delaware State University's MBA Program are consistent with the College mission to provide a student-centered learning environment and develop successful business professionals with a global perspective.

STUDENT LEARNING OUTCOMES

Our students will understand the importance of ethical decision-making.

Our students will demonstrate an understanding of data gathering, analysis, and interpretation.

Our students will have information technology skills.

Our students will have a global, cultural, and diversity perspective.

Our students will demonstrate leadership and communication skills.

ADMISSION REQUIREMENTS AND DEGREE REQUIREMENTS

Application Deadlines:

Rolling Admission with priority dates below:

June 30	Fall Session I (August) enrollment
September 1	Fall Session II (October) enrollment
November 15	Spring Session I (January) enrollment
February 1	Spring Session II (March) enrollment
April 15	Summer (May) enrollment

International Admission Deadlines:

May 1	Fall Session I (August) enrollment
August 1	Fall Session II (October) enrollment
November 1	Spring Session I (January) enrollment
January 15	Spring Session II (March) enrollment
April 1	Summer (May) enrollment

All applicants are required to submit evidence of the following for consideration of unconditional admission:

For admission to the MBA Program, applicants must have earned a baccalaureate degree from an accredited college or university and possess the ability to do graduate work of high quality. The criteria for admission attempt to balance the candidate's undergraduate GPA and GMAT score. The required GMAT score is based on the formula: $200 \times \text{UG GPA} + \text{GMAT Score} \geq 975$. Candidates who have attained the required GMAT score and have completed the common body of knowledge (CBK) in business will be admitted unconditionally.

- Must have earned a Baccalaureate degree.
- Complete an online application for admission.
- Submit official transcript(s) of all academic work completed. All International Transcripts must be verified through one of four organizations: World Education Service (WES), Educational Credential Evaluators (ECE), Global Credential Evaluations, Inc. (GCE) or the Association of Collegiate Registrars and Admissions Officers (AACRAO). This verification should include a course-by-course evaluation.
- Submit Official Graduate Management Admission Test (GMAT) scores. GRE is only accepted with approval of the Program Director.
- Submit a resume.
- Submit two letters of recommendation completed by persons acquainted with your ability for graduate study.
- The Statement of Intent should include your philosophy, objectives, and career aspirations.

The MBA Program Admission Committee will review students' application materials and make a recommendation for acceptance into the MBA Program to the Dean, Graduate Studies and Research, who extends an offer of admission to the applicant.

DEGREE REQUIREMENTS

The MBA degree requires completing 30 credit hours, consisting of 24 credit hours of core courses and 6 credit hours of electives for a general MBA degree. Students may also select a concentration in Business Analytics, MBA-CPA, Finance or Information Systems by taking 9 credit hours of electives in the respective areas.

Students deficient in the foundation courses will be required to complete selected foundation course deficiencies before they take core courses.

Foundation Courses are noted below:

- Accounting
- Finance
- Marketing
- Management Information Systems
- Quantitative Methods for Decision Making (Statistics and Math)
- Economics

Students who are required to complete the foundation courses must complete foundation courses offered by the program prior to enrolling in MBA core courses. Appropriately qualified students may petition for a waiver or may test out of foundations courses up to a maximum of 18 credits.

Non-Degree Option:

This option provides an opportunity for professionals who are seeking graduate course work for their professional growth.

Required Course Work:

Students enrolled in the MBA Program are required to complete a minimum of 30 credit hours for the General MBA degree or 33 credit hours for the MBA degree with a concentration.

Required core courses include:

MBA 600 – Information and Technology Management
MBA 601 – Economics for Managerial Decision Making
MBA 602 – Marketing Management
MBA 603 – Accounting for Decision Making
MBA 604 – Financial Management
MBA 605 – Organizational Leadership and Behavior
MBA 620 – Operations Analysis Management
MBA 616 – Applied Strategic Management (Capstone)

Student registration in graduate-level course work is subject to the approval of an assigned advisor.

FACULTY

Courses are taught by qualified professors who want to see you succeed. Our faculty members have terminal degrees in their respective discipline and have published several research articles in recognized journals.

PROGRAM FACULTY

Dr. Young S. Kwak, Professor, Finance
Dr. Daeryong Kim, Professor, Management Info. Systems
Dr. Bridget Anakwe, Associate Professor, Accounting
Dr. Michael Casson, Jr. Associate Professor, Economics
Dr. Jan E. Christopher, Associate Professor, Economics
Dr. Nandita Das, Associate Professor, Finance
Dr. Zi "Nancy" Ning, Associate Professor, Finance
Dr. Bernadette Ruf, Professor, Accounting
Dr. Winston Awadzi, Professor, Management
Dr. Constant Beugre, Professor, Management
Dr. Chittibabu Govindarajulu, Associate Professor, Info. Systems and Operations Mgmt.
Dr. Martin Nunlee, Associate Professor, Marketing
Dr. Praveen Pinjani, Associate Professor, Management Information Systems
Dr. Carlos Rodriguez, Associate Professor, Marketing
Dr. Devdeep Maity, Assistant Professor, Marketing
Dr. Akash Dania, Associate Professor, Finance

FACILITIES

The Bank of America Building is equipped with state-of-the-art technology and houses the College of Business as well as the University's programs in Aviation Management and Hospitality & Tourism Management. The Delaware Center for Enterprise Development is also housed in this facility.

MASTER OF BUSINESS ADMINISTRATION (MBA)

<p>The total MBA Credit Hours: General MBA: 30 without Foundation Courses, 48 with Foundation Courses MBA with a Concentration: 33 without Foundation Courses, 51 with Foundation Courses</p>	
Foundation Courses 18 Credit Hours	Accounting Foundations (MBA 501) Economics Foundations (MBA 502) Finance Foundations (MBA 503) MIS Foundations (MBA 504) Marketing Foundations (MBA 505) Quantitative Methods Foundations (MBA 506)
Core Courses 24 Credit Hours	Information and Technology Management (MBA 600) Economics for Managerial Decision Making (MBA 601) Marketing Management (MBA 602) Accounting for Decision Making (MBA 603) Financial Management (MBA 604) Organizational Leadership and Behavior (MBA 605) Operations Analysis Management (MBA 620) Applied Strategic Management (MBA 616 - Capstone)
General MBA Electives 6 Credit Hours	Any Two Electives Required for General MBA
MBA with a Concentration 9 Credit Hours Three Electives from a Specific Area	Finance Financial Statement Analysis (MBA 617) Investments and Portfolio Management (MBA 641) Domestic and Global Financial Markets and Institutions (MBA 643) Economic and Financial Environment of Business (MBA 645)
	Information Systems Strategic Information Systems (MBA 631) Managing Electronic Commerce (MBA 632) Topics in Information Systems (MBA 633) Supply Chain Management (MBA 651)
	Business Analytics Database Management Systems (MBA 681) Data Analytics (MBA 682) Data Mining and visualization (CSCI 552)
	MBA-CPA Strategic Information Systems (MBA 631) Advanced Topics in Financial Accounting (MBA 653) Review Courses

COURSE DESCRIPTIONS

MBA-501. ACCOUNTING FOUNDATIONS

The purpose of this course is to introduce students to basics of accounting, the language of business. It will help students understand some common accounting terms, what goes into presenting financial information into financial statements and how managers analyze performance from inside the firm. The course takes a user's perspective and will help students understand how to use accounting information rather than how financial testaments are prepared. Credit, three hours.

MBA-502. ECONOMICS FOUNDATIONS

This is a general introductory course on the fundamentals of Microeconomic and Macroeconomic theories, market models, and principles and their application to national and international economics systems. Credit, three hours.

MBA-503. FINANCIAL FOUNDATIONS

The purpose of this course is to introduce students to corporate finance. Since finance is the cornerstone of the free enterprise system, a good understanding of finance foundations is necessary to become good managers. The course takes a manager's perspective and will help students understand how to use accounting and economic information to make sound financial decisions. Credit, three hours.

MBA-504. MIS FOUNDATIONS

The role of Information Systems (IS) in business and management is getting more important than before because of the growth of information systems, the internet, electronic commerce, and globalization. Thus students will learn what the information systems are, how they affect organizations and their employees, and how they can make business more competitive and efficient to make firms competitive. Credit, three hours.

MBA-505. MARKETING FOUNDATIONS

This course is a general review course on the principles of marketing. This course addresses concepts and issues underlying the modern practice of marketing, including the following: the environmental forces affecting the marketing decision maker, organization, and planning of the market function; market segmentation; marketing mix; and other relevant topics. Credit, three hours.

MBA-506. QUANTITATIVE METHODS FOUNDATIONS

This is a general review course on the fundamentals of mathematical theories, concepts, and applications as they pertain to business. It facilitates students to learn a Value-Driven Approach which presents an overview of fundamentals of Operations Management, the challenges facing today's Operations Managers, the need for a change from a cost orientation to a focus on value, and the place of OM within the corporate and competitive world. It helps to understand values and attributes that are associated with a value such as speed, quality, cost, and flexibility. Credit, three hours.

MBA-565. MBA SELECTED TOPICS

The MBA Selected Topics tests the student's strategic thinking and analytic skills. Students must receive prior approval by the MBA Director for the topic. The students will submit a final presentation discussing their analysis and recommendations of the company or real-world cases they have investigated. A Project Thesis is required. Credit, three hours.

MBA-600. INFORMATION AND TECHNOLOGY MANAGEMENT

The course introduces the students to the uses, trends, and applications of information technologies in organizations. The course also examines the managerial implication of the information technology and the alignment between business and information technology. The course will expose the students to computer hardware and software, database, telecommunications and network technology, the Internet and World Wide Web, mobile computing, and other topics in information technology.

Prerequisites: MBA-504. Credit, three hours.

MBA-601. ECONOMICS FOR MANAGERIAL DECISION MAKING

The course examines the applied microeconomic theory of the firm. Economics concepts covered include demand analysis, production and cost analysis, linear programming applications, pricing policies, and government regulation of the firm. The course also provides an analysis of macroeconomic factors influencing business activity and their implications for strategic management and business policy. Credit, three hours.

MBA-602. MARKETING MANAGEMENT

The course examines the strategic marketing planning process. Emphasis is placed on the development of product lines, sales promotion, and distribution strategies. Prerequisites: Common Body of Knowledge (CBK) requirements in Principles of Economics and Marketing. Credit, three hours.

MBA 603: ACCOUNTING FOR DECISION MAKING

This course-volume-profit analysis; budgeting; responsibility accounting; product costing; cost behavior; and variance analysis. Prerequisite: Foundation course emphasizes the study of accounting as it relates to internal reporting, managerial decision-making, planning, and control. Topics covered include the following: cost requirement in Accounting. Credit, three hours.

MBA-604. FINANCIAL MANAGEMENT

The course addresses the principles of financial management. Topics covered include the following: capital acquisition; working capital management; capital budgeting; valuation theories; and dividend and long-term financial policies. Prerequisites: Common Body of Knowledge (CBK) requirements in Economics, Finance, and Accounting. Credit, three hours.

MBA-605. ORGANIZATIONAL LEADERSHIP AND BEHAVIOR

The course concentrates on the behavior of individuals in small, informal groups, and formal organizations. The course examines the following topics: leadership, in the context of group behavior, job satisfaction, supervision, planning, and conflict resolution. Prerequisites: Common Body of Knowledge (CBK) requirements in Management. Credit, three hours.

MBA-616. APPLIED STRATEGIC MANAGEMENT

The course is a study of policy formulation and implementation by middle- and senior-level management. The course integrates previous course work in the other core courses. The capstone (integrated management course) is intended to apply theoretical concepts to a variety of organizational situations from a top-management perspective. The concepts and techniques of strategic management in organizations will be the focus of the course. Topics include developing a strategic vision, setting objectives, and crafting a strategy. Students will be expected to develop a competitive analysis portfolio; match strategy to an organization's situation; build resource capabilities, support systems, manage a budget, align culture and strategy; and structure the organization to implement the organization's strategic vision in a dynamic global marketplace. Prerequisites: Completion of all other core course requirements. Credit, three hours.

MBA-617. FINANCIAL STATEMENT ANALYSIS

The course provides the fundamentals managers need to analyze financial statements in making non-routine decisions, as well as in discharging their day-to-day operating responsibilities. Accordingly, it addresses the following issues: 1.) basic accounting and applications in the context of financial statement analysis; 2.) analyses of financial position, results of operations, and cash flows; 3.) inter-corporate investments; 4.) financial statement data issues, including "other financial data" and information economics; and 5.) financial statement audit opinions. Prerequisites: MBA-603. Credit, three hours.

MBA-619. BUSINESS LAW AND ETHICS

The course provides the student with an introduction to the areas of law pertaining to business and teaches the student to critically evaluate legal issues within a legal framework. In the course, we will examine the legal and ethical laws, rules, and standards of conduct, guidelines, and systems of conflict resolution relating to business operations and administration. Relevant topics will include contracts, commercial law (sales, secured transactions, and creditors' remedies), forms of business entities (including limited liability companies and corporations), agency, employer-employee relationships, real property concepts, bankruptcy, and negligence, and strict liability concepts. Students will examine corporate governance and business ethics, with emphasis on case studies drawn from recent corporate scenarios. Credit, three hours.

MBA-620. OPERATIONS ANALYSIS AND MANAGEMENT

The course investigates the increasing use of the techniques of business support systems and workflow tools for the optimum performance of manufacturing and service organizations. Students will use analytical, quantitative, and qualitative techniques and workflow tools for resource allocations, facilities design and location, process design, planning, scheduling, and quality control. An emphasis will be placed on current technologies and their applications in various industries. Credit, three hours.

MBA-621. PROJECT RISK MANAGEMENT

The exciting, challenging course focuses on how the Project and Program risks are managed in real life and based on the Standards for PMI (Project Management Institutes') PMBOK methodology. The course focuses on identifying and assessing various risks and developing response plans. Prerequisites: MBA-622. Credit, three hours.

MBA-622. PROJECT MANAGEMENT METHODOLOGY

The exciting, challenging course focuses on how the Projects and Programs planned and executed in real life based on the Standards for PMI (Project Management Institutes') PMBOK methodology. The course focuses on the five (5) phases of the Project management and nine (9) knowledge areas of the Project management discipline.

Prerequisites: MBA-605. Credit, three hours.

MBA-623. PROGRAM AND PORTFOLIO MANAGEMENT

The exciting, challenging course focuses on how Organizations manage multiple projects and allocate resources through Portfolio Management discipline. The course covers the strategy, tactics, and processes needed for successful project portfolio management. Prerequisites: MBA-622. Credit, three hours.

MBA-631. STRATEGIC INFORMATION SYSTEMS

The course examines the use of information technology to achieve competitive advantage, effective decision-making, and efficient operations. The course will explore the usage of many kinds of information systems and technology in organizations and analyze their role, functions, and effects on competitive strategy and organizational operations. Prerequisites: MBA-600. Credit, three hours.

MBA-632. MANAGING ELECTRONIC COMMERCE

With an emphasis on managing electronic organizations, the course examines electronic commerce infrastructures, various types of electronic commerce, issues in designing and managing the on-line business, electronic payments as receivables and payables, and Internet security issues. Additional topics such as database marketing will be discussed. Prerequisites: MBA-600. Credit, three hours.

MBA-633. TOPICS IN INFORMATION SYSTEMS

Information technology is continuously evolving as so is the usage of information systems in the ever-changing business environment. Managers need to adapt operations and processes to the latest trends in information systems and technology. The course will deal with various topics in many current information technologies that are emerging or adopted well in the industry for the competitive advantages. The course examines topics on latest information technology through professional articles, research papers, and/or case studies. Prerequisites: MBA-600. Credit, three hours.

MBA-641. INVESTMENTS AND PORTFOLIO MANAGEMENT

The course addresses principles in determining investment vehicles for individual and institutional investors. The course focuses on investment information sources, features of various securities instruments, as well as strategies and techniques for portfolio construction, management and protection. Prerequisites: MBA-604. Credit, three hours.

MBA-642. DERIVATIVE SECURITIES AND RISK MANAGEMENT

The course examines the fundamental issues in risk management by utilizing futures, options, swaps, and various other derivative securities. Other topics include hedging techniques, mergers and acquisitions, and financial engineering.

Prerequisites: MBA-641. Credit, three hours.

MBA-643. DOMESTIC AND GLOBAL FINANCIAL MARKETS AND INSTITUTIONS

The course examines structures and functions of international and domestic financial markets such as stock, bond, mortgage, and money markets. The course also addresses financial management aspect of different financial institutions including banks, savings, and loans association, investment companies, and pension funds. Theories of comparative advantage, foreign exchange markets, financial risk management, and funds transfer and investments will be discussed. Prerequisites: MBA-604. Credit, three hours.

MBA-645. ECONOMIC AND FINANCIAL ENVIRONMENT OF THE ORGANIZATION

The course examines the macroeconomic and financial environment within which the organization operates. The course focuses on identifying and assessing the macroeconomic and financial factors affecting the organization and on developing strategies to deal with changes in the macro environment. Prerequisites: MBA-604. Credit, three hours.

MBA-651. SUPPLY CHAIN MANAGEMENT

The course considers the components of modern-day distribution systems, with emphasis on facility location, transportation, warehousing, inventory control, and communication. Students will develop a conceptual understanding of issues relating to designing, planning, control, product design, information systems, inventory management, quality control, and warehousing. Prerequisites: MBA-600, MBA-602. Credit, three hours.

MBA 653: ADVANCED TOPICS IN FINANCIAL ACCOUNTING

The course covers the process of how domestic and international bodies influence setting accounting and reporting standards. This course also addresses accounting theory and practice underlying the preparation and presentation of financial statements, measurement, and valuation of assets and liabilities, and selected balance sheet and related income statement items for corporations, governmental agencies, and non-profits.

MBA 681: DATABASE MANAGEMENT

The course offers an extended study of modern database technology, which is designed to expose students to the development of database management systems. Prerequisites MBA 600 (Students may substitute CSCI 500 for MBA 680 with consent of MBA Director), (Cross-listed with MIS 470)

MBA 682: DATA ANALYTICS

This course will introduce students to data-driven decision making and decision models within business settings. Along with an overview of operations research (OR) techniques (linear programming, decision making under uncertainty, Monte Carlo simulation), and analytical techniques and tools, with heavy emphasis, will be given to understanding and using data in businesses through current articles and cases.

MBA-690. MBA CASE PROJECT

The MBA Case Project tests the student's strategic thinking and analytic skills. There are three different approaches to the Case Project: 1) Students will be provided with the income statement and balance sheet, annual reports, and other pertinent information to make recommendations on a broad range of strategic issues facing a company. 2) Students will be provided with a portfolio and other pertinent information to make trades on investments and maximize their portfolios. 3) Students will be given a series of general management cases that cover a broad range of strategic issues facing companies. The students will submit a final presentation discussing their analysis and recommendations of the company or real-world cases they have investigated. A Project Thesis is required. Credit, three hours.

MBA-699. SPECIAL TOPICS: MBA

The MBA Special Topics tests the student's strategic thinking and analytic skills. Students must receive prior approval by the MBA Director for the topic. The students will submit a final presentation discussing their analysis and recommendations of the company or real-world cases they have investigated. A Project Thesis is required. Credit, three hours.

MBA-699A. SPECIAL TOPICS: MBA

The MBA Special Topics tests the student's strategic thinking and analytic skills. Students must receive prior approval by the MBA Director for the topic. The students will submit a final presentation discussing their analysis and recommendations of the company or real-world cases they have investigated. A Project Thesis is required. Credit, three hours.

MBA-699B. SPECIAL TOPICS: MBA

The MBA Special Topics tests the student's strategic thinking and analytic skills. Students must receive prior approval by the MBA Director for the topic. The students will submit a final presentation discussing their analysis and recommendations of the company or real-world cases they have investigated. A Project Thesis is required. Credit, three hours.

CSCI 552: DATA MINING & VISUALIZATION

Study of techniques for analysis and visualization of massive amounts of data. Includes hands-on experience in developing and using data mining software. Three credits: Three lectures per week. Prerequisite: Consent of the instructor.

College of Business
Department of Business Administration

GENERAL MBA DEGREE
PROGRAM: MASTER OF BUSINESS
ADMINISTRATION



WILMINGTON CAMPUS

Fall Term1			Fall Term2		
Course	Course Name	Cr	Course	Course Name	Cr
MBA-603	Accounting for Decision Making	3	MBA-600	Information and Technology Management	3
MBA-620	Operations Analysis Management	3	MBA-616	Applied Strategic Management	3
	Total Credits	6		Total Credits	6
Spring Term1			Spring Term2		
Course	Course Name	Cr	Course	Course Name	Cr
MBA-604	Financial Management	3	MBA-601	Economics for Managerial Decision Making	3
MBA-605	Organizational Leadership and Behavior	3	MBA-602	Marketing Management	3
	Total Credits	6		Total Credits	6
Summer Term 1					
Course	Course Name	Cr	Course	Course Name	Cr
+MBA-xxx	Elective	3			
+MBA-xxx	Elective	3			
	Total Credits	6		Total Credits	
			Total Credits: 30		

* A DSU MBA degree with a concentration requires 9 credit hours of elective courses from a specific area.

* Denotes a Core Requirement | +Denotes an elective

Total Core Credits = 24 | Total Elective Credits = 6

Candidacy Requirement: Core Course Completion | Capstone or Culminating Experience: Case Study Analysis (MBA 616)

Outcomes report and rubric submission to Graduate Studies prior to graduation

MASTER OF SCIENCE IN SPORT ADMINISTRATION

PROGRAM OBJECTIVES

The Master of Science Degree in Sport Administration at Delaware State University was approved by the Board of Trustees and has been offered since 2005. The purpose of the MS in SA is to professionally prepare ethical leaders for advanced responsibilities within sport organizations and/or to design and implement new sport or sport-related enterprises. It is a 30 credit hour, 12-month program designed to develop the student's ability to lead and manage sport and/or sport-related organizations while adapting to changing economic, legal, political, and social influences.

