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A Message from Our Dean

We welcome you to explore the many offerings of our graduate programs at the University of Florida. The reputation of a research university is, in large part, measured not only by the excellence of its graduate faculty and graduate students but, importantly, by the quality of its academic graduate programs. Through its chosen graduate faculty members, the University of Florida offers graduate programs of the highest quality.

Our catalog is intended to provide information and resources to those interested in graduate education programs at the University of Florida. Our catalog is for our current students as well to assist them to make the best decisions for maintaining and continuing their academic progress while on the way to their professional and personal goals.

Henry T. Frierson, PhD
Associate Vice President and Dean of the Graduate School

Research and Academic Offerings

The University of Florida Graduate School (http://graduateschool.ufl.edu) offers research opportunities in a variety of fields. In collaboration with UF’s Office of Research (http://research.ufl.edu), our many colleges and departments (p. 75) offer numerous majors, alongside the various Centers, Institutes, and Other Research Facilities (https://ufl-preview.courseleaf.com/graduate/resources/) and interdisciplinary offerings available to the graduate students here at UF. Explore the many services provided to our graduate students by the Graduate School and other student-oriented service units by visiting the Student Services (p. 38) section of this catalog. Additionally, the University of Florida Libraries and the University Press of Florida offer extensive collections to guide your research. For information on these services and UF’s state-of-the-art computer facilities, art galleries, performing arts centers, museums, and other student offerings, such as UF’s Office of Research (http://research.ufl.edu/), see the Research Facilities and Other Campus Resources (https://ufl-preview.courseleaf.com/graduate/resources/) section of the catalog.

Equity and Diversity Statement

The University of Florida is an Equal Opportunity Employer. The University encourages applications from all qualified candidates. The University is committed to nondiscrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information and veteran status in all aspects of employment including recruitment, hiring, promotions, transfers, discipline, terminations, wage and salary administration, benefits, and training.

For more information regarding UF’s commitment to equity and diversity, visit: http://hr.ufl.edu/manager-resources/recruitment-staffing/institutional-equity-diversity/.

Accreditation

The University of Florida is accredited by the Southern Association of Colleges and Schools Commission on Colleges to award associate, baccalaureate, masters, education specialist, and doctoral degrees.

Contact the Commission on Colleges at

1866 Southern Lane
Decatur, Georgia 30033-4097
or call 404-679-4500 for questions about the accreditation of the University of Florida.

Notes:
*As protected under the Vietnam Era Veterans’ Readjustment Assistance Act
PROMOTING DIVERSITY

The University of Florida is committed to creating a community that reflects the rich racial, cultural, and ethnic diversity of the state and nation. No challenge that exists in higher education has greater importance than the challenge of enrolling students and hiring faculty and staff who are members of our country’s diverse groups. This pluralism enriches the university community, offers robust academic dialogues, and contributes to better teaching and research. The University benefits from the richness of a multicultural student body, faculty, and staff who can learn from and support one another. Diversity and inclusion empower and inspire respect and understanding among us. Importantly, the University does not tolerate the actions of anyone who violates the rights of another person.

Through policy and practice, the university strives to embody a diverse and inclusive community, creating a university that truly reflects the greatness of our state and nation.
GRADUATE SCHOOL

The information in this catalog is current as of July 2020. Please contact individual departments or programs for any additional information or changes.

Organization

The Graduate School currently consists of the Dean, a Senior Associate Dean, an Assistant Dean, the Graduate Council, the Graduate Faculty, and the Graduate School staff. The Graduate School is responsible for establishing, monitoring and enforcing general minimum standards of graduate study in the University and for coordinating the graduate programs of the various colleges and divisions of the University. Responsibility for detailed operation of graduate programs is vested in individual colleges, schools, divisions, and academic units. In most colleges, an associate dean or other administrator is directly responsible for graduate studies in that college. General policies and standards of the Graduate School are established by the Graduate Council. Policy changes must be approved by the graduate dean(s) and the Graduate