PROGRAM GOALS

The broad-based program learning goals for Sport Administration are as follows:

Knowledge of Functional Areas: Students will have a working knowledge of the Sport Administration functional areas of leadership, administration and management, marketing, and finance.

Resourcefulness: Students will have research and technology capabilities to conduct an audit of the external environment that impacts decision making in sport and sport-related organizations.

Personal and Professional Growth: Students will utilize the knowledge and skills gained throughout the program at a sport-related organization.

STUDENT LEARNING OUTCOMES

Upon completion of the program, graduate students should be able to:

Apply leadership, financial, marketing, and managerial principles and practices to a specific sport segment and/or organization.

Conduct an effective inquiry and analysis of sport from an ethical, economical, legal, political, and/or social perspective and formulate strategies for change as needed.

Utilize technology to conduct research and evaluate, analyze, and communicate information related to current trends and issues within the sport industry.

Demonstrate professional competencies and dispositions in a sport organization.

Use self-reflection as a means for personal and professional growth.

ADMISSION DEADLINES AND DEGREE REQUIREMENTS

Application Deadlines:

Rolling Admission

International Admission Deadlines:

Fall – May 1; Fall Session II – July 1

Spring – November 3; Spring Session II – February 1

Summer – April 1

All applicants are required to submit evidence of the following for consideration of unconditional admission:

- Completed Graduate Application and payment of application fee
- Official Undergraduate/Graduate transcript(s) from each college attended
- Undergraduate 2.50 or higher G.P.A. from an accredited college or university
- Three Letters of Recommendation from professionals in the field, one from an academic professional
- Submitted Official Graduate Management Admission Test Scores (GMAT) or Graduate Record Exam (GRE) scores taken within 5 years of application

The Sport Management Department's Graduate Committee will review the student's application materials and make recommendation for acceptance into the Sport Administration program to the Dean of Graduate Studies and Research, who extends an offer of admission to the applicant.

DEGREE REQUIREMENTS

Completion of 30 credit hours with a GPA of 3.0 or higher, with no more than two courses with a grade of "C."

Capstone Requirement - Submission and successful defense of a comprehensive project. The student works closely with his or her major professor throughout the development of the project and presents the project to a pre-selected committee for final approval. This project must entail every aspect of sport administration, including but not limited to a mission statement, goals and objectives, strategic planning, organizational structure, financial considerations, marketing plans, public relations, preventive law plan, methods of assessment and evaluation, and administrative/managerial considerations for adjusting to the current trends and issues in sport. Using a rubric, the project is evaluated by at least three faculty members.

FACULTY

The faculty members in the Sport Administration Program are full-time employees at DSU, possess doctoral degrees in Sport Management/Administration, are actively engaged in national and /or international scholarly research and /or service, and have related work experience.

PROGRAM FACULTY

Li Chen, D.P.E., Professor, Physical Education
Jan Blade, Ed.D., Associate Professor, Sport Management
Mark Zhang, D.S.M., Associate Professor, Sport Management
Mark Still, Ed.D., Associate Professor, Sport Management

COURSE SCHEDULE

During the fall and spring semesters one course is offered in the first half-term of the semester, a second course in the second half-term term of the semester, and a third course is offered over the entire semester. In the summer, two courses are offered in the first summer session and a 6 credit hour internship is offered in the second summer session.

Course Sequence

Course#		Credit Hours	Term offered
SPSC-671	Financial Aspects of Sport	3	Fall
SPSC-672	Sport Administration	3	Fall
SPSC-676	Sport in Society*	3	Fall
SPSC-625	Introduction to Research Methods and Statistics in Sport	3	Spring
SPSC-674	Sport Marketing*	3	Spring
SPSC-681	Legal Issues in Sport	3	Spring
SPSC-673	Sport Facilities Design and Management*	3	Summer I
SPSC-675	Current Trends and Issues in Sport* -- Comprehensive Project	3	Summer I
SPSC-616	Internship	6	Every Term
Total Credits:		30	

*All can be taught through online delivery

COURSE DESCRIPTIONS

SPSC 616. INTERNSHIP

The Sport Administration Internship is an experience in which a sport administration major enrolls in after all requirements, including course work, in the sport administration curriculum has been completed successfully. The Sport Administration Internship comprises a minimum of 270 field-based hours at the agency, or at events sponsored by the agency if the responsibilities are carried out at another site. Credit, six hours.

SPSC 625. INTRODUCTION TO RESEARCH METHODS AND STATISTIC

The course is designed to introduce students to research methods and statistics used to assess, evaluate, and critically examine principle and practices of sport organizations. Credit, three hours.

SPSC 671. FINANCIAL ASPECTS OF SPORT

The course examines the financial and accounting principles and their application in for-profit and non-profit sport organizations. Topics include revenue and expenses, budgeting methods, economic principles, methods of financing sport and sport venues, and fund raising methods. Credit, three hours.

SPSC 672. SPORT MANAGEMENT

The course is designed to provide students with an understanding of organizational theory and its application in the sport industry. Students will examine the organizational structure, leadership styles, and culture of different sport organizations. Credit, three hours.

SPSC-673. SPORT FACILITIES DESIGN AND MANAGEMENT

The course is designed to introduce students to the fundamentals of conducting needs assessments, planning, constructing, equipping, staffing, programming, and managing facilities in sport and physical activities. Credit, three hours.

SPSC-674. SPORT MARKETING

The course provides an overview of the principles and practices of promotions and marketing in the sport industry. Topics include sport marketing planning, market segmentation and identification of target market, sport marketing mix, and sponsorship. Credit, three hours.

SPSC-675. CURRENT TRENDS AND ISSUES IN SPORT

The course examines the current trends and issues in the sport industry. Extensive research of current texts and journal articles is required. Credit, three hours.

SPSC-676. SPORT IN SOCIETY

The course is an examination of sport as a social institution and of the interactive impact of sport and society. Credit, three hours.

SPSC-681. LEGAL ISSUES IN SPORT

The course is designed to provide an overview of legislation and legal actions in sport. Credit, three hours.

**PROGRAM: MASTER OF SCIENCE
IN SPORT ADMINISTRATION**



Fall			Spring		
Course	Course Name	Cr	Course	Course Name	Cr
SPSC 671	Financial Aspects of Sport	3	SPSC 625	Intro to Research Methods & Statistics	3
SPSC 672	Sport Management	3	SPSC 674	Sport Marketing	3
SPSC 676	Sport in Society	3	SPSC 681	Legal Issues in Sport	3
	Total Credits	9		Total Credits	9
Summer I			Summer II		
Course	Course Name	Cr	Course	Course Name	Cr
SPSC 673	Sport Facilities Design & Management	3	SPSC 616	Internship	6
SPSC 675	Current Trends & Issues in Sport	3			
	Total Credits	6		Total Credits	6
			Total Credits: 30		

*Denotes a Core Requirement

+Denotes an elective

Total Core Credits = 30

Total Elective Credits = 0

Candidacy Requirement: 18 credit hours with a minimum GPA of 3.0

Capstone or Culminating Experience: Submission and successful defense of a comprehensive project

Outcomes report and rubric to Graduate Studies and Research prior to graduation

COLLEGE OF HEALTH AND BEHAVIORAL SCIENCES



Department of Social Work

MSW

MASTER OF SOCIAL WORK

The mission of the Department of Social Work is to prepare culturally competent professionals guided by values, ethics, and evidence-based practice for professional and leadership roles, thus enhancing the quality of life of individuals, families, groups, communities, and organizations in a global society. The MSW program at Delaware State University has one concentration — advanced generalist practice. Accordingly, the program prepares students for advanced practice with individuals, families, groups, organizations, and communities. Having satisfied all of the program's academic requirements, students leave the program with competencies allowing them to practice with and on behalf of Delawareans, and with clients throughout the region, across the nation and globally. Course offerings provide students an understanding of social, economic, political and interpersonal problems from a global perspective. Consequently, students comprehend the effects of problems, such as poverty, health disparities, racism and oppression on populations that live in parts of the world outside the United States.

PROGRAM GOALS

Prepare social work practitioners to develop an understanding of the importance of a Black perspective based on strengths-based empowerment approach for social work practice;

Prepare culturally competent professionals guided by values and ethics who are capable of promoting social and economic justice when working with diverse and at risk populations in a global society;

Prepare practitioners for evidence-based professional practice and leadership roles; and educate students to think critically and to evaluate their own practice.

Graduates of the MSW Program possess the competencies needed to engage, assess, intervene and evaluate individuals, families, treatment groups, organizations and communities. It is understood that these unique elements of the curriculum are congruent with the concepts and intervention principles that define the framework for all professional social work practice, that is generalist practice. Therefore, students graduate able to generalize the knowledge, values and skills that underlie all social work practice in different settings with diverse populations experiencing multiple, complex problems. The MSW curriculum is grounded on the Department of Social Work's underpinnings. The foundation courses present a generalist perspective to social work practice and consist of fundamental content in human behavior and the social environment, social policies, research, practice and field practicum. The advanced courses build upon the core foundation year competencies of acquired knowledge, values and skills and demonstrate the integration and application of both the core and advanced competencies in practice with individuals, families, groups, organizations, and communities.

STUDENT LEARNING OUTCOMES

Graduates of the MSW Program possess the competencies needed to engage, assess, intervene and evaluate individuals, families, treatment groups, organizations and communities. These competencies are mandated by the Council on Social Work Education (CSWE): to demonstrate ethical and professional behavior; engage diversity and difference in practice; advance human rights and social, economic and environmental justice; engage in practice-informed research and research-informed practice; engage in policy practice; and engage, assess, intervene, and evaluate with individuals, families, groups, organizations and communities.

In addition, students will be able to:

Evaluate the efficacy of interventions and programs;

Integrate theories of personality and psychopathology;

Address health and mental health disparities from a public health perspective and understand and assimilate theories and practice principles that guide human service administration;

Practice with systems of all sizes in a wide array of settings—from traditional public social welfare and governmental agencies to small and medium size nonprofit organizations to private and for-profit entities.

ADMISSION DEADLINES AND DEGREE REQUIREMENTS

Application Deadlines:

Fall – May 31 for Advanced Standing Applications
June 30 for Regular Admission

International Admission Deadlines:

Fall – May 31 for Advanced Standing Applications
June 30 for Regular Admission

All applicants are required to submit evidence of the following for consideration of unconditional admission:

- The earning of a baccalaureate degree at an accredited college or university (or its equivalent for foreign students) and the ability to engage in high-quality graduate work. Applicants must have an undergraduate Liberal Arts foundation as defined by the Program faculty. A background in the social and behavioral sciences is preferred.

No academic credit is given for life and/or professional experience.

- A completed online graduate application package by the established deadline. The entire application can be completed and submitted online.

May 31 is the deadline for Advanced Standing admission and June 30 is the deadline for Fall admission. There is no Spring or Summer admission.

An application must be submitted for the Fall semester in which applicant wishes to enroll. Due to the required prerequisites, the MSW program admits students only in the Fall semester.

- Official transcripts of all previous undergraduate and graduate work. The applicant's undergraduate transcript must reflect a Cumulative Grade Point Average of 3.0 or above on a 4.00 scale (4.0=A). A "B" average in the major field of study is required. Higher scholastic achievement is preferred.
- Three letters of recommendation. These letters should be from individuals who can provide information about your scholarly ability, moral character and characteristics to succeed in a

graduate program. Individuals like present or past teachers, advisors, supervisors, and colleagues are in positions to provide credible recommendations.

Personal Attributes:

- Motivation toward, interest in, and preparation for social work education;
- A capacity to function as a creative, responsible independent, and accountable practitioner;
- Ability to deal with sexual, racial, ethnic, physical, social, and cultural diversity;
- A capacity and willingness for self-introspection and change;
- A capacity to deal with individual differences;
- A desire to work for social change in order to enhance leadership skills and create greater equity in society;
- The ability to develop a scientific stance toward social welfare and social work practice, and
- Identification with and a desire to apply social work knowledge, values and skills.

Type of Admission:

- Advanced standing status—one summer plus academic year. The Advanced Standing Seminar course is offered during the second summer session, usually from the beginning of July to the beginning of August. The course may be offered online. For accurate information regarding the days and times the class will meet and method of instruction, go to www.desu.edu, the university's website.
- Full-time status—two years
- Part-time status—three or four years
- Advanced standing credits (BSW only) or course waivers (MSW only) are given on a case-by-case basis.

Non-Degree Option:

This option provides an opportunity for candidates and other professionals who are seeking graduate course work for their professional growth (who have not been accepted into the MSW Program) to register for and take three MSW courses.

Required Course Work:

Students enrolled in the Master of Social Work Program are required to complete a minimum of 30 (Advanced Standing) or 60 credit hours (regular two-year program) for graduation candidacy.

Required courses include:

SCWK 601	Social Welfare Policies & Services Policy I	SCWK 602	Social Welfare Policies & Services Policy II
SCWK 603	Human Behavior & the Social	SCWK 604	Human Behavior & the Social Environment II
SCWK 605	Generalist Practice I	SCWK 606	Generalist Practice II
SCWK 607	Research & Evaluation I	SCWK 608	Research & Evaluation II
SCWK 633/804	Field Practicum I	SCWK 634/805	Field Practicum II
SCWK 646	Advanced Generalist Practice I	SCWK 668	Advanced Generalist Practice III
SCWK 647	Advanced Generalist Practice II	SCWK 669	Advanced Generalist Practice IV

SCWK 643	Theories of Personality & Adult Psychopathology	SCWK 610	Administration, Management & Supervision
SCWK 651	Practice & Program Evaluation for the Advanced	SCWK 660	Advanced Generalist Practice in a Public Health Context
SCWK 635	Field Practicum III	SCWK 636	Field Practicum IV

Registration in graduate-level course work is subject to the approval of an assigned Advisor.

FACULTY

The faculty members in the Social Work Program are dedicated to their respective fields of study and have a diverse background. Specific areas of research interest of the social work faculty include health, mental health, child welfare, violence, community health/wellness, etc. As faculty engage in research in these areas, they offer graduate students many opportunities for active learning and discovery.

PROGRAM FACULTY

Dr. Kelly Ward, Professor, Social Work
Dr. John Austin, Professor, Social Work
Dr. Eleanor Kiesel, Assistant Professor, Social Work
Dr. Leela Thomas, Associate Professor, Social Work
Dr. Franzine Franklin, Associate Professor, Social Work
Dr. Sheridan Quarless Kingsberry, Associate Professor, Social Work
Dr. Dolores Finger-Wright, Associate Professor, Social Work

COURSE DESCRIPTIONS

ADVANCED STANDING SEMINAR 559 (FOR ADVANCED STANDING STUDENTS ONLY)

The Advanced Standing Seminar is designed to prepare students for the advanced curriculum (second year) of the Master of Social Work Program at Delaware State University. Accordingly, the seminar familiarizes students with the program's curriculum and theoretical underpinnings. These include a Black perspective for social work practice, empowerment, the strengths perspective, the rural perspective and the global perspective at the micro, macro and mezzo levels. Upon successful completion of the course, students are eligible to enroll in the second year of the MSW program as a full-time student. Advanced standing students are not permitted to enter the program on a part-time basis. *PREREQUISITE:* BSW degree awarded by a social work program accredited by the Council on Social Work Education. The degree must have been earned within five years of admission to MSW program at Delaware State University. 6.000 Credit hours

SCWK 601. SOCIAL WELFARE AND POLICY I

Explores and identifies the social, political, legal economic, historical, and philosophical foundation of social welfare policy and services in the United States. Reviews major historical themes such as systematic oppression and discrimination of groups such as African Americans, women, and Native Americans. Structures, such as managed care, which restrict the level of services intervention, are also examined. Introduces models of policy analysis and reviews the development of the social work profession. 3.0 Credit hours

SCWK 602. SOCIAL WELFARE AND POLICY II

Focuses attention on major social welfare programs and social policy issues associated with various areas of practice and social problems, e.g., child welfare unemployment. Various approaches to policy analysis as well as planning and implementation process necessary to deliver services are considered. Emphasizes social policies related to special groups such as African Americans women, the elderly, and disabled. Prerequisites: SCWK 601. 3.000 Credit hours

SCWK 603. HUMAN BEHAVIOR AND THE SOCIAL ENVIRONMENT I

The course introduces various influences on human behavior within a social context and identifies cognitive, psychological, and developmental theories pertaining to human growth and development. The course examines the interplay of psychosocial, biological, and institutional factors from conception through adolescence so that students have a basis for understanding and assessing behavior. The course considers the relevance of such factors as ethnicity, gender, race, sexual preference, and mental and physical challenges on human functioning in society. 3.000 Credit hours

SCWK 604. HUMAN BEHAVIOR AND THE SOCIAL ENVIRONMENT II

This course is the second in a two-course foundation Human Behavior and Social Environment sequence. HBSE I and II study the various components of human behavior and social environment and provide a framework for studying the person-in-environment from an ecological approach. The courses, designed for the generalist practitioner, explore multiple factors that shape the development of individual growth and social interaction, and they explore a range of theories, both intra-personal and interpersonal. In addition, these two courses provide a conceptual model for viewing human behavior from a holistic perspective with particular emphasis on a Black perspective, a strength, and empowerment.

An ecological approach stresses: 1) the significant biological, psychological, social, and spiritual developmental milestones, 2) life span stages and their associated life events, 3) socio-structural (e.g., health, economic) factors, and 4) human diversity (e.g., race, ethnicity, gender, age), and its effect on human and societal behavior. Credits, three hours.

SCWK 605. GENERALIST PRACTICE I

This course is the first of two that comprise the foundation practice sequence. The course presents the generalist foundation for micro and mezzo social work practice centering on the interactive and dynamic processes of assessment, intervention, and evaluation with individuals, families and groups. The course presents knowledge and skills for generalist practice according to eco-systems and person and social environment perspectives for understanding people and responding their needs and problems. Students are introduced to a Black perspective for social work practice, empowerment, the strengths perspective, the rural perspective and the global perspective as core concepts for not only assessing clients' problems but, most importantly, assessing their strengths, gifts and talents for resolving and overcoming obstacles to their well-being. By the end of the course, students learn to view clients as central resources in the problem-solving process.

The course emphasizes that social work values and ethics, promotion of social and economic justice, and service to diverse groups, exemplified by cultural competence, overlie all social work practice in all settings with all clients. The grade "B" must be earned in this course. Students enrolled in this course must also be enrolled in the appropriate first year field instruction course.

SCWK 606. GENERALIST PRACTICE II

This is the second of two courses that comprise the foundation practice sequence. The course builds on the knowledge, values and skills for generalist practice that were imparted in Generalist Practice I by teaching students how to apply dynamic and interactive processes of assessment, intervention, and evaluation at the macro level in communities and organizations. The course teaches communities and organizations as settings where the social worker and the client work together in an attempt to reduce or ameliorate problems that adversely impact client well-being. Guided by a Black perspective for social work practice, empowerment, the strengths perspective, the rural perspective, and the global perspective, students learn to focus on clients' strengths as a potential solution to the problem(s) for which the client is receiving assistance. The course directs students to look to evidence based practices and related research when considering effective ways to assist clients. Consequently, the course familiarizes students with resources for evidence based interventions and promotes evaluation of practice using reliable research methods. Guided by a prevention orientation to generalist practice at the macro level, students learn to examine risk and protective factors that should be taken into account when developing interventions to prevent problems before they emerge. The course emphasizes that social work values and ethics, promotion of social and economic justice, and service to diverse groups, exemplified by cultural competence, overlie all social work practice in all settings with all clients. The grade "B" must be earned in this course. Students enrolled in this course must also be enrolled in the appropriate first year field instruction course. Credits, three hours.

SCWK 607. RESEARCH EVALUATION I

Methods of Research in Social Work Practice is the first of a three (3) course sequential offering in the research foundation curriculum. It is designed to introduce students to the scientific method of inquiry within the context of advanced generalist practice and research problems germane to social work. Issues relating to research, theory, goals and methodological procedures are examined. Students are introduced to the various ways in which these underpinnings are designed to aid in the development of the appropriate language, knowledge and skills for the application of research methods associated with advanced generalist social work practice. Substantive topics include: framing hypotheses and delineating the components of the hypotheses; stages involved in conducting social scientific research projects; the logic of such procedures; values and ethics; conceptualization and operationalization; research design; and sampling. Ethnology and ecological fallacies provide the conceptual frame of reference for issues relating to cultural diversity, working with at-risk populations, and achieving social justice. Credits, three hours.

SCWK 608. RESEARCH & EVALUATION METHODS FOR SOCIAL WORK PRACTICE II

This is the second course in a three course research sequence that introduces students to concepts in data analyses. Content includes analyses and interpretation of univariate, bivariate, and multivariate statistics appropriate for various kinds of data and levels of measurement used in social work practice. Students will learn data collection, data entry, data processing, and data analysis using the SPSS software package and will use the knowledge to complete their own research projects. Thus, at this level, students become active participants in conducting self-directed social work research. Additionally, students continue to deepen and extend their knowledge and skills as they relate to social work research and evaluation at the generalist practice level. Substantive topics include: frequency distributions, measures of central tendency and variability, hypothesis testing, inferential statistics, including correlation and regression. Focus will also be on the application of research methods to the evaluation of interventions at various levels. In follow up to Research and Evaluation Methods I, this course continues to explore social research as a means for promoting a Black perspective, strengths perspective, empowerment, rural, and global perspective, and for attending to cultural diversity and social and economic justice for all, especially populations-at-risk. Credits, three hours.

SCWK 610. ADMINISTRATION, MANAGEMENT & SUPERVISION

This course is designed to increase students' knowledge and skills for social work macro practice in organizations. The course aims to prepare students for leadership positions as administrator, manager and supervisor. Accordingly, students will be encouraged to think from an organizational point of view; specifically, looking at systems dynamics and the functioning of the organization as an entity and to critically think and behave like managers and leaders, with a broad, visionary perspective and an emphasis on both results and process. The course is taught with the point of view that organizations provide services in a manner reflecting its orientation to service delivery. Hence, students are challenged to consider how an organization should organize and deliver services and manage its diverse human resources in a manner consistent with strengths, empowerment, and global perspectives. Credits, three hours.

SCWK 633. FIELD PRACTICUM I

To be taken by first year students in the field. This course provides students with opportunities to employ the knowledge, values, skills and conceptual frameworks that are related to the generalist perspective in agency settings while under the supervision of an approved field instructor. Students are enabled to develop and refine the skills necessary for effective advanced practice and to integrate the concepts and philosophy of empowerment. The generalist perspective to social work practice and a Black Perspective in the helping process are applied with all client systems. Credits, three hours.

SCWK 634. FIELD PRACTICUM II

To be taken by first year students in the field. This course provides students with opportunities to employ the knowledge, values, skills and conceptual frameworks that are related to the generalist perspective in agency settings while under the supervision of an approved field instructor. Students are enabled to develop and refine the skills necessary for effective advanced practice and to integrate the concepts and philosophy of empowerment. The generalist perspective to social work practice and a Black Perspective in the helping process are applied with all client systems. Credits, three hours.

SCWK 635. FIELD PRACTICUM III

To be taken by second year students in the field. This course provides Advanced Generalist Practice students with opportunities to employ the knowledge, values, skills and conceptual frameworks that are related to the generalist perspective in agency settings while under the supervision of an approved field instructor. Students are enabled to develop and refine the skills necessary for effective advanced practice and to integrate the concepts and philosophy of empowerment, the generalist perspective to social work practice and a Black Perspective in the helping process with all client systems. Credits, three hours.

SCWK 636. FIELD PRACTICUM IV

This course provides students with opportunities to employ the knowledge, values, skills and conceptual frameworks that are related to the advanced generalist perspective in agency settings while under the supervision of an approved field instructor. Students are enabled to develop and refine the skills necessary for effective advanced practice and to integrate the concepts and philosophy of empowerment, the generalist perspective to social work practice and a Black Perspective in the helping process with all client systems. Credits, three hours.

SCWK 643. THEORIES OF PERSONALITY & ADULT PSYCHOPATHOLOGY

This is a required second year course that builds on Human Behavior and Social Environment I & II by expanding students' understanding of mental disorders over the life span that social workers are likely to encounter in their practice with individuals, families, communities, groups and organizations. The critical influence of culture, class, ethnicity, social values and other distinguishing characteristics of the individual, family, and communities is emphasized. Disparities in mental health delivery systems and their implications for advanced generalist practitioners as advocates for equal access to mental health services by all persons is a major focus of the course. The course expands students' knowledge and skills in assessing, developing intervention plans and intervening with clients experiencing mental disorders. Personality and behavioral symptoms in children, adolescents and adults, including development disorders, learning disorders, developmental delays and mental retardation through class discussion and case presentations. The Diagnostic and Statistical Manual of Mental Disorders is used as a framework for identification of key elements of mental disorders. Alternative models for assessing mental disorders from a bio-psycho-social perspective are examined. Several child and adult diagnostic categories are addressed from a person and environment perspective. Current research pertaining to the biological, psychological and environmental explanations for mental disorders is reviewed. Credits, three hours.

SCWK 646. ADVANCED GENERALIST PRACTICE I

This is a required second year course that builds on the vertical integration of Generalist Practice I & II and the other across the curriculum foundation content areas that include human behavior and social environment, policy, research, and field across the foundation curriculum. The course focuses on engagement and assessment phases of the planned change process with individuals, families and treatment groups, and is designed to develop advanced knowledge and skills for advanced generalist practice at the micro and mezzo levels. In addition, the course enables students to independently integrate social work values and ethics with clients experiencing serious, complex problems. Problem solving processes of engagement and assessment are taught according to an ecological and holistic social work perspective. Core organizing frameworks for assisting clients are a Black perspective for social work practice, empowerment, the strengths perspective, the rural perspective, and the global perspective. These underpinnings mean that the course necessarily provides students with advanced level skills that support clients' capacities to recover from serious problems and, in addition, addresses the ways social injustices, e.g., health disparities, institutionalized racism, etc., negatively impact the well-being of individuals and families. This course also explores the implications of such injustices on advanced practice with treatment groups. The grade "B" must be earned in this course. Credits, three hours.

SCWK 647. ADVANCED GENERALIST PRACTICE II

This is the second of a four-part advanced generalist practice sequence. It is a required second year course that builds on the vertical integration of Generalist Practice I & II and the other across the curriculum foundation content areas that include human behavior and social environment, policy, research, and field. The course focuses on the engagement and assessment phases of the planned change process in and with communities and organizations, and is designed to develop advanced knowledge and skills for advanced generalist practice at the micro and mezzo levels. The course focuses on effective models for engaging communities and organizations as a necessary step for assessing needs and problems that are impediments to community well-being and the effective administration and management of human service organizations. Reflecting the program's underpinnings — a Black perspective for

social work practice, empowerment, the strengths perspective, the rural perspective and the global perspective — the course gives special attention to the significance of such factors as ethnicity, culture, class, and community values when assisting communities and organizations that are experiencing complex, difficulty needs and problems. The grade "B" must be earned in this course. Students enrolled in this course must also enroll in the appropriate second year field instruction course. Credits, three hours.

SCWK 651. PRACTICE PROGRAM EVALUATION FOR THE ADVANCED PRACTITIONER

This is the third course in a three course research sequence that introduces students to concepts in program evaluation. It focuses on the knowledge skills and procedures used for practice and program evaluation. Practice evaluation emphasizes the integration of research and practice by utilizing single subject/case design methodology and group designs. The course focuses on analysis of evaluation studies concerned with special populations. Values and ethics of the social work profession, in relation to research methods used in evaluation, are addressed. Content includes needs assessment, formative evaluation, program monitoring, outcome evaluation, and cost-benefit analysis. Students will also learn about qualitative research, focus group interviews, action research and participatory research. Additionally, students continue to deepen and extend their knowledge and skills as they relate to social work research and evaluation at the generalist practice level. This course continues to explore social research as a means for promoting strengths perspective, empowerment, and rural perspectives, and for attending to cultural diversity and social and economic justice for all, especially populations-at-risk. Credits, threehours.

SCWK 660. ADVANCED GENERALIST PRACTICE

This course examines the activities that entail public health as essential approaches social workers should undertake and/or be involved in to address health issues that adversely impact the well-being of individuals, families, communities, and vulnerable populations. The course will define public health, and examine its mission, foci, and functions. In addition, the course will focus on how an individual and population-level approach are merged to include a partnership between social work and public health to prevent and solve health and related problems that threatened the well-being of individuals and communities, especially populations that are vulnerable to phenomenon such as health disparities due to class status, gender, sexual orientation, and mental health status. The course will emphasize prevention of health problems before they emerge. The course will examine concepts such as risk, resilience and protection factors as variables to be taken into account when developing and implementing programs to ensure that all people have essential health care services and programs. The course will also review the history of public health social work, the roles and functions of public health social workers in a variety of arenas, and interventions and strategies public health social workers utilize to assure the delivery of public health services to all populations, particularly at-risk groups. The course will also present an introduction to the cross-cutting areas of public health including communication and informatics, diversity and culture, leadership, public health biology, professionalism, program planning, and systems thinking. Credits, three hours.

SCWK 668. ADVANCED GENERALIST PRACTICE III

This is the third course in the four-part advanced generalist practice sequence. It is a required second year course that builds on the vertical integration of Generalist Practice I & and II and the other across the curriculum foundation content areas that include human behavior and social environment, policy, research, and field. The course prepares students for advanced generalist social work practice with an emphasis on intervention and evaluation with individuals, families, and treatment groups. Building on the advanced skills for engagement and assessment derived from Advanced Generalist Practice I, this course provides concepts, and principles that enable students to assist clients experiencing serious, complex problems. A Black perspective for social work practice, empowerment, the strengths perspective, the rural perspective and the global perspective are utilized to increase students' proficiency in tapping clients' internal and external resources to face and overcome problems that could prevent productive relations and functioning in society. Major attention is given cultural competence for effective practice with populations, e.g., African American, Latinos, gays, lesbians, the poor and elderly, who have long histories as targets of racism, discrimination and prejudice. Credits, three hours.

SCWK 669. ADVANCED GENERALIST PRACTICE IV

This is the final course of the four-part advanced generalist practice sequence. It is a required second year course that builds on the vertical integration of Generalist Practice I & and II and the other across the curriculum foundation content areas that include human behavior and social environment, policy, research, and field. It focuses on the intervention and evaluation of the planned change process. The course considers models for problem solving inside organizations and for understanding communities, intervening with them and evaluating the effectiveness of practice with communities. Strategies for initiating and pursuing change in communities and organizations are identified, including different points of intervention. Throughout the course, special attention is given to factors affecting diverse population groups, including, but not limited to, groups distinguished by race, ethnicity, culture, class, gender, sexual orientation, religion, physical or mental ability, age, and national origin. Strategies for mobilizing communities to address problems before they emerge are explored. The grade "B" must be earned in this course. Students enrolled in this course must be also enrolled in the appropriate second year field instruction course. Credits, three hours.

MASTER OF SOCIAL WORK FULL TIME

*College of Health and Behavioral Sciences
Department of Social Work*



PROGRAM: MASTERS IN SOCIAL WORK (MSW)

Student Name:			Student ID: D			
Year One Fall Semester			Year One Spring Semester			
Course	Course Name	Cr	Course	Course Name	Cr	
SCWK 601	Social Welfare Policies & Services Policy I	03	SCWK 602	Social Welfare Policies & Services Policy II	03	
SCWK 603	Human Behavior & the Social Environment I	03	SCWK 604	Human Behavior & the Social Environment II	03	
SCWK 605	Generalist Practice I	03	SCWK 606	Generalist Practice II	03	
SCWK 607	Research & Evaluation I	03	SCWK 608	Research & Evaluation II	03	
SCWK 633/804	Field Practicum I	03	SCWK 634/805	Field Practicum II	03	
Total Credits		15	Total Credits		15	
Year Two Fall Semester			Year Two Spring Semester			
Course	Course Name	Cr	Course	Course Name	Cr	
SCWK 646	Advanced Generalist Practice I	03	SCWK 668	Advanced Generalist Practice III	03	
SCWK 647	Advanced Generalist Practice II	03	SCWK 669	Advanced Generalist Practice IV	03	
SCWK 643	Theories of Personality & Adult Psychopathology	03	SCWK 610	Administration, Management & Supervision	03	
SCWK 651	Practice & Program Evaluation for the Advanced Practitioner	03	SCWK 660	Advanced Generalist Practice in a Health Context	03	
SCWK 635	Field Practicum III	03	SCWK 636	Field Practicum IV	03	
Total Credits		15	Total Credits		15	
			Total 60			

*Denotes a Core Requirement

+Denotes an elective

Total Core Credits = 60 credits

Total Elective Credits = 0

Candidacy Requirement: Completion of 30 credit hours with 3.0 GPA or equivalent

Capstone or Culminating Experience: Successful completion of required courses and Field Practicum, and submission of the last year's Field evaluation, and a Practice paper or presentation and grading rubric.

Outcomes report to Graduate Studies and Research prior to graduation

MASTER OF SOCIAL WORK ADVANCED STANDING

College of Health and Behavioral Sciences
Department of Social Work



PROGRAM: MASTERS IN SOCIAL WORK (MSW)

<i>Advanced Standing</i>				<i>Advanced Standing</i>			
				<i>Advanced Standing</i>			
	<i>Total Credits</i>	15			<i>Total Credits</i>	15	
<i>Year Two Fall Semester</i>				<i>Year Two Spring Semester</i>			
Course	Course Name	Cr		Course	Course Name	Cr	
SCWK 646	<i>Advanced Generalist Practice I</i>	03		SCWK 668	<i>Advanced Generalist Practice III</i>	03	
SCWK 647	<i>Advanced Generalist Practice II</i>	03		SCWK 669	<i>Advanced Generalist Practice IV</i>	03	
SCWK 643	<i>Theories of Personality & Adult Psychopathology</i>	03		SCWK 610	<i>Administration, Management & Supervision</i>	03	
SCWK 651	<i>Practice & Program Evaluation for the Advanced Practitioner</i>	03		SCWK 660	<i>Advanced Generalist Practice in a Public Health Context</i>	03	
SCWK 635	<i>Field Practicum III</i>	03		SCWK 636	<i>Field Practicum IV</i>	03	
	<i>Total Credits</i>	15			<i>Total Credits</i>	15	
30 credits waived, and 30 course credits with a preceding summer seminar.						Total Credits: 30	

*Denotes a Core Requirement

+Denotes an elective

Total Core Credits = 30 credits

Total Elective Credits = 0

Candidacy Requirement: Completion of 15 credit hours and Advanced Standing Seminar with a 3.0 GPA or equivalent

Capstone or Culminating Experience: Successful completion of required courses and Field Practicum, and submission of the last year's Field evaluation, and a Practice paper or presentation and grading rubric.

Outcomes report and rubric to Office of Graduate Studies and Research prior to graduation

MASTER OF SOCIAL WORK PART TIME

*College of Health and Behavioral Sciences
Department of Social Work*



PROGRAM: MASTERS IN SOCIAL WORK (MSW)

Foundation Fall – Year 1	Foundation Spring – Year 1
SCWK 601 Social Welfare Policy & Services I (3) SCWK 603 Human Behavior & the Social Environment I (3) SCWK 607 Research & Evaluation Methods for Social Work I (3)	SCWK 602 Social Welfare Policy & Services II (3) SCWK 604 Human Behavior & the Social Environment II SCWK 608 Research & Evaluation Methods for Social Work II (3) (Data Analysis)
Foundation Fall – Year 2	Foundation Spring – Year 2
SCWK 605 Generalist Practice I (3) SCWK 633 Field Practicum I (3) SCWK 643 Theories of Personality (3)	SCWK 606 Generalist Practice II (3) SCWK 634 Field Practicum I (3) SCWK 660 AGP I Pub Health (3)
Concentration Fall – Year 3	Concentration Spring – Year 3
SCWK 646 Advanced Generalist Practice I: Engagement & Assessment with Individuals & Treatment Groups (3) SCWK 647 Advanced Generalist Practice II: Engagement & Assessment with Communities & Organizations (3) SCWK 635 Field Practicum III (3)	SCWK 688 Field Practicum (3) SCWK 668 Advanced Generalist Practice III: Intervention & Evaluation with Individuals, Families & Treatment Groups (3) SCWK 669 Advanced Generalist Practice IV: Intervention with Communities & Organizations (3)
Concentration Fall – Year 4	Concentration Spring – Year 4
SCWK 643 Theories of Personality & Adult Psychopathology (3) SCWK 651 Practice & Program Evaluation for the Advanced Practitioner (3)	SCWK 610 Administration, Management & Supervision (3) SCWK 660 Advanced Generalist Practice in a Public Health Context (3)

*Denotes a Core Requirement | +Denotes an elective

Total Core Credits = 60 | Total Elective Credits = 0

Candidacy Requirement: Completion of 30 credit hours with 3.0 GPA or equivalent

Capstone or Culminating Experience: Successful completion of required courses and Field Practicum, and submission of the last year's Field evaluation, and a Practice paper or presentation and grading rubric

Outcomes report and rubric to Office of Graduate Studies and Research prior to graduation

COLLEGE OF HUMANITIES, EDUCATION AND SOCIAL SCIENCES



Department of Education

Ed.D. in Educational Leadership
M.Ed. in Educational Leadership

Department of English and Foreign Languages

MA Teaching English to Speakers of Other Languages (TESOL) / Bilingual Education
TELL Program Secondary Certification in Teacher of English Language Learners/ Bilingual Teacher
Online Graduate Certificate in TESOL

Department of Public Administration

MS of Public Administration

DOCTOR OF EDUCATION (Ed.D.) IN EDUCATIONAL LEADERSHIP

The Doctor of Education in Educational Leadership blends together scholarship and practice. This transformative doctoral program prepares students for leadership roles in P-12 Education, Higher Education, or other educational and/or research organizations. Students will envision the future of great educational institutions, interacting with global minds, using 21st century cutting-age research and practice approaches, and developing a new vision for the education of the diverse society.

PROGRAM OBJECTIVES

In collaboration with the State of Delaware, the purpose of Delaware State University's Doctor of Education (Ed.D.) in Educational Leadership program is to prepare educational leaders for prominent leadership and service positions in school districts and higher education sectors. Through a rigorous educational foundation and directed field experience, students emerge as viable candidates for leadership positions throughout the country. At Delaware State University, students find a unique balance between rigorous research, serious academic studies, partnership, collegiality, and personal development. Students will be prepared to make data-driven decisions to serve authentically and lead with integrity. Students hone their personal leadership style, create a new career path and learn to meet the challenges in any situation. Most states require Doctor of Education in K- 12 to gain licensure to become a superintendent or assistant superintendent in a school district. Our program does not provide a licensure or a certification and will not certify a student as a superintendent or assistant superintendent in a school district or as a Certified Central Office personnel. More information about the requirements for superintendent or assistant superintendent certification in the state of Delaware can be found at:

<http://regulations.delaware.gov/AdminCode/title14/1500/1593.shtml#TopOfPage>.

To serve the professional needs of the students and to meet the growing demands of the job market, our doctoral program offers two concentrations to choose from:

(i) Doctor of Education (Ed. D.) in Educational Leadership in K-12, (3-year program; 51 credit hours)

(Note: The curriculum of this program is under revision to align it with the upcoming NELP Standards and the revised program will be of three-and-a-half-year duration with 55 credit hours)

(ii) Doctor of Education (Ed. D.) in Educational Leadership in Higher Education (three-and-a-half years; 55 credit hours)

Courses are conducted in an accelerated weekend format. Courses span six weeks and the classes are normally held in the first, third and sixth weekends of a six-week session. Normally, a two-week break is provided between the courses so that the students can prepare for the next course. Sessions are held on Friday nights from 5- 9 p.m.; Saturdays from 9 a.m.-4 p.m. and Sundays from 10 a.m.- 3 p.m.

Our program prepares leaders who will be equipped with a repertoire of knowledge, skills, and dispositions to meet the challenges of educational leadership in the 21st century and will emerge as:

- Skilled educational leaders who can connect and apply educational research to policy and practice to serve the institution and the community.
- Critical thinkers who strive to become successful, effective, efficient and socially responsive administrators.
- Change agents and reflective practitioners who stimulate interest in using national databases to address educational issues.
- Professionals who can effectively utilize education software tools for data collection & data analysis, and adopt other information technology to broaden their vision of learning.
- Self-aware and ethical professionals who demonstrate ethical and professional competence in their chosen disciplines.

- Professionals who value diversity, demonstrate a deep commitment to diversity issues and are role models for the community.
- Informed leaders who demonstrate the understanding of lifelong learning and personal flexibility to sustain personal and professional development.

PROGRAM GOALS

- Provide a high-quality educational program that prepares candidates for successful careers as administrative leaders.
- Provide a program of study that promotes effective organizational and individual performance.
- Maintain a professional environment that promotes an understanding of and appreciation for diversity.
- Provide a rigorous multidisciplinary advanced program of study for working professionals that fosters continuous refinement of leadership knowledge and skills.

Specific goal of K - 12 Concentration:

- To help the students articulate a vision for public schools at the district level as well as other educational institutions and involve all the stakeholders in strategic planning, implementing, and evaluating processes which benefit the academic growth and development of all students.

Specific goal of Higher Education Concentration:

- To provide the students with grounding in the conceptual underpinnings of the practice of higher education. It will prepare them with a broad appreciation and understanding of educational systems in social, historical, and normative perspectives as related to theory and research on educational leadership in higher education.

STUDENT LEARNING OUTCOMES

The Department of Education at Delaware State University has established the following Learning Outcomes for its doctoral program:

Student Learning Domains & Learning Outcomes for Ed. D. in K-12 Concentration:

- **Learning Domain: Vision**

Students will be able to facilitate the development, articulation, implementation, and stewardship of a district-wide vision of learning supported by the school community.

- **Learning Domain: Culture**

Students will be able to promote a positive district culture, provide an effective instructional program, apply best practices to student learning, and design comprehensive professional growth plans for staff.

- **Learning Domain: Management**

Students will be able to manage district organization, operations, and resources in a way that promotes a safe, efficient, and effective learning environment.

- **Learning Domain: Collaboration**

Students will be able to collaborate with the families and other community members, respond to diverse community interests and needs, and mobilize community resources.

- **Learning Domain: Ethics/Integrity**

Students will be able to act with integrity, fairly, and in an ethical manner.

- **Learning Domain: Context/Influence**

Students will be able to influence the larger political, social, economic, legal, and cultural context.

- **Learning Domain: Research and Real-Work Applications**

Students will be able to synthesize and apply the above outcomes through substantial, sustained, standards-based work in real settings.

Student Learning Domain & Learning Outcomes for Ed. D. in Higher Education Concentration:

- **Learning Domain: Knowledge acquisition, integration, construction, and application**

Students will be able to understand knowledge from a range of disciplines; connect knowledge to other knowledge, ideas, and experiences; construct knowledge; and relate knowledge to daily life.

- **Learning Domain: Cognitive complexity**

Students will be able to demonstrate critical thinking, reflective thinking, effective reasoning, and creativity.

- **Learning Domain: Intrapersonal development**

Students will be able to develop realistic self-appraisal, self-understanding, and self-respect; identity development; commitment to ethics and integrity; and spiritual awareness.

- **Learning Domain: Interpersonal competence**

Students will be able to develop meaningful relationships, interdependence, collaboration, and effective leadership.

- **Learning Domain: Humanitarianism and civic engagement**

Students will be able to develop an understanding and appreciation of cultural and human differences, social responsibility, global perspective, and sense of civic responsibility.

- **Learning Domain: Practical competence**

Students will be able to pursue goals, communicate effectively, develop technical competence, manage personal affairs, manage career development, demonstrate professionalism, maintain health and wellness, and live a purposeful and satisfying life.

ADMISSION DEADLINES

Application Deadlines:

Fall enrollment - June 30

International Admission Deadlines:

Fall enrollment – May 1

All applicants are required to submit evidence of the following for the consideration of unconditional admission:

- An earned master's degree with a minimum cumulative grade point average of 3.00.
- A completed online application for admission.
- The non-refundable application fee of \$50.00 made payable to Delaware State University.
- Official transcript(s) of all academic work completed.
- Graduate Record Exam (GRE) scores or Miller Analogies Test (MAT) scores. Testing must be within 5 years of application. Scores must be submitted prior to being admitted into program. The acceptable cut-off scores: (i) GRE: 40 percentiles (+ - 1) and a score of 3.0 or better on the Analytical Writing component; and (ii) MAT: 40 percentiles (+ - 1). An applicant seeking the GRE/MAT waiver must have a minimum GPA of 3.50 with a demonstrated ability of writing a five-chapter master's thesis.
- A resume.
- Three letters of recommendation (two academic/ professional recommendations and one- character recommendation) – via the online application process.
- An "essay." The candidate must specifically explain why he or she wants to be admitted in the Ed.D. in Educational Leadership program. The essay needs to be focused on concentration-specific educational leadership. Specifications: 2-5 pages, APA style, grammatical error free.
- An applicant must be working in or toward a leadership role in his or her current position, or must have similar experience (e.g., administrator coordinator or teacher at a district/school, higher education, or education department in other organization). For admission in Ed.D. (K-12 Concentration), the applicant must hold a valid Delaware Initial, Continuing, or Advanced Licensure; or a Limited Standard, Standard, or Professional Status Certificate issued by the Department prior to August 31, 2003, or must hold such or similar certification from any other state.
- Copies of any earned teaching and/or administrative certificates (optional).
- Sample of scholarly work: It is optional for an applicant who has conducted some research or has some research publications that he or she wants to highlight.

The Director of Education Graduate Programs and the Education Graduate Admission Ad hoc Committee will review students' application materials and make a recommendation for acceptance into the program to the Dean, Graduate Studies and Research, who will extend an offer of admission to the applicant.

Requirements for International Applicants

Please review application procedures at the following link: <https://www.desu.edu/academics/international-programs/prospective-international-students>. In addition to the requirements noted above, international applicants must submit WES, ECE, or GCE evaluation of all academic work completed as well and results from the TOEFL or IELTS examination if the earned baccalaureate degree is from a non-English speaking country.

All international students must also meet visa requirements of the Office of International Student Services (OISS) before a Certificate of Eligibility for Non-Immigrant (F-1), Student Vias (I-20 A-B form) can be issued. Please review procedures at the following link: <https://www.desu.edu/admissions/other-admissions-types/international-students>.

QUALIFYING EXAMINATION

Students are required to take a Qualifying Examination. It is an exhaustive exam designed to provide students an opportunity to demonstrate their analytical writing ability by conceptualizing and synthesizing their knowledge in an organized and cogent manner. The schedule of this exam is included in the cohort plan of the program provided to the students at the time of New Student Orientation.

INTERNSHIP EXPERIENCE

As a part of the degree requirements, the students of the K-12 concentration will be required to complete 240 hours of internship in a K-12 setting, and the students of the Higher Education concentration will be required to complete 120 hours of field experience in a higher education setting.

CAPSTONE

The Ed.D. program offers three capstone options for the final capstone experience -- i.e. the Case Study Analysis, the Project Study, and the Dissertation. Doctoral candidates must complete and orally present and defend a doctoral research capstone as one of their course requirements.

Professional Portfolio: In consultation with their academic advisor, the candidates will also be required to submit a professional portfolio in the office of Education Graduate Programs after successfully defending their final capstone. The candidates from K-12 concentration will submit a professional portfolio reflecting their experiences and skills related to district-level ELCC/NELP standards. Candidates of the Higher Education concentration will submit a professional portfolio reflecting activities/projects completed during their field experience and the major course assignments related with CAS standards.

TRANSFER OF CREDITS

Applicants who have earned a grade of "B" or higher in graduate courses taken at an accredited institution and related to their proposed program of study can request consideration for transfer of credit. These courses will be evaluated on an individual basis by the respective Graduate Program.

Applicants admitted to doctoral programs with an earned master's degree from an accredited institution must provide supporting documentation (as requested by the Program) at the time of admission. Program Directors will review all documentation and note the allowable course waivers in the program's recommendation to Graduate Studies and Research. The Dean of Graduate Studies and Research will note approval of hours in the admissions offer.

DEGREE REQUIREMENTS

This program of study requires the completion of **55 graduate credit hours** including an integral component of Applied Educational Internship/Field Experience. The students of K-12 concentration will be required to complete 240 hours of internship in a K-12 setting, and the students of Higher Education concentration will be required to complete 120 hours of field experience in a higher education setting.

FACULTY

The Department of Education's distinguished faculty members include nationally and internationally known authors, researchers and academicians. The faculty members have achieved notable distinction in their respective fields. The faculty combines academic expertise with direct experiences in the field of education. Their knowledge, skills and experience enables them to offer practical guidance and mentorship, helping students adapt to the professional world and make wise career choices.

PROGRAM FACULTY

Dr. Bob Martin, Professor
Dr. Joseph Falodun, Associate Professor
Dr. Chandra Aleong, Associate Professor
Dr. Richard Phillips, Associate Professor
Dr. Nirmaljit K. Rathee, Professor
Dr. Sae Yeol Yoon, Assistant Professor
Dr. Chetanath Gautam, Assistant Professor

CORE COURSES FOR K-12 AND HIGHER EDUCATION CONCENTRATIONS

(FOR COHORT 2017)

EDUC-803. HUMAN RESOURCES MANAGEMENT/PERSONNEL ADMINISTRATION:

This course addresses the role and functions, strategic planning, information technology, recruitment, selection, and induction of employees, staff development, performance appraisal, compensations, employment continuity, and unionism from the human resource administrator's standpoint. Additionally, this course addresses the human relations aspects intrinsically involved in and through the human resource parameters. The relationship of the human resources office to the effective, safe, and efficient operation of an educational organization's vision for the promotion of student success is further examined. 3 credits.

EDUC-805. QUANTITATIVE RESEARCH METHODS IN EDUCATION:

This course is designed to prepare doctoral students to understand, interpret, evaluate and design quantitative research and to develop the ability to select and use appropriate research methods. This course integrates the major concepts and practices of quantitative research methodology and introduces descriptive and inferential statistics. This course focuses on the development and application of research for the purpose of writing the doctoral capstone. Topics addressed in this course include choice of research methods, developing a problem statement and proposal, preparing questionnaires, conducting research, tabulating data, and reaching conclusions from quantitative data. Additionally, this course includes readings on methodology, lectures, discussions, presentations, and in-class exercises that are designed to highlight various issues. 3 credits.

EDUC-808. ORGANIZATIONAL STRATEGIC PLANNING AND PROGRAM ANALYSIS:

This course explores the steps of the strategic planning process in educational organizations. The benefits of involving a broad range of personnel in the process are discussed. The doctoral student will examine the following strategic planning steps: the development of a mission statement; completion of an environmental scan; development of key objectives and initiatives; design of programs and activities to accomplish the key objectives; and determination of performance measures to monitor and evaluate the organization's progress toward accomplishing its key objectives. 3 credits.

EDUC-888. ACTION RESEARCH AND QUALITATIVE RESEARCH METHOD IN EDUCATION:

This course addresses the role of action research in studying the underlying problems that occur in educational organizations. The role of action research as it relates to educational leadership roles in strategic planning, change management and organization development will be emphasized. Types of action research, their advantages and disadvantages, the action research process and the similarities and differences between action research and formal qualitative research will be examined. The Qualitative research paradigm will be further examined and explored. Participants will have hands-on opportunity to plan action research projects and apply action research planning techniques. 3 credits.

FOR COHORT 2018 ONWARD

EDUC 805. RESEARCH DESIGN AND QUANTITATIVE RESEARCH METHODS:

This course is designed to prepare doctoral students to understand, interpret, evaluate and design quantitative research and to develop the ability to select and use appropriate research methods. This course integrates the major concepts and practices of quantitative research methodology and introduces descriptive and inferential statistics. This course focuses on the development and application of research for the purpose of writing the doctoral capstone. Topics addressed in this course include choice of research methods, developing a problem statement and proposal, preparing questionnaires, conducting research, tabulating data, and reaching conclusions from quantitative data. Additionally, this course includes readings on methodology, lectures, discussions, presentations, and in-class exercises that are designed to highlight various issues. Credits, Three Hours.

EDUC-808. ORGANIZATIONAL STRATEGIC PLANNING AND PROGRAM ANALYSIS:

This course explores the steps of the strategic planning process in educational organizations. The benefits of involving a broad range of personnel in the process are discussed. The doctoral student will examine the following strategic planning steps: the development of a mission statement; completion of an environmental scan; development of key objectives and

initiatives; design of programs and activities to accomplish the key objectives; and determination of performance measures to monitor and evaluate the organization's progress toward accomplishing its key objectives.

Credits: Three Hours

EDUC 831: FOUNDATIONS OF DOCTORAL STUDIES

The purpose of this course is to provide an overview of the doctoral program and identify the skills required for students to become innovative leaders in the present-day education sector. The key features of this course will highlight the unique differences of each concentration. Doctoral capstone options will be discussed. The course will focus on writing style, grammar, and use of APA style and citations. Collaboration and individual assignments will ensure students have the scholarly writing, critical thinking, oral communication, and research skills essential for completion of their capstone experience and development of high level of leadership skills. Credit, One Hour.

EDUC 833: APPLIED ASSESSMENT AND DATA ANALYTICS

Education institutions must assess varied and extensive information to gauge institutional effectiveness and generate data-based decisions. Upon completing the course, participants will be able to locate, examine, and interpret qualitative and quantitative educational research and assessment data to determine areas of institutional effectiveness or concern. Students will also use this course to help solidify the data needed for their capstone experience and determine the most appropriate method to solve their research problem. At the completion of this course, students will select a preliminary capstone option and submit their decision to Graduate Studies and Research. Credit, three hours.

EDUC 835: USE OF TECHNOLOGY IN ACTION RESEARCH AND DATA DRIVEN DECISION MAKING

While Applied Assessment and Data Analytics course (EDUC 833) focuses on interpreting data, this course emphasizes designing and evaluating assessment strategies. Students will synthesize appropriate assessment measures and appraise data collection methods; determine if the assessment methods generate the necessary data; and make recommendations for improvements in the assessment process. The class participants will draw conclusions based on the data presented, while discussing the limitations of data collection designs and validity of the results. In addition, presenting results to stakeholders and effectively using data to persuade institutional decisions will be practiced. Students will find the concepts presented in this course valuable when writing discussion or application portion of their capstone experience. Credit, three hours.

EDUC 888. QUALITATIVE AND MIXED RESEARCH METHODS IN EDUCATION

This research course provides students with the opportunity to develop knowledge and skills for designing qualitative research at the doctoral level. Students will explore the nature of qualitative inquiry; field work strategies and the nature of observation; theoretical approaches to qualitative research; the importance of quality assurance; and the ethical, legal, and social change implications of conducting qualitative research. They will practice using software to code data and interpret and present results. Course participants will apply their knowledge and skills by developing a possible qualitative research plan to examine their research interests. Credit, three hours.

RESEARCH COURSES

(UP TO COHORT 2016)

EDUC-817. RESEARCH SEMINAR I: Dissertation/Project Study/Case Study - Writing:

The research seminar is designed to address doctoral candidates' progress as they navigate through the doctorate program. Course familiarizes candidates with the importance of Form/Style (APA) and Scholarly writing. An orientation to the capstone process is discussed. Emphasis is placed on the Ed. D. course sequences and capstone products for each of the Research seminars. Special attention is given to literature review and the importance of understanding the complexity of conducting a search. Additionally, students are assisted on how to select a capstone topic, determination of their research format, and the chapter requirements. Doctoral candidates meet with the course professor as a cohort group. Discussion of policies and procedures of the capstone process takes place in this course/ seminar. 1 credit hour.

EDUC-818. RESEARCH SEMINAR II: Dissertation/Project Study/Case Study - Prospectus Workshop:

The research seminar is designed to address doctoral candidates' progress in the choice of topic, determination of their research format, and the capstone chapter requirements. Assistance is given to clarify the candidate's research

question(s), determine the appropriate research design, methodologies and analysis of data. Doctoral candidates meet with the course professor as a cohort group and on an individual basis. Discussion of policies and procedures of the capstone process and the qualifying exam are addressed in this course/seminar. 1 credit hour

EDUC-819. RESEARCH SEMINAR III: Dissertation/Project Study/Case Study – Final Research Document Preparation:

This course provides a comprehensive review and knowledge of educational leadership research and prepares students for the final research document preparation. Emphasis is placed on understanding of a variety of leadership paradigms, understanding of quantitative and qualitative research competencies, how to effectively analyze data and examine their own leadership experiences through the lenses of the Education Leadership curriculum. Instructions are given on how to complete the final research document. Doctoral candidates meet with the course instructor as a cohort group and on an individual basis with their respective advisory committee chair. Discussion of policies and procedures of the dissertation/project study/case study process is addressed in this course. 1 credit hour

EDUC-820. RESEARCH COURSE I: Dissertation: IRB Prep & Developing Prospectus; Project Study: Identifying the Problem; Case Study: Selecting the Problem:

This course provides candidates in the doctoral program of Educational Leadership with advisement and support while carrying out their doctoral research study. Doctoral candidates are required to address one or more ELCC/NELP standards through their choice of doctoral research. This course provides assistance with completing and presenting the prospectus. The overarching objective of this course is for students to demonstrate readiness to conduct doctoral research. EDUC 820 is designed as the culminating experience of the first-year experience of the Ed. D. leadership program. 3 credit hours

EDUC-821. RESEARCH COURSE II: Dissertation: Proposal Completion & Defense; Project Study: Development of Project; Case Study:

Presentation of Analysis: This course provides a comprehensive review and knowledge of Educational Leadership research. Emphasis is placed on understanding of a variety of leadership paradigms, understanding of quantitative and qualitative research competencies, how to effectively analyze data and examine their own leadership experiences through the lenses of the educational leadership curriculum. 3 credit hours

EDUC-822. RESEARCH COURSE III: Dissertation/Project Study/Case Study – Research Doc. Finalization & Defense Prep:

This course provides a comprehensive review and knowledge of Educational Leadership research and prepares students for the completion, defense and submission of the final research document. Emphasis is placed on understanding of a variety of leadership paradigms, understanding of quantitative and qualitative research competencies, how to effectively analyze data and examine their own leadership experiences through the lenses of the educational leadership curriculum. Instructions are given on how to write final research document. Doctoral candidates meet with the course professor as a cohort group and on an individual basis with their respective advisory committee chair. Discussion of policies and procedures of the capstone process is addressed in this course. 3 credit hours

EDUC-823. RESEARCH COURSE IV: Dissertation/Project Study/Case Study – Research Document Completion, Defense & Submission process:

This course provides candidates in the doctoral program of Educational Leadership with advisement and support while carrying out their dissertation/project study/case study. Doctoral candidates are required to address one or more ELCC/NELP standards through their choice of dissertation/project study/case study research. 3 credit hours

(FOR COHORT 2017 ONWARD)

EDUC-840. RESEARCH SEMINAR I: PROSPECTUS:

All doctoral students are required to complete a capstone experience emphasizing innovation in K-12 & higher education leadership. In this course, students will officially begin focusing on their doctoral capstone experience while building on assignments from previous courses. The students will be provided with examples of each type of capstone option and will outline their individual experience. All students will complete Institutional Review Board training. At the completion of this course, students will provide a prospectus of their capstone experience to their committee members. 3 credit hours

EDUC-841. RESEARCH SEMINAR II: PROPOSAL WRITING AND DEFENSE:

Doctoral students will continue independently progressing toward the completion of their capstone experience. Their experience must be approved by their committee members and students are encouraged to work closely with their committee chair as they develop a proposal. This course will involve extensive reading of research and writing. At the completion of this course, students are expected to have written and defended their capstone experience proposal. Students must have their capstone experience approved by their committee. 3 credit hours.

EDUC-842. RESEARCH SEMINAR III: DATA COLLECTION:

Doctoral students will continue independently progressing toward the completion of their capstone experience. Their experience must be approved by their committee members and students should work closely with their committee chair as they develop and defend their proposal. This course will involve extensive reading of research and writing. By the end of this course, students must successfully collect any data required for their capstone experience. 3 credit hours

EDUC-843. RESEARCH SEMINAR IV: CAPSTONE WRITING:

Doctoral students will continue independently progressing toward the completion of their capstone experience. Their experience must be approved by their committee members and students should work closely with their committee as they work on their experience. This course will involve extensive reading of research and writing. By the end of this course, students must demonstrate progress in their capstone experience and present a plan of completion to their advisory committee. 3 credit hours

EDUC-844. RESEARCH SEMINAR V: CAPSTONE DEFENSE:

Doctoral students will continue independently progressing toward the completion of their capstone experience. Their experience must be approved by their committee members and students should work closely with their committee chair as they work on their experience. This course will involve extensive reading of research and writing. Students must defend their capstone experience by the completion of this course to receive course credit. 3 credit hours.

EDUC-829. SUSTAINING DISSERTATION RESEARCH:

Students must maintain Capstone Sustaining Credits as they progress toward completion of their capstone experience. Students must maintain communication with the course instructor and their committee chair and submit a summary of progress made and plan outlining the next steps and targeted completion dates for their capstone experience prior to the end of each course. Credit 6 hours.

INTERNSHIP & FIELD EXPERIENCE COURSES

EDUC-812 and EDUC-813. INTERNSHIP: APPLIED EDUCATIONAL ADMINISTRATION:

The internship experience (240 hours) is a supervised field experience that enables the doctoral candidate to practice knowledge and skills acquired in course work and professional experiences in an authentic setting. The doctoral candidate experiences the everyday life of an administrator and how everyday challenges are solved, such as time management strategies, organizational techniques, successful secretarial relationships, appropriate interpersonal skills and human relations, communication vehicles, problem solving, negotiation, instructional leadership, management, professional dispositions, and leadership. In conjunction with the field-based administrator, doctoral candidates will identify an educational problem in the organization and design an action-based research project to examine possible solutions. 3 + 3 credits.

EDUC-836. ADMINISTRATIVE FIELD EXPERIENCE:

Field Experience (120 hours) is a series of rigorous, substantial, high quality, supervised clinical experiences that enable the students to synthesize the theoretical and research-based content of the course offerings with practical and professional experiences of the internship. It prepares the students to face the everyday administrative challenges and devise an operational framework from which concepts, plans, and strategies for institution's improvement can be made. The students will acquire skills and competence to demonstrate an appreciation for reflective practices in an authentic setting. 3 credit hours

COURSES FOR K-12 CONCENTRATION

EDUC-800. THE SUPERINTENDENT AS A SCHOLAR-PRACTITIONER EDUCATIONAL LEADER:

This course gives an overview and provides the foundation for developing and cultivating the leadership skills and values that superintendents and K-12 leaders will find helpful to move from a theoretical base to becoming an effective scholar-practitioner educational leader. This course addresses district/ institution vision, school culture, politics and governance, internal and external communication, organizing for high performance, curriculum design and delivery, and human resource management for student learning. The course also provides insights on how to utilize leadership and organizational theories as a theoretical framework and foundation for research in leadership studies. Students are encouraged in this course to be grounded in leadership theories in order to use them as a foundation for research or to critically evaluate empirical research studies. Methods and practices that influence leadership and organizations will be explored based on the theory used. Emphasis on leadership and organizational performance outcomes and how implementations impact emerging global markets will be presented. The ELCC Standards and AASA professional standards for the superintendency are used to define the role of a superintendent/leader as scholar-practitioner. Credit, Three Hours.

EDUC-801. SOCIAL JUSTICE, EQUITY AND CULTURAL RESPONSIVENESS: CRITICAL ANALYSIS OF CONTEMPORARY EDUCATIONAL ISSUES:

This course assists advanced students to further understand social justice, equity and cultural responsiveness and analyze current trends, problems and theories based upon an examination of recently surfacing educational events and/or topics from a historical perspective. Discussions will focus on a critical exploration of topics related, but not limited to, the formation of curriculum, instructional policy and methodology, cultural responsiveness, social justice and assessment of student success in education. Additionally, current issues that involve students with challenges, Every Child Succeeds Act, state standards and teacher certification, state testing, full inclusion, school choice, charter schools, and accreditation are typical topics of discussion. Components that relate to administrative handling of current issues and challenges in the educational system, found in ELCC Standards and CAEP Standards, are addressed. Credits, Three Hours.

EDUC-804. EFFECTIVE ADMINISTRATION: MANAGEMENT OF PEOPLE, FINANCE, FACILITIES AND THE RESOURCES:

The course explores the major issues that impact administrative policies, decisions, and one's effectiveness as a school leader. The emphasis is research and applied oriented. The following topics are examined: leadership; decision-making, authority, power; communication; conflict management; organizational culture; and major changes affecting the K-12 and to some extent the higher education environment. Components that relate to administrative handling of current issues and challenges in the educational system, found in ELCC and CAEP Standards, are addressed. Credits, Three Hours.

EDUC-806. EDUCATIONAL POLICY: POLITICAL, SOCIAL, ECONOMIC, LEGAL, AND CULTURAL ISSUES:

This course provides the framework and content by which the doctoral student as an aspiring administrator can affect school governance and policy. Major issues influencing administrative practices are addressed, including, but not limited to, school autonomy versus government control, state legislated learning effects on the teaching profession, democratic versus professional authority in the teaching profession, lack of minorities in administration, the effects of economics on the educational system, society's cultural views, desires, and ramifications, and comprehending the diverse theories of school change. In this course, doctoral students have opportunities to develop their skill sets that will enable them, as aspiring administrators, to build the requisite interlocking and collaborative relationships among school personnel, the community, the state and federal agencies for the purpose of creating better schools. Advanced students will focus upon current issues and challenges that impact the formation of educational policy in today's ever-changing society. 3 credits.

EDUC-807. EDUCATIONAL LEADER AS A CHANGE AGENT: LEADING DISTRICT COMMUNITY PARTNERSHIP:

This course focuses on a review and discussion of current methods used to change school cultures, curriculums, and parent/community involvement. The course is used to enhance collegiality, professionalism, instructional strategies, classroom management techniques, effective classroom designs, student motivational techniques, and to create a safe and orderly environment. Additionally, the course focuses on making staff development a worthwhile endeavor and using systems thinking as the key to continuous improvement. It focuses on envisioning desired results, defining reality through data, developing action plans while welcoming accountability. Credit, Three Hours.

EDUC-809. TECHNOLOGY APPLICATIONS

The course addresses the latest technologies from a practitioner's point of view. The Internet and World Wide Web are used with the intent to make informed decisions. Fifty percent of the semester is assigned to an on-site field experience, in which the student demonstrates the ability to report research, security, data collection, etc. Doctoral candidates complete a project focusing on the applications of technology to the unique area of their administrative interest within educational administration, leadership or supervision and teaching fields. Doctoral candidates will have the opportunity to focus on emerging technologies and their applications from the viewpoint of planning, enhancing communications, managing information and the latest technologies used by professionals in their respective fields. 3 credits.

EDUC XXX'. INSTRUCTIONAL LEADERSHIP IN LEARNING ORGANIZATION: LEARNING SYSTEM, CAPACITY BUILDING, AND EVALUATION:

Doctoral students will be engaged in critical and reflective analysis of instructional leadership practices in schools. They develop understanding and skills of leading and managing curriculum, instruction, assessment, services, and resources. Using scholar practitioner philosophical stance and practical cases and examples, the course offers district/building capacity development approaches and the critique of them. Topics like instructional leadership, professional learning communities in leading instruction, district-building collaboration for teaching learning transformation in K-12 systems will be addressed. Credit, three hours. (**The new course # is yet to be assigned*).

EDUC XXX'. LEGAL, ETHICAL AND MORAL FOUNDATIONS OF EDUCATIONAL LEADERSHIP:

This course explores legal, ethical and moral issues governing PreK-12 education and identifies the fundamental principles that are central to be an ethical educational leader. This course also examines the characteristics, principles, and practices of an educational leader who promotes the success of all students by acting with integrity, fairness, and in an ethical manner. Legal theories and case studies will be used to cover such topics as constitutional mandates of due process and equal protection, nondiscrimination in employment and educational programs, privacy and openness, tenure and academic freedom, contractual obligations, and program discontinuance and their applications in the real-life settings. Credit, three hours. (**The new course # is yet to be assigned*).

COURSES FOR HIGHER EDUCATION CONCENTRATION

EDUC-802. LEADERSHIP IN HIGHER EDUCATION: THEORY & PRACTICE:

This course will focus on seminal works, contemporary theories and models, and emerging perspectives of educational leadership. Adopts a cross-disciplinary and integrative view of the leadership phenomenon that highlights how different disciplines inform leadership study and illustrates various research methodologies used for understanding and assessing the concept of leadership. It will examine the complex social and political environments and the current and future trends of higher education while providing a foundational grounding in the study of leadership theory and research. 3 credits.

EDUC-803. HUMAN RESOURCES MANAGEMENT/PERSONNEL ADMINISTRATION:

This course addresses the role and functions, strategic planning, information technology, recruitment, selection, and induction of employees, staff development, performance appraisal, compensations, employment continuity, and unionism from the human resource administrator's standpoint. Additionally, this course addresses the human relations aspects intrinsically involved in and through the human resource parameters. The relationship of the human resources office to the effective, safe, and efficient operation of an educational organization's vision for the promotion of student success is further examined. 3 credits.

EDUC-814. PUBLIC POLICY AND HIGHER EDUCATION:

Doctoral students will be introduced to the fundamental issues and topics in contemporary higher education policy. Using an interdisciplinary perspective, the course offers a systematic overview of the key factors, structures, and dynamics in the field of higher education. Global and domestic higher education policy development trends will be addressed. 3 credits.

EDUC-816. ETHICS & LAW IN HIGHER EDUCATION:

The purpose of this course is to allow doctoral students to explore basic legal theories and their application to higher education. Case studies will be used to cover such topics as constitutional mandates of due process and equal

protection, nondiscrimination in employment and educational programs, privacy and openness, tenure and academic freedom, contractual obligations, and program discontinuance. 3 credits.

EDUC 824. GLOBALIZATION OF HIGHER EDUCATION - INTERNATIONAL PERSPECTIVES:

This course examines the related concepts of globalization/internationalization from an interdisciplinary perspective and probes their interlocks in the context of higher education policy and student identity/learning in a transnational context. The students will also explore a number of current issues and key concepts relevant to higher education in a transnational context, in relation to how they inform practices of student learning/identity and every day social relations (e.g., knowledge production, transnational organizations, global trade policies, study abroad, citizenship, immigration, policy, media, language, power, and curriculum). 3 credit hours.

EDUC 825. INSTITUTIONAL STRATEGIC PLANNING IN HIGHER EDUCATION:

This course will examine the conceptual framework for developing an integrated and comprehensive institutional strategic plan, while suggesting guidelines intended to assure its successful implementation. The students will explore the environmental challenges and trends, ways to examine institutional strengths and weaknesses within a broader competitive context, the function of major components within a plan and the ways the institutional direction and priorities may be determined. 3 credit hours.

EDUC 832. CONTEMPORARY ISSUES IN HIGHER EDUCATION


Higher education faces many challenges, such as the increasing importance of higher education in American and global societies, a lack of financial resources, disparities in the educational preparation of candidates, and much more. In this course, candidates will evaluate data to analyze effectiveness of current policies and recommend strategies to address these issues. They will also formulate research questions to generate information for possible solutions. Candidates will build upon the discussions of these contemporary issues in higher education to identify their research interests. 3 credits.

EDUC-834 STRATEGIC FINANCIAL MANAGEMENT:

This course explores core financial analysis and evaluation tools and teaches students how to apply them to their business or organization. They would do scenario and other types of financial analysis to determine which operating decisions will drive the greatest value. They will learn to anticipate how decisions such as tuition increase, changes in state and federal funding, interest rate fluctuations etc. affect financial performance and create value. The discussions, presentations, and case studies will teach students the jargon to communicate with finance leaders in their own language. 3 credits.

EDUC-837. ORGANIZATIONAL DYNAMICS: Successful leaders are able to develop and communicate a vision while managing resources to effectively meet the goals of their organization. This summative course allows students to connect concepts from all previous courses. This course will present different leadership styles. Students will analyze an organization's culture, trends, and opportunities for change, then discuss leadership strategies based on desired outcomes. In addition, students will identify different resources and strategies to work with diverse groups. Case studies will be utilized for students to discuss implementation and communication of leadership decisions in a variety of contexts, including times of crisis or chaos, lack of resources, disengaged unit members, change, and challenges. 3 credits.

Transitional Curriculum Sequence Sheet* for Ed.D. 2017 Cohort (K-12 concentration)
for Fall 2018, Spring 2019 and Summer-I, 2019


Delaware State University College of Humanities, Education & Social Sciences Department of Education DOCTOR OF EDUCATION (ED. D.) IN EDUCATIONAL LEADERSHIP IN K – 12 *(for 2017 Cohort)					
Student Name:			Student ID:		
Year 1: Fall			Year 1: Spring		
Course	Course	Cr	Course	Course Name	Cr.
EDUC 817	Research Seminar - 1: Dissertation/Project Study/Case Study - Writing	1	EDUC 805 (Core Course)	Quantitative Research Methods in Education	3
EDUC 800	The Superintendent as CEO	3	EDUC 888 (Core Course)	Action Research and Qualitative Research Methods in Education	3
EDUC 801	Contemporary Issues in American Education	3			
Total Credits		7	Total Credits		6
Year 1: Summer-I			Year 1: Summer-II		
Course	Course	Cr	Course	Course Name	Cr.
EDUC 803 (Core Course)	Human Resource Management * <i>Capstone option declaration</i>	3	EDUC 833	Applied Assessment and Data Analytics I	3

* It is expected that the K-12 curriculum will be revised and approved by Year 1: Summer-I.


The students of the K-12 concentration will be provided a revised Curriculum Sequence Sheet (55 Credit hours in 3.5 years) at that time.

Total Core Credits = 12

Ed.D. in Higher Education CURRICULUM SEQUENCE SHEET (2018-2019)

Delaware State University College of Humanities, Education & Social Sciences Department of Education					
DOCTOR OF EDUCATION (ED. D.) IN EDUCATIONAL LEADERSHIP IN HIGHER EDUCATION					
Year 1: Fall			Year 1: Spring		
Course	Course Name	Cr.	Course	Course Name	Cr.
EDUC 831 (Core Course)	Foundations of Doctoral Studies	1	EDUC 805 (Core Course)	Research Design and Quantitative Research Methods	3
EDUC 802	Leadership in Higher Education: Theory and Practice	3	EDUC 888 (Core Course)	Action Research and Qualitative Research Methods in Education	3
EDUC 832	Contemporary Issues in Higher Edu	3			
Total Credits		7	Total Credits		6
Year 1: Summer			Year 1: Summer		
Course	Course Name	Cr.	Course	Course Name	Cr.
EDUC 803	Human Resource Management * Capstone option declaration	3	EDUC 833 (Core Course)	Applied Assessment and Data Analytics	3
Total Credits		3	Total Credits		3
Year 2: Fall			Year 2: Spring		
Course	Course Name	Cr.	Course	Course Name	Cr.
EDUC 814	Public Policy and Higher Education	3	EDUC 834	Strategic Financial Management	3
EDUC 816	Ethics and Law in Higher Education	3	EDUC 835 (Core Course)	Use of Technology in Action Research and Data Driven Decision Making	3
Total Credits		6	Total Credits		6
Year 2: Summer			Year 2: Summer		
Course	Course Name	Cr.	Course	Course Name	Cr.
EDUC 840	Research Seminar I: Prospectus **Qualifying Exam	3	EDUC 808 (Core Course)	Organizational Strategic Planning & Program Analysis	3
Total Credits		3	Total Credits		3
Year 3: Fall			Year 3: Spring		
Course	Course Name	Cr.	Course	Course Name	Cr.
EDUC 841	Research Seminar II: Proposal Writing and Defense *Apply for candidacy	3	EDUC 836	Administrative Field Experience (120 hrs.)	3
EDUC 842	Research Seminar III: Data Collection* (*Progression of Capstone Research)	3	EDUC 837	Organizational Dynamics	3
Total Credits		6	Total Credits		6
Year 3: Summer			Year 4: Fall		
Course	Course Name	Cr.	Course	Course Name	Cr.
EDUC 843	Research Seminar IV: Capstone Writing	3	EDUC 844	Research Seminar V: Capstone Defense	3
Total Credits		3	Total Credits		3
			Total Credits for the Program = 55		

Ed. D. in K-12 CURRICULUM SEQUENCE SHEET (2018-2019)

Delaware State University College of Humanities, Education & Social Sciences Department of Education DOCTOR OF EDUCATION (ED.D.) IN EDUCATIONAL LEADERSHIP IN K-12					
Year 1: Fall			Year 1: Spring		
Course	Course Name	Cr.	Course	Course Name	Cr.
EDUC 831 (Core Course)	Foundations of Doctoral Studies	1	EDUC 805 (Core Course)	Research Design and Quantitative Research Methods	3
EDUC 800	The Superintendent as a Scholar-Practitioner Educational Leader	3			
EDUC 801	Social Justice, Equity, and Cultural Responsiveness: Critical Analysis of Contemporary Educational Issues	3	EDUC 888 (Core Course)	Qualitative & Mixed Research Methods in Education	3
Total Credits		7	Total Credits		6
Year 1: Summer-I			Year 1: Summer-II		
Course	Course Name	Cr.	Course	Course Name	Cr.
EDUC XXX	Instructional Leadership in Learning Organization: Learning System, Capacity Building, and Evaluation	3	EDUC 833 (Core Course)	Applied Assessment and Data Analytics *Constitution of Advisory Committee & Capstone Option Declaration by the students	3
Total Credits		3	Total Credits		3
Year 2: Fall			Year 2: Spring		
Course	Course Name	Cr.	Course	Course Name	Cr.
EDUC 807	Educational Leader as a Change Agent: Leading District Community Partnership	3	EDUC 804	Effective Administration: Management of People, Finance, Facilities and the Resources	3
EDUC XXX	Legal, Ethical and Moral Foundations of Educational Leadership	3	EDUC 835 (Core Course)	Use of Technology in Action Research and Data Driven Decision Making (Initiation of Prospectus Development)	3
Total Credits		6	Total Credits		6
Year 2: Summer			Year 2: Summer		
Course	Course Name	Cr.	Course	Course Name	Cr.
EDUC 840	Research Seminar I: Prospectus Completion & Proposal Preparation **Qualifying Exam - after the completion of 31 credit hours and at least 3 core courses	3	EDUC 808 (Core Course)	Organizational Strategic Planning & Program Analysis	3
Total Credits		3	Total Credits		3
Year 3: Fall			Year 3: Spring		
Course	Course Name	Cr.	Course	Course Name	Cr.
EDUC 841	Research Seminar II: Proposal Writing and Defense *Apply for candidacy	3	EDUC 812	Internship: Applied Educational Administration (120 hrs)	3
EDUC 842	Research Seminar III: Data Collection* (*Progression of Capstone Research)	3	EDUC 813	Internship: Applied Educational Administration (120 hrs)	3
Total Credits		6	Total Credits		6
Year 3: Summer			Year 4: Fall		
Course	Course Name	Cr.	Course	Course Name:	Cr.
EDUC 843	Research Seminar IV: Capstone Writing	3	EDUC 844	Research Seminar V: Capstone Defense	3
Total Credits		3	Total Credits		3
			Total Credits for the Program = 55		

MASTER OF EDUCATION (M.Ed.) IN EDUCATIONAL LEADERSHIP

This program aims to prepare school leaders through new understandings related to leadership models and frameworks that support diverse, inclusive, equitable and safe learning environments. Our program encourages academic and personal excellence through rigorous learning experiences in the areas of strategic leadership, ethical and reflective leadership, community leadership, and instructional leadership. Emerging leaders will be able to translate authentic research on school leadership and society into quality practice.

OBJECTIVES

In collaboration with the State of Delaware, the purpose of Delaware State University's Master of Education (M. Ed.) in Educational Leadership program is to prepare educators for prominent leadership and service positions in Schools and other educational institutions. Through a rigorous educational foundation and directed field experience, students emerge as viable candidates for leadership positions. Since 2002, the master's program has been consistently adjusted to meet the current needs of K-12 education institutions. At Delaware State University, students find a unique balance between rigorous research, serious academic studies, collegiality, and personal development. Students are prepared to make data-driven decisions to serve authentically and lead with integrity. Students hone their personal leadership style, create a new career path and learn to meet the challenges in any situation. Our program provides the confidence, credibility and knowledge to pursue a career as a principal or assistant principal and in administrative posts related to education, empowering students to bring their school/institution to new levels of efficiency and productivity. Our program does not provide a licensure or a certification and will not certify a student as a school teacher, principal, assistant principal, or Certified Central Office Personnel. Most states require a Master of Education to gain licensure to become a principal or assistant principal. More information about the requirements for principal/assistant principal certification in the State of Delaware can be found at: <http://regulations.delaware.gov/AdminCode/title14/1500/1591.shtml>.

PROGRAM GOALS

The primary goal of Delaware State University's Master of Education (M. Ed.) in Educational Leadership Program is to prepare leaders who are equipped with a repertoire of knowledge, skills, and dispositions to meet the challenges of school leadership. The additional goals are to prepare leaders who can:

- Articulate a vision for public schools at the building levels as well as other educational institutions and involve all the stakeholders in strategic planning, implementing, and evaluating processes which benefit the academic growth and development of all students.
- Demonstrate a deep commitment to diversity issues and are role models for the community.
- Demonstrate technological awareness and competence.
- Demonstrate substantive knowledge of school finance, law, and contract.
- Create a positive school culture that promotes student learning and development.
- Understand schools as political systems and develop relationships with constituent groups which effectively connect the community with the school.
- Promote professional collaboration and the advancement of Institutional Research.

STUDENT LEARNING OUTCOMES

Delaware State University commits itself to supporting students' professional goals that will exemplify ethical and authentic leadership qualities in public schools and other related educational institutions. Leadership abilities will be developed and refined through the integration of educational philosophies, theories, leadership constructs, and

critical thought in the arenas of educational literacy, communication, systematic and empirical research inquiries, socio-cultural perspective, professional development, and transformational leadership. This program includes a six-credit internship, through which students will have an opportunity to apply experience and develop their leadership abilities in a real-life education setting.

DSU graduates will be able to:

- Exemplify educational literacy through applied leadership knowledge, a research foundation, and an educational leader worldview.
- Describe the nature and mission of the educational leadership process as revealed in the literatures.
- Apply a dialectic approach in the examination of educational issues that impact the school community, reflecting the conditions and dynamics of the diverse school community, enabling ongoing dialogue with representatives of diverse community groups, taking into account community resources, and recognizing the role of public education in developing and renewing a democratic society and the role of equity in a democratic society.
- Develop a framework for use in examining matters of significance in education in order to clarify personal viewpoints and develop a successful model of a school.
- Examine the contextual variables, value orientations, and philosophical and political assumptions that shape both the status quo and reform efforts.
- Relate educational issues to focus on the success of all students by advocating that education is the key to opportunity and social mobility and recognizing and respecting a variety of ideas, values, and cultures.
- Demonstrate ethical and professional competence in their chosen disciplines.
- Develop the knowledge and application of human resource management and personnel administration and development, ensuring the maintenance of confidentiality and privacy of school records.
- Demonstrate the knowledge and application of information sources, data collection and data analysis strategies, and related technologies.
- Acquire the ability to facilitate processes to ensure that the human resources functions support the attainment of school goals.
- Be able to craft their individual professional development plan.

ADMISSION DEADLINES AND DEGREE REQUIREMENTS for M.ED. PROGRAM

Application Deadlines:

- Fall enrollment - June 30

International Admission Deadlines:

- Fall enrollment – May 1

Educators who wish to seek admission in our program are required to submit the following for consideration of unconditional admission:

- An earned baccalaureate degree in education or an allied field with a minimum undergraduate cumulative grade point average of 3.00.
- A completed online application for admission.
- The non-refundable application fee of \$50.00 made payable to Delaware State University.
- Official transcript(s) of all academic work completed.
- Graduate Record Exam (GRE) or Miller Analogies Test (MAT) scores. Testing must be within 5 years of the application. Scores must be submitted prior to being admitted into the program. The acceptable cut-off scores: (i) GRE: 40 percentiles (+ - 1) and a score of 3.0 or better on the Analytical Writing component; and (ii) MAT: 40 percentiles (+ - 1). An applicant seeking the GRE/MAT waiver must have a minimum GPA of 3.50.
- A current professional resume.
- Three letters of recommendation via the online application process (two academic/professional recommendations and one character recommendation).
- A statement of purpose/intent that needs to be content specific, focused on educational leadership. The candidate must specifically explain why he or she wants to be admitted into the M.Ed. in Educational Leadership program. Specifications: 1-2 pages, APA format, grammatical error free.
- An applicant should be working in or toward a leadership role in his or her current position, or must have similar experience (e.g., administrator, coordinator, or teacher at a school or any other educational institution) and must hold a valid Delaware Initial, Continuing, or Advanced License; a Limited Standard, Standard or Professional Status Certificate issued by the Department prior to August 31, 2003; or a similar licensure from another state.

The Director, Education Program, and the Department of Education Graduate Admission Committee will review students' application materials and make recommendation for acceptance into the program to the Dean, Graduate Studies and Research, who extends an offer of admission to the applicant.

DEGREE REQUIREMENTS

This program of study requires the completion of **36 graduate credit hours**. Included as an integral component of the program is a 6 credit hour Applied Educational Internship.

FINAL CAPSTONE REQUIREMENTS:

Students are required to:

- Take and pass the Comprehensive Exam, after completing 24 credit hours. This capstone requirement is designed to provide students an opportunity to demonstrate their ability to conceptualize and critically analyze the content knowledge.
- Complete 240 hours of internship in K-12 setting, and submit and present their internship portfolio comprising artifacts collected as a part of their internship activities and experience before the committee.

TRANSFER OF CREDITS:

Applicants who have earned a grade of "B" or higher in graduate courses taken at an accredited institution and related to their proposed program of study can request consideration for transfer of credit. These courses will be evaluated on an individual basis by the respective Graduate Program. Applicants admitted to master's degree graduate programs may transfer a maximum of 9 graduate credits from another accredited institution toward the master's degree provided these credits have not been used to meet the requirements of a degree previously earned.

Applicants must provide supporting documentation (as requested by the Program). Program Directors will review all documentation and note the allowable course waivers in the Program's recommendation to Graduate Studies and Research. The Dean of Graduate Studies and Research will note approval of hours in the admissions offer.

PROGRAM FACULTY

The Department of Education's distinguished faculty members include nationally and internationally known authors, researchers and academicians. The faculty members have achieved notable distinction in their respective fields. The faculty combines academic expertise with direct experiences in the field of education. Their knowledge, skills and experience enable them to offer practical guidance and mentorship, helping students adapt to the professional world and make wise career choices.

PROGRAM FACULTY

Dr. Joseph Falodun, Associate Professor
Dr. Chandra Aleong, Associate Professor
Dr. Janet Hill, Associate Professor
Dr. Elaine Marker, Associate Professor
Dr. Nirmaljit K. Rathee, Professor
Dr. Richard Phillips, Associate Professor
Dr. Kim K Keun, Associate Professor
Dr. SaeYeol Yoon, Assistant Professor
Dr. Chetanath Gautam, Assistant Professor

FACILITIES

The Education and Humanities Center accommodates the Department of Education. The facility also houses the Child Development Laboratory, Education Computer Lab., and is also the site for the University's wide-ranging cultural enrichment programs. The Physical Education Program of the department is based in Memorial Hall.

COURSE DESCRIPTIONS

EDUC-605. CURRICULUM ORGANIZATION AND DESIGN

Educational implications of human development over the life span are examined. Students will survey research with special attention to the applications to teaching and developmentally appropriate school programs. This course explores the differentiating instruction based on student growth. 3 credits

EDUC-614. HUMAN GROWTH AND DEVELOPMENT

Educational implications of human development over the life span are examined. Students will survey research with special attention to the applications to teaching and developmentally appropriate school programs. This course explores the differentiating instruction based on student growth. 3 credits

EDUC-625. INTRODUCTION TO STATISTICS AND RESEARCH METHODS/ACTION RESEARCH

This course addresses the fundamentals of evaluating and designing educational research with an emphasis on applied and action research. Types of research, their advantages and disadvantages, the research process and the similarities and differences between action research and formal quantitative and qualitative research will be examined. Participants will have hands-on opportunity to develop an action research proposal and use statistical software to analyze and interpret data. This course facilitates assessment of school programs and the accomplishment of knowledge and skills. This is not an accelerated format course. 3 credits.

EDUC-680. LEADERSHIP WITH A VISION FOR CHANGING SCHOOL CULTURE IN A CHANGING SOCIETY

This course focuses on the educational administrator's development of a vision for the creation of effective teaching that is shared by the school community. The course presents the conceptual underpinnings regarding building of effective learning organizations. The importance and relevance of (1) decision-making; (2) problem solving; (3) effective verbal and written communication skills; (4) relationship-building skills; (5) good listening skills; (6) ability to manage conflict; (7) creation of a safe and secure learning environment; and (8) ongoing effective reflective practice are discussed. 3 credits.

EDUC-681. HUMAN RELATIONS IN DIVERSE POPULATIONS

This course examines how administrators must react, understand and respond to a changing society to foster a true sense of community in school. The course primarily addresses three dimensions: 1) developing academic partnerships with parents and the members of the community; 2) creating learning organizations (communities of practice) among teachers; and 3) nurturing the development of personalized learning environments for students. 3 credits.

EDUC-682. ASSESSMENT OF INSTRUCTION

This course emphasizes the role of assistant principals and principals as the instructional leaders of the school and the official in charge of promoting a safe, secure student environment to make possible student learning and staff professional growth. Reflective assessment practices are thoroughly reviewed and discussed. Research is conducted by advanced students on the following topics: (1) identifying effective models of instruction; (2) student achievement; and (3) frameworks for identifying and analyzing models of teaching, decision-making, and assessment. Additionally, the course focuses on defining supervisor responsibilities, understanding and implementing controls, solving problems and making decisions, effective communications, effective leadership, motivational techniques, problem-solving, and the supervisor's role in labor relations. 3 credits.

EDUC-683. USING TECHNOLOGY TO ENHANCE STUDENT LEARNING AND ORGANIZATIONAL MANAGEMENT

This course addresses current technologies from a practitioner's point of view. The Internet, World Wide Web and production software are used with the intent to make informed decisions both administratively and instructionally. Advance students will have the opportunity to focus on emerging technologies in their applications from the viewpoint of planning, enhanced communications, managing information, delivery of instruction and the latest technologies used by professionals in their respective fields. 3 credits.

EDUC-684. LEGAL ISSUES, ETHICAL CONDUCT AND SOCIAL JUSTICE IN TODAY'S SCHOOLS

This course examines the following: (1) prudent strategies, safe environments, ethical principles in decision making, and fair practices in a litigious society; (2) school district judicial policies and student/employee rights; (3) legal issues that impact today's schools; and; (4) students' and teacher's practices. 3 credits.

EDUC-685. SUPPORTING A SCHOOL VISION THROUGH EFFECTIVE BUSINESS AND FINANCE PRACTICES

This course provides advanced students with an understanding of the issues and challenges facing administrators with regards to the financing of education in an era of intense change. Some of the issues facing practicing school administrators, teachers, school board members, legislators and other interested parties include, but are not limited to: The Every Student Succeeds Act (ESSA), The No Child Left Behind Act; budget cuts at the federal, state, local and school levels; and changes in legislation allowing for school choice, voucher plans and charter schools. This course also addresses the various principles relating to the fiscal operations of a school's management and the entrepreneurial acts required to support the continuous improvement of instruction and learning for all students. Strategic planning, budgeting, accounting, auditing, and human resource management at the school level will be discussed through case studies. 3 credits.


EDUC-686. SUPERVISION AND LEADERSHIP IN ELEMENTARY AND SECONDARY SCHOOLS

This course focuses on the knowledge, dispositions and performance skills required of school principals that include, but are not limited to, the following: (1) development, articulation, implementation and stewardship of a vision of learning in a pluralistic society; (2) encouraging and achieving high standards of learning; (3) effective communication, consensus building and negotiation skills; (4) continuous school improvement; (5) involvement of the school community; (6) continuous staff professional growth; (7) effective instruction(learning theories, motivational theories, assessment strategies and recognizing student growth and development); (8) technology in promoting student learning and professional growth; (9) valuing student diversities and school cultures; (10) creating a safe and supportive learning environment; (11) implementing and evaluating curriculum and instruction; (12) management of school operations; and (13) selecting, supervising and evaluating staff. 3 credits.

EDUC-690. APPLIED EDUCATONAL LEADERSHIP INTERNSHIP

The internship experience is a supervised field experience that enables master's degree candidates to practice knowledge and skill performances acquired in course work and professional experiences in an authentic setting. The master's degree candidate will experience firsthand the everyday challenges of making management decisions with the enhancement of learning and teaching in mind. Advanced students will develop and apply organizational techniques and communication and problem solving abilities in a field setting. In conjunction with the field-based administrator, master's degree candidates will execute an action- research project to examine possible solutions and to provide data to support data-based decision-making. 3 + 3 credits.

M. Ed. CURRICULUM SEQUENCE SHEET (2018-2019)

Delaware State University College of Humanities, Education & Social Sciences Department of Education MASTER OF EDUCATION (M.ED.) IN EDUCATIONAL LEADERSHIP					
Year 1: Fall			Year 1: Spring		
Course	Course Name	Cr.	Course	Course Name	Cr.
*EDUC 605 (Core Course)	Curriculum Organization and Design	3	*EDUC 625 (Core Course)	Introduction to Statistics and Research Methods/Action Research	3
*EDUC 614 (Core Course)	Human Growth and Development	3	*EDUC 681 (Core Course)	Human Relations in Diverse Populations	3
Total Credits		6	Total Credits		6
Year 1: Summer-I			Year 1: Summer-II		
Course	Course Name	Cr.	Course	Course Name	Cr.
EDUC 686	Supervision and Leadership in Elementary & Secondary Schools	3	EDUC 684	Legal Issues, Ethical Conduct, and Social Justice in Today's Schools	3
Total Credits		3	Total Credits		3
Year 2: Fall			Year 2: Spring		
Course	Course Name	Cr.	Course	Course Name	Cr.
EDUC 680	Leadership with a Vision for Changing School Culture in a Changing Society	3	EDUC 690	Applied Educational Leadership Internship (120 hrs.)	3
EDUC 682	Assessment of Instruction: Supervision and Evaluation	3	EDUC 690	Applied Educational Leadership Internship (120 hrs.) *Apply for Comprehensive Exam	3
Total Credits		6	Total Credits		6
Year 2: Summer-I			Year 2: Summer-II		
Course	Course Name	Cr.	Course	Course Name	Cr.
EDUC 683	Using Technology to Enhance Student Learning and Organizational Management ** Comprehensive Exam	3	EDUC 685	Supporting a School Vision Through Effective Business & Finance Practices	3
Total Credits		3	Total Credits		3
			Total Credits for the Program = 36		

MASTER OF ARTS IN TEACHING ENGLISH TO SPEAKERS OF OTHER LANGUAGES (TESOL) / BILINGUAL EDUCATION

PROGRAM OBJECTIVES

This program is designed to provide students with an advanced level of expertise and thorough training on the theory and practice of teaching English to non-native speakers of English (MA TESOL) and/or bilingual learners (Bilingual Education). The program provides students with the pedagogical and intellectual preparations necessary to teach in K-12 English Language Learner (ELL) or dual language immersion classrooms as well as in colleges, universities, and language institutes both in the United States and internationally. Further, students with a pre- or co-requisite K-12 teaching certification earn secondary certification in TEL (Teacher of English Learners) or Bilingual Teacher.

PROGRAM GOALS

The goal of the MA TESOL / Bilingual Education program is to produce educators who are prepared to teach English language and/or bilingual learners both in the U.S. and internationally in K-12 education, colleges and universities, and language institutes.

STUDENT LEARNING OUTCOMES

Student Learning Outcomes have been established in accordance with and based directly on the *TESOL International Association* standards for TESOL programs.

- **SLO 1: Language** – Candidates will understand and be able to apply the major research theories related to the structure and acquisition of language in order to mediate learners in developing language and literacy and achievement in content areas.
- **SLO 2: Culture** – Candidates will demonstrate functional understanding of concepts and theories relating to the role of culture in developing supportive learning environments for learners.
- **SLO 3: Planning, Implementing, and Managing Instruction** – Candidates will understand and be able to apply evidence-based practices and strategies in planning, implementing, and managing instruction. This includes the integration of technology and application of diverse teaching strategies for developing and integrating language skills.
- **SLO 4: Assessment** – Candidates will demonstrate functional understanding of various assessment issues affecting second and foreign language learners, and be able to implement a variety of language proficiency instruments to show language growth and inform instruction.
- **SLO 5: Professionalism** – Candidates will demonstrate knowledge of historical and current instructional techniques, research results, and advances in the field. Further, this information is applied to improve and inform instruction and assessment practices.

ADMISSION AND DEGREE REQUIREMENTS

Application Deadlines:

- Applications may be submitted at any time; successfully accepted candidates typically submit applications by **April 1** for Fall admission or **October 1** for Spring admission.

All Applicants are required to:

- Have earned a bachelor's degree at an accredited college or university, possess the ability to do graduate work of high quality, and meet language proficiency requirements for English (and target language for those pursuing bilingual education).
 - Submit one official transcript from all previous undergraduate and graduate work.
 - Submit three letters of recommendation.
 - Submit a statement of purpose indicating educational career goals and experience.
 - Submit GRE scores.*
 - Have native or near native fluency in English. Non-native speakers of English without a college degree from a U.S. or English speaking institution must also have a minimum TOEFL score of 95 (iBT), 585 (paper), or an IELTS of 7.0.
-
- Applicants pursuing K-12 certification (only) need a pre- or co-requisite teacher education program.
 - Applicants must meet all graduate school requirements.

* GRE score requirement may be waived for those entering the program with substantial professional and academic experience and credentials. Additionally, educators taking courses for secondary certification may also have GRE waived.

DEGREE REQUIREMENTS

The MA TESOL / Bilingual Education degree requires the completing of 33 credit hours, consisting of 27 credit hours of core courses and 6 credit hours of approved electives courses. The program follows a praxis model in which students are expected to apply the learned theory and methods in the classroom. Accordingly, 80 hours of EFE (early field experience) are required as part of the core course curriculum, including a practicum course that places students directly in a K-12 or post-secondary classroom.

Students pursuing the bilingual education track must evidence language proficiency in their target language. Proficiency is evidenced by 1) achieving a minimum level of Advance Mid (for tests using the Roman alphabet) or Advanced Low (for tests using a non-Roman alphabet) based on the ACTFL Proficiency Guidelines on the ACTFL OPI in the target language, and 2) achieving a passing score on the ACTFL WPT in the target language.

The final required 6 core course credits can be obtained by one of two pathways:

- 1) Research and Thesis -- The completion of a research-based thesis in which students write a publishable thesis based on independent research. In addition to successfully defending the thesis, students are required to submit their work to a reputable peer-reviewed journal or scholarly publisher for publication consideration.
- 2) Applied Research -- The completion of an applied research project in a classroom setting suited to student's focus area of study that engages in current, ongoing issues in ELL / Bilingual Education pedagogy, identifies key problem areas or areas for improvement, and then recommends and implements evidence-based best practices to address the identified issue. This process will place students directly in the professional atmosphere and setting they will be working in, allow them to develop applied competencies, and contribute to the specific learning environment in which they are working, as well as to the field in general. All details of the project are reported in a comprehensive portfolio.

COURSE DESCRIPTIONS

ENG-504. SECOND LANGUAGE ACQUISITION

This course is an analysis of current issues in second language acquisition based on readings and research findings. Discussion of theories includes the Acculturation Model, the Nativization Model, Accommodation Theory, Discourse Theory, the Monitor Model, the Variable Competence Model, the Universal Hypothesis, Neuro-functional Theory and other models. Prerequisites: 12 semester hours of a foreign language. 3 credits.

ENGL-508. GRADUATE RESEARCH WRITING

Graduate students will learn to express complex ideas using oral and written research modes, acquiring knowledge of linguistic accuracy and (structural and lexical) complexity to develop disciplinary writing proficiency. Ongoing teacher-student interaction takes place in the selection of research topic, proposal, and plan; formation of outline; review of rough drafts; and critique of the final draft before submission to a disciplinary professor or advisor for graduate school credit. Through this course, students will have the means to connect as professionals with disciplinary professors and advisors for independent study. 3 credits.

ENGL-510. STRUCTURE OF MODERN ENGLISH

Structure of Modern English is an advanced course in the grammar and structure of English. It is designed to give intensive study and practice in analyzing the structure of English sounds, words, phrases, and sentences; doing error analysis; recognizing and correcting errors; taking examinations; writing research papers and engaging in various pedagogically-oriented linguistic analysis projects. 3 credits.

ENGL-511. TEACHING LITERACY FOR ENGLISH LANGUAGE LEARNERS

This course provides instruction on effective practices for literacy instruction of elementary, middle school, secondary, and adult English language learners. Literacy practices and instructional strategies focus on general language development, reading fluency and comprehension, lexical development, and interactive learner engagement. 3 credits.

ENGL-512. SEMINAR ON THEORIES AND PRACTICE OF SECOND LANGUAGE LEARNING AND TESTING

This seminar will focus on and put into practice relevant aspects of applied linguistics, second language acquisition (SLA), pedagogy and testing. Topics include interactive and non-interactive hypermedia technologies, computer-assisted language learning (CALL) and second language (L2) literacy, language testing and technology, distance learning, online chat discussions, software selection, and more. Course formats include readings, discussion, demonstrations, and hands-on sessions with technologies. As part of a teaching portfolio, students will create their own computer-based materials for teaching. 3 credits.

ENGL-514. SECOND LANGUAGE LEARNERS – IDENTITY, COMMUNITY, AND LANGUAGE LEARNING

This course explores the many factors that influence individual learners. The complexities of identity and the interaction of language and thought will be considered in order to develop a more extensive understanding of individual learners and how their backgrounds, cultures, communities, language, and communicative experiences influence and shape them as language learners. 3 credits.

ENGL-516. CLASSROOM – PLANNING, SUPPORTING LEARNERS

This course focuses on developing skills associated with establishing a classroom environment that is conducive and encouraging to learning and development. Topics addressed include current research based practices for classroom management, discipline, motivation, individual and group interaction, and more. This course also specifically focuses on strategies and skills for managing ELL and bilingual education learning environments. 3 credits.

ENG-518. METHODS OF TEACHING ENGLISH AS A SECOND LANGUAGE

This course introduces students to basic concepts and methodologies for teaching second language learners. It is designed as a review of theories, programs, approaches, strategies, and techniques for effective second language teaching methods. Additionally, the course addresses theories of acquisition of a second language. 3 credits.

ENGL-520. FOUNDATIONS OF BILINGUAL EDUCATION

This course is designed to equip bilingual and second language teachers with the tools, knowledge and philosophy for working with language minority students in the context of bilingual/ESL programs. The course introduces candidates to the historical, political and legal foundations of bilingual education programs in the United States, in addition to exploring different models of bilingual programs and their psycholinguistic and sociolinguistic foundations upon which they rest. 3 credits.

ENGL-590. PRACTICUM

This course provides students with the opportunity to supplement course work with practical work experience related to their educational program. Students work under the immediate supervision of experienced personnel in the classroom (at School District or the University) where they are assigned as well as with the direct guidance of their instructor. 3 credits.

ENGL-591. RESEARCH AND THESIS

This course is one of two options for the culminating project in the completion of the MA TESOL / Bilingual Education degree. This course requires students to write and defend a publishable thesis based on independent research. In addition to submitting and defending the thesis, students are required to submit their work to a reputable peer-reviewed journal or scholarly publisher for publication consideration. 6 credits.

ENGL-592. APPLIED RESEARCH

This course is one of two options for the culminating project in the completion of the MA TESOL / Bilingual Education degree. This course requires students to complete an applied research project in a classroom setting suited to their focus area of study. As part of this project, they will engage in current, ongoing issues in ELL / Bilingual Education pedagogy, identify key problem areas or areas for improvement, and then recommend and implement evidence-based best practices to address the identified issue. This process will place students directly in the professional atmosphere and setting they will be working in, allow them to develop applied competencies, and contribute to the specific learning environment in which they are working, as well as to the field in general. All details of the project are reported in a comprehensive portfolio. 6 credits.

EDUC-557. EFFECTIVE TEACHING SKILLS AND CLASSROOM MANAGEMENT

This course combines effective teaching skills and classroom management into one comprehensive course. It is designed to provide basic pedagogical tools and conceptual frames necessary for creating effective teaching and learning environments. Students will be introduced to the current research on best practices that inform teachers/practitioners. Students will be required to demonstrate through individual and small group experiential activities, the critical teaching skills that are embodied in the Delaware Teaching Standards, multiple assessment strategies, micro-teaching, mastery teaching, cooperative learning strategies and other instructional models. Additionally, the student will have the opportunity to develop reflective teaching skills in the planning, delivery and evaluation of their cohort's teaching performances. In a convivial atmosphere, the instructor and peers will provide feedback on an individual's teaching related to performance-based objectives and learner outcomes. This course incorporates current research on the most effective strategies for improving classroom discipline, motivation, interpersonal relationships and academic performance on all grade levels. Attention is given to aspects of diversity and/or cultural factors that influence perceptions about classroom management and also factors which may assist in facilitating mainstreaming efforts. 3 credits.

EDUC-614. HUMAN GROWTH AND DEVELOPMENT

Educational implications of human development over the life span are examined. Students will survey research with special attention to the applications to teaching and developmentally appropriate school programs. 3 credits.

EDUC-625. INTRODUCTION TO STATISTICS AND RESEARCH/ACTION RESEARCH.

This course covers application of basic statistical techniques and research methodologies employed in qualitative and quantitative research in education. The focus of the course is primarily on action research and students will develop an action research plan as a course requirement. 3 credits.

EDUC-683. USING TECHNOLOGY TO ENHANCE STUDENT LEARNING AND ORGANIZATIONAL MANAGEMENT

This course addresses current technologies from a practitioner's point of view. The Internet, World Wide Web and production software are used with the intent to make informed decisions both administratively and instructionally. Advance students will have the opportunity to focus on emerging technologies in their applications from the viewpoint of planning, enhanced communications, managing information, delivery of instruction and the latest technologies used by professionals in their respective fields. 3 credits.

**PROGRAM: DEPARTMENT OF MA TESOL / BILINGUAL EDUCATION
FULL TIME ENROLLMENT**

Fall 1 Semester			
Course	Course Name	Credit	EFE
ENGL - 518	Methods of Teaching English as a Second Language	3	20
ENGL - 504	Second Language Acquisition	3	
Elective	Elective	3	
Total Credits		9	
Spring 1 Semester			
Course	Course Name	Credit	
ENGL - 510	Structure of Modern English	3	
EDUC - 557	Effective Teaching Strategies and Classroom Management†	3	20
ENGL - 511	Teaching Literacy for English Language Learners	3	
Total Credits		9	
Fall 2 Semester			
Course	Course Name	Credit	
ENGL - 512	Seminar on Theories and Practice of Second Language Learning and Testing	3	
Elective	Elective	3	
ENGL - 590	Practicum	3	40
Total Credits		9	
Spring 2 Semester			
Course	Course Name	Credit	
ENGL 591 OR ENGL 592	Research and Thesis OR Applied Research	6	
Total Credits		6	
Requirement Totals			
		33	80

Electives			
Course	Course Name	Credit	
ENGL 520	Foundations of Bilingual Education* (Fall)	3	
ENGL 516	Classroom - Planning, Supporting Learners (Spring)	3	20
ENGL 514	Second Language Learners – Identity, Community, and Language Learning (Fall)	3	10
ENGL 508	Graduate Research Writing	1-3	
EDUC 614	Human Growth and Development (Fall)	3	
EDUC 625	Introduction to Statistics and Research Methods/ Action Research (Spring)	3	
EDUC 683	Using Technology to Enhance Student Learning and Organizational Management (Fall)	3	

† ENGL 516 may substitute EDUC 557.

*ENGL 520 – *Foundations of Bilingual Education* is a required elective selection for students pursuing bilingual education.

**Alternative tracks for course scheduling will be considered to meet student needs.

TELL PROGRAM SECONDARY CERTIFICATION IN TEACHER OF ENGLISH LANGUAGE LEARNERS / BILINGUAL TEACHER

PROGRAM OBJECTIVES

This program is designed to provide students expertise and training on the theory and practice of teaching English to non-native speakers of English and/or bilingual learners. The program provides students with the pedagogical and intellectual preparations necessary to teach in K-12 English Language Learner (ELL) or dual language immersion classrooms and obtain Delaware Department of Education secondary certification in either "1562 Teacher of English Learners" or "1561 Bilingual Teacher."

PROGRAM GOALS

The goal of the TELL program is to produce K-12 educators who are certified in either DDOE "1562 Teacher of English Learners" or "1561 Bilingual Teacher." Obtaining this secondary certification is evidence of an individual's ability to provide high-quality, research-based instruction to English language learners and/or bilingual learners in K-12 education.

STUDENT LEARNING OUTCOMES

Student Learning Outcomes have been established in accordance with and based directly on the *TESOL International Association* standards for TESOL.

- **SLO 1: Language** – Candidates will understand language as a system of communication and be knowledgeable about major theories related to the structure and acquisition of language.
- **SLO 2: Culture** – Candidates will demonstrate an understanding of the role of culture in instruction, and that culture and language are inseparable.
- **SLO 3: Instruction** – Candidates will be able to effectively plan and provide evidence-based instruction that leads to learner language development. Further, they will be able to identify and use resources and technology that best supports learner development.
- **SLO 4: Assessment** – Candidates will demonstrate an understanding of the purposes and types of assessment tools, and how to best implement them to assess learner language skill and communicative ability.
- **SLO 5: Professionalism** – Candidates understand the importance of, and are able to independently develop through classroom research and professional development opportunities. Further, they demonstrate an understanding of professional ethics and behavior in the field of TESOL.

ADMISSION AND PROGRAM REQUIREMENTS

Application Deadlines:

- Applications received on a rolling basis.

All applicants are required to:

- Have earned a bachelor's degree at an accredited college or university, possess the ability to do graduate work of high quality, and meet language proficiency requirements for English (and target language for those pursuing bilingual education).
- Submit one official transcript from all previous undergraduate and graduate work.
- Submit three letters of recommendation.
- Submit a statement of purpose indicating educational career goals and experience.
- Submit GRE scores.*
- Have native or near native fluency in English. Non-native speakers of English without a college degree from a U.S. or English speaking institution must also have a minimum TOEFL score of 95 (iBT), 585 (paper), or an IELTS of 7.0.
- Applicants pursuing K-12 certification (only) need a pre- or co-requisite teacher education program.
- Applicants must meet all graduate school requirements.

* GRE score requirement may be waived for those entering the program with substantial professional and academic experience and credentials. Additionally, educators taking courses for secondary certification may also have GRE waived.

COURSE DESCRIPTIONS

ENG-504. SECOND LANGUAGE ACQUISITION

This course is an analysis of current issues in second language acquisition based on readings and research findings. Discussion of theories includes the Acculturation Model, the Nativization Model, Accommodation Theory, Discourse Theory, the Monitor Model, the Variable Competence Model, the Universal Hypothesis, Neuro-functional Theory and other models. Prerequisites: 12 semester hours of a foreign language. 3 credits.

ENGL-510. STRUCTURE OF MODERN ENGLISH

Structure of Modern English is an advanced course in the grammar and structure of English. It is designed to give intensive study and practice in analyzing the structure of English sounds, words, phrases, and sentences; doing error analysis; recognizing and correcting errors; taking examinations; writing research papers and engaging in various pedagogically-oriented linguistic analysis projects. 3 credits.

ENGL-511. TEACHING LITERACY FOR ENGLISH LANGUAGE LEARNERS

This course provides instruction on effective practices for literacy instruction of elementary, middle school, secondary, and adult English language learners. Literacy practices and instructional strategies focus on general language development, reading fluency and comprehension, lexical development, and interactive learner engagement. 3 credits.

ENGL-512. SEMINAR ON THEORIES AND PRACTICE OF SECOND LANGUAGE LEARNING AND TESTING

This seminar will focus on and put into practice relevant aspects of applied linguistics, second language acquisition (SLA), pedagogy and testing. Topics include interactive and non-interactive hypermedia technologies, computer-assisted language learning (CALL) and second language (L2) literacy, language testing and technology, distance learning, online chat discussions, software selection, and more. Course formats include readings, discussion, demonstrations, and hands-on sessions with technologies. As part of a teaching portfolio, students will create their own computer-based materials for teaching. 3 credits.

ENG-518. METHODS OF TEACHING ENGLISH AS A SECOND LANGUAGE

This course introduces students to basic concepts and methodologies for teaching second language learners. It is designed as a review of theories, programs, approaches, strategies, and techniques for effective second language teaching methods. Additionally, the course addresses theories of acquisition of a second language. 3 credits.

Fall Semester			
Course	Course Name	Credit	EFE
ENGL - 518	Methods of Teaching English as a Second Language	3	20
ENGL - 504	Second Language Acquisition	3	
ENGL - 512	Seminar on Theories and Practice of Second Language Learning and Testing	3	
Total Credits		9	
Spring Semester			
Course	Course Name	Credit	
ENGL - 510	Structure of Modern English	3	
ENGL - 511	Teaching Literacy for English Language Learners	3	
Total Credits		6	
Requirement Totals			
		15	20

ONLINE GRADUATE CERTIFICATE IN TESOL

PROGRAM OBJECTIVES

This program is designed to provide students with fundamental skills and entry-level credentials for teaching English to speakers of other languages. The program prepares students to teach non-native speakers of English in community programs, language schools, and other similar programs both in the United States and internationally.

PROGRAM GOALS

The goal of the online graduate certificate program is to ensure students are prepared to successfully guide the development and learning of English language learners. This is evidenced by a functional understanding of language, language teaching, learner identity, and classroom management strategies.

STUDENT LEARNING OUTCOMES

Student Learning Outcomes have been established in accordance with and based directly on the *TESOL International Association* standards for Short-Term TEFL/TESL Certificate programs.

- **SLO 1: Language** – Candidates will understand language as a system of communication and be knowledgeable about first- and second-language acquisition.
- **SLO 2: Culture** – Candidates will demonstrate an understanding of the role of culture in instruction, and that culture and language are inseparable.
- **SLO 3: Instruction** – Candidates will be able to effectively plan and provide instruction that leads to learner language development. Further, they will be able to identify and use resources and technology that best supports learner development.
- **SLO 4: Assessment** – Candidates will demonstrate an understanding of the purposes and types of assessment tools, and how to best implement them to assess learner language skill and communicative ability.
- **SLO 5: Professionalism** – Candidates understand the importance of, and are able to independently develop through classroom research and professional development opportunities. Further, they demonstrate an understanding of professional ethics and behavior in the field of TESOL.

ADMISSION AND CERTIFICATE REQUIREMENTS

Application Deadlines:

- Applications received on a rolling basis.

All Applicants are required to:

- Have earned a bachelor's degree at an accredited college or university, possess the ability to do graduate work of high quality, and meet language proficiency requirements for English.
- Submit one official transcript from all previous undergraduate and graduate work.
- Submit three letters of recommendation.
- Submit a statement of purpose indicating educational career goals and experience.

- Submit GRE scores*
- Have native or near native fluency in English. Non-native speakers of English without a college degree from a U.S. or English speaking institution must also have a minimum TOEFL score of 95 (iBT), 585 (paper), or an IELTS of 7.0.
- Applicants must meet all graduate school requirements.

* GRE score requirement may be waived for those entering the program with substantial professional and academic experience and credentials.

CERTIFICATE REQUIREMENTS

The online graduate certificate in TESOL program requires the completion of 12 credit hours. The program follows a praxis model in which students are expected to apply the learned theory and methods in the classroom as part of the course curricula. Students are also required to complete a final portfolio project that evidences their development through the program.

All courses completed in this program can also be applied toward the MA TESOL/ Bilingual Education degree.

COURSE DESCRIPTIONS

ENGL-510. STRUCTURE OF MODERN ENGLISH

Structure of Modern English is an advanced course in the grammar and structure of English. It is designed to give intensive study and practice in analyzing the structure of English sounds, words, phrases, and sentences; doing error analysis; recognizing and correcting errors; taking examinations; writing research papers and engaging in various pedagogically-oriented linguistic analysis projects. 3 credits.

ENGL-514. SECOND LANGUAGE LEARNERS – IDENTITY, COMMUNITY, AND LANGUAGE LEARNING

This course explores the many factors that influence individual learners. The complexities of identity and the interaction of language and thought will be considered in order to develop a more extensive understanding of individual learners and how their backgrounds, cultures, communities, language, and communicative experiences influence and shape them as language learners. 3 credits.

ENGL-516. CLASSROOM – PLANNING, SUPPORTING LEARNERS

This course focuses on developing skills associated with establishing a classroom environment that is conducive and encouraging to learning and development. Topics addressed include current research based practices for classroom management, discipline, motivation, individual and group interaction, and more. This course also specifically focuses on strategies and skills for managing ELL and bilingual education learning environments. 3 credits.

ENG-518. METHODS OF TEACHING ENGLISH AS A SECOND LANGUAGE

This course introduces students to basic concepts and methodologies for teaching second language learners. It is designed as a review of theories, programs, approaches, strategies, and techniques for effective second language teaching methods. Additionally, the course addresses theories of acquisition of a second language. 3 credits.

PROGRAM: ONLINE GRADUATE CERTIFICATE IN TESOL

Fall 1 Semester		
Course	Course Name	Credit
ENGL - 514	Second Language Learners – Identity, Community, and Language Learning	3
ENGL - 518	Methods of Teaching English as a Second Language	3
Total Credits		6
Spring 1 Semester		
Course	Course Name	Credit
ENGL - 510	Structure of Modern English	3
ENGL - 516	Classroom - Planning, Supporting Learners	3
Total Credits		6
Total Program Credits		12

MASTER OF PUBLIC ADMINISTRATION

PROGRAM OBJECTIVES

The MPA program at DSU is designed to provide students with a rigorous program of study preparing policy analysts, public administrators, and public managers with critical decision-making skills. Success in the field of public administration, public policy and management is based on developing analytical skills to diagnose problems, synthesize information, and choose among various competing policy options in the course of managing in a dynamic and ever-changing environment.

PROGRAM GOALS

The goal of the Master of Public Administration Program is to offer its students a high-quality degree that prepares them for advancement in a variety of fields. The program of study prepares students for a careers in government (state, federal, and local government administrative and management positions), as well as not-for-profit, private, and non-governmental organizations.

STUDENT LEARNING OUTCOMES

Students will be able to apply modern public administration practices in real-world settings.

Students will demonstrate leadership and management skills that drive operational efficiency.

Students will apply principles of budgeting and finance to public governmental and nonprofit organizations.

Students will appreciate the public policy process and the critical role of stakeholders in the development and implementation of public policy.

Students will develop and implement techniques for more effective administration through measuring and managing for results.

ADMISSION DEADLINES AND DEGREE REQUIREMENTS

Application Deadlines:

The MPA uses an accelerated 8-week-term format with rolling admissions.

International Admission Deadlines:

The MPA uses an accelerated 8-week-term format with rolling admissions. International students should submit all required documents no later than 4 weeks prior to the beginning of the session. Allow additional time as necessary to complete requirements (see admission requirements for international applicants).

All applicants are required to submit evidence of the following for consideration of unconditional admission:

- Completed University Application
- Baccalaureate Degree from a regionally accredited college or university (2.5 minimum overall GPA)
- Two letters of recommendations
- Official transcripts
- Three to five years of work experience (preferably with two years of supervisory, managerial, or professional experience)
- Submission of GRE or GMAT: may be waived for experience

***Note: Professional-level experience is defined as working in a position classified as exempt under the Fair Labor Standards Act definitions.**

Students without 3-5 years of work experience are still eligible for admission; however, they will be required to take a 3 credit hour internship course as a part of their program of study.

The Director of the MPA Program will review students' application materials and make recommendation for acceptance into the MPA program to the Dean, Graduate Studies and Research, who extends an offer of admission to the applicant.

DEGREE REQUIREMENTS

The program is comprised of 15 credit hours of foundational core courses and 18 credit hours of core MPA courses, and a 3 credit hour capstone course (students who do not meet the experience requirement must also take a 3 credit hour internship class).

Students must complete 5 foundational core courses with an overall GPA of 3.0 before moving on to complete the MPA Core Courses.

Foundation Courses:

MPA 503 American Government/Public Policy
MPA 504 Research Methods in Public Administration
MPA 505 Public Organizational Behavior & Operations
MBA 502 Economic Foundations or MBA 601 Economics for Managerial Decision-Making
MBA 605 Organizational Leadership & Behavior

MPA Core Courses:

MPA 601 Foundations of Public Administration
MPA 602 Public Policy Analysis
MPA 603 Public Budgeting
MPA 604 Public Information Technology
MPA 605 Management Systems
MPA 606 Human Resources Management
MPA 607 Graduate Project
MPA 608 Internship (if required)

Graduate Project:

Students who successfully complete all required course work with an overall cumulative grade point average of 3.0 are able to move on to complete the Capstone Project. The student must prepare (under the guidance of an MPA faculty member) and successfully present/defend their project. Outcomes report and rubric will be submitted to Graduate Studies prior to graduation.

FACULTY

As a practitioner oriented program, the MPA Program draws faculty from working professionals with the appropriate degree qualifications to provide practical application knowledge of program material. Faculty members are accomplished professionals who share their knowledge and experience with students. Additionally, the program benefits from accomplished interdisciplinary faculty from the College of Business, the College of Health and Behavioral Sciences, and the College of Humanities, Education and Social Sciences for foundational core courses.

PROGRAM FACULTY

Jason Bourke, Interim Program Director

FACILITIES

All courses are taught at the DSU at Wilmington location, 3931 Kirkwood Highway, Wilmington, DE.

COURSE DESCRIPTIONS

MPA 503. AMERICAN GOVERNMENT/PUBLIC POLICY

The course considers the underpinnings of American government by defining public administration and describing the constitutional and political environment. The federal bureaucracy is studied as well as the policy architecture for carrying out decisions at the federal, state, and local levels. The course also discusses public administration reform and improvement efforts. Credits, three hours.

MPA 505. PUBLIC ORGANIZATIONAL BEHAVIOR AND OPERATIONS

This seminar surveys organizational theory and behavior and how it applies to public organizations. This course discusses theoretical frameworks that are common in business but that can be applied in the public sector. Credits, three hours.

MBA 502 or 601.

502. ECONOMIC FOUNDATIONS

This is a general introductory course on the fundamentals of Microeconomic and Macroeconomic theories, market models, and principles and their application to national and international economics systems. Credits, three hours.

601. ECONOMICS FOR MANAGERIAL DECISION MAKING

The course examines the applied micro-economic theory of the firm. Economics concepts covered include demand analysis, production and cost analysis, linear programming applications, pricing policies, and government regulation of the firm. The course also provides an analysis of macro-economic factors influencing business activity and their implications for strategic management and business policy. Credits, three hours.

MBA 605. ORGANIZATIONAL LEADERSHIP AND BEHAVIOR

The course concentrates on the behavior of individuals in small, informal groups, and formal organizations. The course examines the following topics: leadership, in the context of group behavior, job satisfaction, supervision, planning, and conflict resolution. Prerequisites: Common Body of Knowledge (CBK) requirements in Management. Credits, three hours.

MBA 504. RESEARCH METHODS FOR PUBLIC ADMINISTRATION

This course focuses on the behavioral approach to the study of political and administrative behavior. This course explores a variety of topics which include the philosophy of social science; experimental, quasi and non-experimental research designs; data collection techniques; and basic statistical analysis with computer applications. Data analysis using the computer software, SPSS, is integrated throughout the course. Credits, three hours.

MPA 601. FOUNDATIONS OF PUBLIC ADMINISTRATION

This seminar surveys public administration theory, approaches to public management and contemporary problems in public administration. Credits, three hours.

MPA 602. PUBLIC POLICY ANALYSIS

This course introduces students to principles of public policy analysis with an emphasis on administrative decision-making and the implications. Credits, three hours.

MPA 603. PUBLIC BUDGETING

This course views budgeting in a broad perspective providing a familiarity with the economic and political implications of public budgeting; the budgetary process; types and uses of budgetary data systems; and recent reform efforts that attempt to modernize budgetary techniques at the federal, state, and local levels in government. Credits, three hours.

MPA 604. PUBLIC INFORMATION TECHNOLOGY

This course is designed to acquaint MPA students with a scholarly and practical introduction to the application of information technology in the public sector. It places heavy emphasis on e-Government and the use of technology to enable business process management in public environments. Credits, three hours.

MPA 605. MANAGEMENT SYSTEMS

The purpose of this course is to teach public administration students about the field and practice of management and operations of results-based management systems in governmental and non-profit organizations. This course emphasizes application knowledge merging the theoretical and practical to "real world" situations and events through the use of case study analyses.

Credits, three hours.

MPA 606. HUMAN RESOURCE MANAGEMENT

The purpose of this course is to teach public administration students about the field and practice of human resources management from the perspective of public managers. This course emphasizes applying the theoretical knowledge discussed in class lectures to "real world" situations and events through the use of case study analyses. Credits, three hours.

MPA 608. INTERNSHIP

This course is an opportunity for the student to gain practical experience by completing an intern experience with a public administrator under the direction of an MPA faculty member. Credits, three hours.

MPA 607. GRADUATE PROJECT

The Graduate project is an applied project to be completed over the duration of the 8-week term. It requires students to relate theory to practice. The specific topic of the project and the relevant level of government will be chosen jointly by the course faculty member and the student with heavy consideration of the student's career interests. The written portion of a successful graduate project will include, at minimum, an executive summary, introduction, literature review, plan of implementation, financial plan, evaluation plan, and a conclusion. Credits, three hours.

PROGRAM: MASTER OF PUBLIC ADMINISTRATION (MPA)

For students who meet who meet professional experience requirement

First 8 week session – Start of the Foundational Core Courses (5 Courses)			Second 8 week session		
Course	Course Name	Cr	Course	Course Name	Cr
*MPA 503	American Government/Public Policy	3	*MBA 502 (or MBA 601)	Economics Foundations	3
*MPA 505	Public Organizational Behavior and Operations	3	*MBA 605	Organizational Leadership and Behavior	3
	Total Credits	6		Total Credits	6
Third 8 week session			Fourth 8 week session Start of the MPA Core Courses		
Course	Course Name	Cr	Course	Course Name	Cr
*MPA 504	Research Methods for Public Administration	3	*MPA 601	Foundations of Public Administration	3
			*MPA 602	Public Policy Analysis	3
	Total Credits	3		Total Credits	6
Fifth 8 week session			Sixth 8 week session		
Course	Course Name	Cr	Course	Course Name	Cr
*MPA 603	Public Budgeting	3	*MPA 605	Management Systems	3
*MPA 604	Public Information Technology	3	*MPA 606	Human Resource Management	3
	Total Credits	6		Total Credits	6
Seventh 8 week session (Start of Year Two)					
Course	Course Name	Cr	Course	Course Name	Cr
*MPA 607	Graduate Project	3			
	Total Credits	3		Total Credits	
			Total Credits: 36		

Students who do not meet the experience requirement must take a 3 credit Internship Class before they can proceed to the Graduate Project. Students in this category will have 39 total credits upon completion of their program.

*Denotes a Core Requirement

+Denotes an elective

Total Core Credits = 27 Elective Credits = 6

Candidacy Requirement: Completion of 15 credits, 80 hours of EFE, language proficiency Capstone or Culminating Experience:

Thesis and Scholarly Publication or Project and Portfolio

FACULTY CREDENTIALS

Adegoke	Mopelola	Human Ecology	Associate Professor	Ph.D.	Family and Consumer Science Education	Iowa State University
Aikins	Anthea	Biological Sciences	Assistant Professor	Ph.D.	Microbiology-Medicine and College Teaching	University of Missouri
Akey	Jennifer	Nursing	Associate Professor	EdD	Educational Leadership	Delaware State University
Aleong	Chandra	Education	Associate Professor	Ed.D.	Higher Education Administration	University of Pennsylvania
Amoako	Joe	English and Foreign Languages	Professor	Ph.D.	Linguistics	University of Florida
Anakwe	Bridget	Accounting, Economics and Finance	Associate Professor	Ph.D.	Accounting	Rutgers, The State University of New Jersey
Anderson	Amanda	English	Assistant Professor	Ph.D.	English	University of Louisiana at Lafayette
Areke	Olaniyi	Mass Communications	Associate Professor	M.F.A.	Film	Howard University
Austin*	John	Social Work	Professor	D.S.W.	Social Work	Virginia Commonwealth University
Awadzi	Winston	Business Administration	Professor	Ph.D.	Management	Louisiana State University
Balliro	Michael	Social Work	Assistant Professor	Ph.D.		University of Texas at Austin
Balogun	Fidelis	English and Foreign Languages	Professor	Ph.D.	Slavic Languages and Literature	University of Illinois at Urbana-Champaign
Balzarini	John	Sociology and Criminal Justice	Assistant Professor	Ph.D.	Sociology	Temple University

Banerjee	Padmini	Psychology	Associate Professor	Ph.D.	Human Development and Family Studies	The Pennsylvania State University - University Park
Barczewski	Richard	Agriculture and Natural Resources	Associate Professor	Ph.D.	Animal Science	University of Maryland College Park
Beaumont	Hazel Bradshaw	Art	Associate Professor	Ph.D.	Art Education	The Ohio State University
Becker	Carla	Music	Visiting Assistant Professor	Ed.D.	Music and Music Education	Teachers College, Columbia University
Becker	Donald	Art	Associate Professor	Ed.D.	Educational Leadership	University of Delaware
Belcher	Natalie	English and Foreign Languages	Instructor	M.A.	Education	Delaware State University
Besong	Samuel	Human Ecology	Associate Professor	Ph.D.	Animal Science	University of Kentucky
Beugre'	Constant	Business Administration	Professor	Ph.D.	Management	Rensselaer Polytechnic Institute
Bieker	Richard	Accounting, Economics and Finance	Professor	Ph.D.	Economics	University of Delaware
Blade	Janet	Sport Management	Associate Professor	Ed.D.	Sport Management	United States Sports Academy
Blake	Andrew	English and Foreign Languages	Associate Professor	Ed.D.	Innovation and Leadership	Wilmington University
Bluemel	Brody	English	Assistant Professor	Ph.D.	Applied Linguistics and Asian Studies	The Pennsylvania State University
Boukari	Hacene	Physics and Pre-Engineering	Associate Professor	Ph.D.	Chemical Physics	University of Maryland College Park

Broderick	Cyril	Agriculture and Natural Resources	Associate Professor	Ph.D.	Plant Science	University of New Hampshire
Brooks-Collins	Phyllis	History, Political Science and Philosophy	Assistant Professor	Ph.D.	Organizational Leadership	University of Maryland Eastern Shore
Carr	Ellen	Mathematical Sciences	Assistant Professor	Ph.D.	Mathematics	Delaware State University
Casson	Michael	Accounting, Economics and Finance	Associate Professor	Ph.D.	Agriculture and Resource Economics	University of Connecticut
Silver	Alexa	History, Political Science and Philosophy	Associate Professor	Ph.D.	History	American University
Chen	Li	Sport Management	Professor	D.P.E.	Physical Education	Springfield College
Cheng	Yinghong	History, Political Science and Philosophy	Associate Professor	Ph.D.	History	Northeastern University
Christopher	Jan	Accounting, Economics and Finance	Associate Professor	Ph.D.	Economics	Howard University
Clark	Cecil	Education	Associate Professor	Ed.D.	Educational Leadership	Argosy University
Clark	June	Hospitality and Tourism	Associate Professor	Ph.D.	Human Sciences	Oklahoma State University
Colbert	William	Art	Associate Professor	M.F.A.	Art	University of Delaware
Crawford	Lori	Art	Associate Professor	M.F.A.	Computer Art	Savannah College of Art and Design

Dampeer-Moore	Jodi	Nursing	Associate Professor	Ed.D	Educational Leadership	Delaware State University
Danz	Sally	Nursing	Associate Professor	Ph.D.	Educational Leadership	University of Delaware
Das	Nandita	Accounting, Economics and Finance	Associate Professor	Ph.D.	Economics	West Virginia University
Dawley	Edward	English and Foreign Languages	Assistant Professor	Ph.D.	Modern French Studies	University of Maryland
Davidson	Adenike	English and Foreign Languages	Professor	Ph.D	English Language and Literature	University of Maryland
Davis	LaPointe	Music	Professor	Ph.D.	Music	The Ohio State University
Dhillon	Harbinder	Biological Sciences	Associate Professor	Ph.D.	Biochemistry	Rutgers, The State University of New Jersey
Dillard	Dorothy	Sociology and Criminal Justice	Associate Professor	Ph.D.	Sociology	University of Delaware
DiMaria	Peter	Chemistry	Associate Professor	Ph.D.	Biochemistry	Temple University
Edwards	Francine	Mass Communications	Associate Professor	Ph.D.	Communication and Culture	Howard University
Edwards-Omelawa.	Nicola	Mathematical Sciences	Associate Professor	Ph.D.	Education	University of Delaware
Elavarthi	Sathya	Agriculture and Natural Resources	Associate Professor	Ph.D.	Plant Science	Oklahoma State University

Ette	Ezekiel	English	Associate Professor	Ph.D.	Social Work Immigration/ Social Research	Portland State University
Falodun	Joseph	Education	Associate Professor	Ph.D.	Education	University of Pennsylvania
Fletcher	Kami	History	Assistant Professor	Ph.D.	African American History, Race and Gender Studies, and Death and Cemeteries	Morgan State University
Fondong	Vincent	Biological Sciences	Associate Professor	Ph.D.	Epidemiology	Cornell University
Fox	Dewayne	Agriculture and Natural Resources	Associate Professor	Ph.D.	Zoology	North Carolina State University
Franklin	Franzine	Social Work	Assistant Professor	Ph.D.	Social Work	Catholic University of America
Friel	Brian	Psychology	Associate Professor	Ph.D.	Experimental Psychology	Kansas State University
Gawrysiak	Michael	Psychology	Assistant Professor	Ph.D.	Psychology	The University of Tennessee, Knoxville
Gazda	Frank	Music	Associate Professor	D.M.A.	Music	University of Maryland College Park
George	Tina	English and Foreign Languages	Instructor	M.A.	Teaching English as a Second Language	University of Delaware
German	Myna	Mass Communications	Associate Professor	Ph.D.	Literature and Philosophy in Communication	University of South Africa at Pretoria
Gibson	Paul	Mathematical Sciences	Associate Professor	Ph.D.	Applied Mathematics and Mathematical Physics	Delaware State University
Gitcho	Michael	Biological Sciences	Assistant Professor	Ph.D.	Cellular & Molecular Pharmacology	Saint Louis University

Gomez	Cara	Public and Allied Health Sciences	Assistant Professor	Ed.D	Innovation & Leadership- Org. Leadership	Wilmington University
Gomia	Victor	English and Foreign Languages	Associate Professor	Ph.D.	Post-Colonial Literature	University of Yaoundé, Cameroon
Goote-Ash	Amy	Public & Allied Health Sciences	Instructor	MS	Health Science	James Madison University
Goswami	Rubella	Agriculture and Natrual Resources	Assistant Professor	Ph.D.	Plant Pathology	University of Minnesota
Goudy	Andrew	Chemistry	Professor	Ph.D.	Physical Chemistry	University of Pittsburgh
Govindarajulu	Chittibabu	Business Administration	Associate Professor	Ph.D.	Management Information Systems	University of Mississippi
Guo	Mingxin	Agriculture and Natural Resources	Associate Professor	Ph.D.	Soil Science	The Pennsylvania State University - University Park
Guo	Wieping	Chemistry	Lecturer	Ph.D.	Chemistry	Pennsylvania State University
Gupta	Sangeeta	Public & Allied Health Sciences	Associate Professor	MD	Psychiatry	Lady Hardinge Medical College
Gwanmesia	Gabriel	Physics and Pre-Engineering	Professor	Ph.D.	Earth and Space Sciences	State University of New York at Stony Brook
Hagos	Asgede	Mass Communications	Professor	Ph.D.	African Studies	Howard University
Harrington	Melissa	Biological Sciences	Professor	Ph.D.	Neuroscience	Stanford University

Heckscher	Christopher	Agriculture and Natural Resources	Associate Professor	Ph.D.	Entymology and Wildlife Ecology	University of Delaware
Hei	Xiali	Computer and Information Sciences	Assistant Professor	Ph.D.	Computer and Information Sciences	Temple University
Hill	Anthony	Social Work	Associate Professor	Ph.D.	Social Work	Howard University
Hill	Janet	Education	Associate Professor	Ph.D.	Curriculum and Instruction	Kent State University
Hoff	Samuel	History, Political Science and Philosophy	Professor	Ph.D.	Political Science	State University of New York at Stony Brook
Hoffman	Patrick	Music	Professor	D.M.A.	Music	University of Georgia
Holness	Gary	Computer and Information Sciences	Associate Professor	Ph.D.	Computer Science	University of Massachusetts Amherst
Jarrett	Earl Caesar	Biology	Instructor	MS	Forensic Medicine	University of New Haven
Johnson	Delayne	Mathematical Sciences	Assistant Professor	Ph.D.	Education	University of Delaware
Jordan	Tina	Social Work	Associate Professor	Ph.D.	Social Work	Morgan State University
Kalavacharla	Venugopal	Agriculture and Natural Resources	Professor	Ph.D.	Plant Science	North Dakota State University
Katz	Michael	Accounting, Economics and Finance	Professor	J.D.	Law	Widener University

Khan	Mohammad	Physics & Engineering	Assistant Professor	Ph.D.	Electrical Engineering	Old Dominion University
Kiesel	Eleanor	Social Work	Visiting Assistant Professor			
Kim	Daeryong	Business Administration	Professor	Ph.D.	Management Information Systems	University of Mississippi
Kim	Keun Kyu	Education	Associate Professor	Ph.D.	Early Childhood Education	University of Georgia
Kim	Young-Hwan	Biological Sciences	Associate Professor	Ph.D.	Physiological Science	University of California
Kong	Kam	Computer and Information Sciences	Associate Professor	Ph.D.	Mathematical Sciences	Purdue University
Krawitz	Robin	History, Political Science and Philosophy	Research Assistant Professor	M.A.	History	Colorado State University
Kuperavage	Adam	Public & Allied Health Sciences	Assistant Professor	Ph.D.		Pennsylvania State University
Kwak	Young-Sik	Accounting, Economics and Finance	Professor	Ph.D.	Finance	University of Mississippi
Lai	Cheng-Yu	Chemistry	Associate Professor	Ph.D.	Inorganic Chemistry	Iowa State University
Lamar	Horace	Music	Associate Professor	D.M.Ed.	Music Education	University of Southern Mississippi
Lawal	Hakeem	Biological Sciences	Assistant Professor	Ph.D.	Biology	University of Alabama
Lee	Jung-Lim	Human Ecology	Associate Professor	Ph.D.	Food Biochemistry	Kyung-Hee University, South Korea

Lin	Zhongyan	Computer and Information Sciences	Associate Professor	Ph.D.	Mathematics	University of Delaware
Ling	Yi	Mathematical Sciences	Lecturer	Ph.D.	Mathematics	University of Toledo
Liu	Jinjie	Mathematical Sciences	Associate Professor	Ph.D.	Computational Applied Mathematics	State University of New York at Stony Brook
Liu*	Fengshan	Mathematical Sciences	Professor	Ph.D.	Applied Mathematics	University of Delaware
Lloyd	Andrew	Biological Sciences	Professor	Ph.D.	Microbiology	University of Virginia
Lorio	Edward	Art	Associate Professor	M.F.A.	Art	University of South Florida
Lott	Dawn	Mathematical Sciences	Professor	Ph.D.	Applied Mathematics	Northwestern University
Lu	Qi	Physics and Engineering	Assistant Professor	Ph.D.	Physics	Clemson University
Lumor	Stephen	Human Ecology	Assistant Professor	Ph.D.	Food Science	University of Georgia
Maity	Devdeep	Business Administration	Assistant Professor	Ph.D.	Marketing	Oklahoma State University
Makrogiannis	Sokratis	Physics & Engineering	Assistant Professor	Ph.D.	Physics	University of Patras
Mallory	Lloyd	Music	Associate Professor	D.M.A.	Music	University of California at Los Angeles

Maloney	Megan	Public & Allied Health Sciences	Instructor	MS		Salisbury University
Man	Dula	Chemistry	Assistant Professor	Ph.D.	Biological Science	University of Texas at El Paso
Marcano	Aristides	Physics and Engineering	Research Professor	Ph.D.	Non-Linear Optics, Laser Spectroscopy	Moscow State University
Marker	Elaine	Education	Associate Professor	Ed.D.	Language Arts / Literacy	Widener University
Markushin	Yuri	Physics & Engineering	Assistant Research Professor	Ph.D.	Biophysics/Biopolymers /Laser Spectroscopy	Moscow State University
Martin	Robert	Education	Associate Professor	Ed.D.	Curriculum and Instruction (Physical Education)	Columbia University
McGary	Sabrina	Biological Sciences	Associate Professor	Ph.D.	Animal and Avian Sciences	University of Maryland College Park
McIntosh	Dennis	Agriculture and Natural Resources	Research Assistant Professor	Ph.D.	Soil, Water and Environmental Science	University of Arizona
McNair	Rodney	Mathematical Sciences	Associate Professor	Ph.D.	Education	University of Delaware
Mercer	Devin	Music	Visiting Lecturer	M.M.	Music Voice	The John Hopkins University
Miletti-Gonzalez	Karl	Biological Sciences	Assistant Professor	Ph.D.	Microbiology and Mol Genetics	University of Medicine & Dentistry of NJ & Rutgers University
Mills-Wisneski	Sharon	Nursing	Associate Professor	Ph.D.		Widener University

Milutinovic	Janko	Computer and Information Sciences	Associate Professor	Ph.D.	Physics	University of Maryland College Park
Morrison	Mable	Music	Associate Professor	M.M.	Music	DePaul University
Muzorewa	Susan	Accounting, Economics and Finance	Assistant Professor	M.B.A.	Accounting	Morgan State University
Newton	Faith	Education	Associate Professor	Ed.D.	Educational Administration	The College of William and Mary
Newton	Steven	History, Political Science and Philosophy	Professor	Ph.D.	History	The College of William and Mary
Ning	Nancy (Zi)	Accounting, Economics and Finance	Associate Professor	Ph.D.	Business	The University of Texas at San Antonio
Nunlee	Martin	Business Administration	Associate Professor	Ph.D.	Business Administration	University of Illinois at Urbana-Champaign
Nurse	Myrna	English and Foreign Languages	Associate Professor	Ph.D.	English	Temple University
O'Brien	Dahlia	Agriculture and Natural Resources	Assistant Professor	Ph.D.	Food Science and Technology	University of Maryland Eastern Shore
Oh	Jungmi	Human Ecology	Associate Professor	Ph.D.	Clothing, Textiles, & Merchandising	Florida State University
Olsen	Julia	Public & Allied Health Sciences	Instructor	MS		Salisbury University

Osei	Akwasi	History, Political Science and Philosophy	Professor	Ph.D.	African Studies	Howard University
Ozbay	Gulnihal	Agriculture and Natural Resources	Professor	Ph.D.	Fisheries and Allied Aquacultures	Auburn University
Parker	Laurin	Sociology and Criminal Justice	Assistant Professor	M.A.	Sociology	The American University
Parrotta	Kylie	Sociology & Criminal Justice	Assistant Professor	Ph.D.	Sociology	North Carolina State University
Patel	Shilpa	Computer and Information Sciences	Lecturer	M.S.	Computer Science	Drexel University
Pati	Gour	Physics and Engineering	Associate Professor	Ph.D.	Physics	India Institute of Technology
Pepper	Valarie	Accounting, Economics and Finance	Visiting Assistant Professor		Business Administration	
Perrine	Ava	Mass Communications	Instructor	MS		Wilmington University
Phillips	Richard	Education	Associate Professor	Ph.D.	Organizational Leadership in Education	University of Maryland Eastern Shore
Pierre	Yvette	Education	Assistant Professor	Ph.D.	Education: Teaching and Learning	The Ohio State University
Pinjani	Praveen	Business Administration	Associate Professor	Ph.D.	Information Systems and Operations Management	University of North Carolina at Greensboro

Planchon	Thomas	Chemistry	Associate Professor	Ph.D.	Physics	École Polytechnique, Paris, France
Pokrajac	Dragoljub	Computer and Information Sciences	Professor	Ph.D.	Computer and Information Science	Temple University
Pulverman	Rachael	Psychology	Associate Professor	Ph.D.	Linguistics	University of Delaware
Quarless Kingsberry	Sheridan	Social Work	Associate Professor	Ph.D.	Social Work	Rutgers, The State University of New Jersey
Radu	Daniela	Chemistry	Assistant Professor	Ph.D.	Chemistry	Iowa State University
Ralston	Kevin	Sociology and Criminal Justice	Assistant Professor	Ph.D.	Sociology	University of Delaware
Rana	Mutki	Physics and Engineering	Associate Professor	Ph.D.	Electrical Engineering	The University of Texas at Arlington
Rasamny	Marwan	Computer and Information Sciences	Associate Professor	Ph.D.	Physics	University of Connecticut
Rathee	Nirmaljit	Education	Associate Professor	Ph.D.	Physical Education	Panjab University, India
Ren	Jen	Physics and Pre-Engineering	Assistant Professor	Ph.D.	Electrical Engineering	Stanford University
Rhoads	Anne	Accounting, Economics, & Finance	Lecturer	M.S.	Political Science	Bryn Mawr College
Rich	John	Psychology	Associate Professor	Ph.D.	Educational Psychology	Temple University
Richardson	Agnes	Nursing	Associate Professor	D.S.L.	Strategic Leadership	Regents University

Robinson	Niklas	History, Political Science and Philosophy	Assistant Professor	Ph.D.	History	Tulane University
Rodriguez	Carlos	Business Administration	Associate Professor	Ph.D.	Business Administration	The Pennsylvania State University - University Park
Rogers	Amy	Psychology	Associate Professor	Ph.D.	Applied Experimental Psychology	Southern Illinois University at Carbondale
Roye	Susmita	English & Foreign Languages	Associate Professor	Ph.D.	English	University of Bristol, UK
Ruf	Bernadette	Accounting, Economics and Finance	Professor	Ph.D.	Business	Virginia Polytechnic Institute and State University
Sacko	Ladji	English and Foreign Languages	Associate Professor	Ed.D.	Administration and Policy Studies	University of Pittsburgh
Sadoughi	Mohammad	Business Administration	Associate Professor	Ed.D.	Business Teaching	University of Northern Colorado
Sando	Carol	Nursing	Associate Professor	Ph.D.	Nursing	Widener University
Santamore	Deborah	Physics and Engineering	Associate Professor	Ph.D.	Applied Physics in the field of Condensed Matter Theory	California Institute of Technology

Scott	Derrick	Biological Sciences	Visiting Assistant Professor	M.S.	Biological Sciences	Virginia Tech
Scott-Jones	Gwendolyn	Psychology	Associate Professor	Psy.D.	Clinical Psychology	Philadelphia College of Osteopathic Medicine
Shahin	Mazen	Mathematical Sciences	Professor	Ph.D.	Mathematics	Lvov State University, Russia
Shamburger	Benjamin	Sociology and Criminal Justice	Instructor	M.S.	Social Work	University of Pennsylvania
Shi	Xiguan	Mathematical Sciences	Professor	Ph.D.	Applied Mathematics	Jilin University, China
Smolinski	Tomasz	Computer and Information Sciences	Associate Professor	Ph.D.	Computer Science and Engineering	University of Louisville
Sokoswki	Sandra	English and Foreign Languages	Instructor	Ph.D.	Comparative Literature	Rutgers University
Still	Mark	Sport Management	Associate Professor	Ed.D.	Sports Administration	United States Sports Academy
Streetman	Lee	Sociology and Criminal Justice	Professor	Ph.D.	Sociology	University of Delaware
Stringfield	Yvonne	Nursing	Associate Professor	Ed.D.	Higher Education	The College of William and Mary
Suarez	Pablo	Mathematical Sciences	Associate Professor	Ph.D.	Mathematics	Rensselaer Polytechnic Institute

Suggs	Maurice	Sport Sciences	Instructor			DSU
Szabo-Maas	Theresa	Biological Sciences	Assistant Professor	Ph.D.	Zoology	Texas A&M University
Tanzy	Matthew	Mathematical Sciences	Assistant Professor	Ph.D.		Northwestern University
Taylor	Bettina	Human Ecology	Assistant Professor	Ph.D.	Foods and Nutrition	Kansas State University
Taylor	Erica	Public and Allied Health Sciences	Associate Professor	Ph.D.	Exercise Science	University of Georgia
Taylor	Marcia	Mass Communications	Assistant Professor	Ed.D.	Innovation and Leadership	Wilmington University
Taylor	Ordner	English and Foreign Languages	Visiting Associate Professor	Ph.D.	English	Morgan State University
Taylor	Stephen	History, Political Science and Philosophy	Associate Professor	Ph.D.	Philosophy	Bryn Mawr College
Temburni	Murali	Biological Sciences	Associate Professor	Ph.D.	Life Sciences	University at New Delhi in The Republic of India
Teye	John	English and Foreign Languages	Associate Professor	Ph.D.	Curriculum and Instruction	Purdue University
Thomas	Leela	Social Work	Associate Professor	Ph.D.	Social Work	Washington University

Tolley	David	Music	Associate Professor	D.M.A.	Music	The Ohio State University
Tripathi	Renu	Physics and Engineering	Associate Professor	Ph.D.	Physics	India Institute of Technology
Tucci	Roberta	Art	Professor	Ed.D.	Educational Leadership	University of Delaware
Tutu	Raymond	History, Political Science and Philosophy	Associate Professor	Ph.D.	Geography	The Pennsylvania State University - University Park
Udezulu	Ifeyinwa	History, Political Science and Philosophy	Associate Professor	Ph.D.	Political Science	Clark Atlanta University
Umoh	Hanson	Mathematical Sciences	Professor	Ph.D.	Mathematics	Howard University
VanGolen	Cynthia	Biological Sciences	Associate Professor	Ph.D.	Neuroscience	University of Michigan
Vulinec	Kelvina	Agriculture and Natural Resources	Professor	Ph.D.	Wildlife Ecology	University of Florida
Wang	Qiquan	Chemistry	Associate Professor	Ph.D.	Environmental Science (Chemistry)	Zhejiang University, China
Watson	Clytrice	Biological Sciences	Professor	Ph.D.	Food Science and Technology	University of Maryland Eastern Shore
West	Susan	History, Political Science and Philosophy	Associate Professor	Ph.D.	Philosophy	University of Chicago
Wilson	Charlie	Biological Sciences	Associate Professor	Ph.D.	Biological Sciences	University of Delaware

Winstead	Cherese	Chemistry	Associate Professor	Ph.D.	Chemistry	Virginia Polytechnic Institute and State University
Workie	Bizuneh	Chemistry	Associate Professor	Ph.D.	Chemistry	Tufts University
Finger-Wright	Dolores	Social Work	Associate Professor	D.S.W.	Social Work	Howard University
Yoon	Sae Yeol	Education	Visiting Assistant Professor	Ph.D.	Science Education	University of Iowa
Zamir	Zahid	Business Administration	Instructor	MIS	Knowledge Management and Decision Support Systems	Dakota State University
Zerrad	Essaid	Physics and Engineering	Professor	Ph.D.	Physics	University of Connecticut
Zhang	Mark	Sport Management	Associate Professor	D.S.M.	Sports Management	United States Sports Academy
Zuba	Jesse	English and Foreign Languages	Associate Professor	Ph.D.	Language and Literature	Yale University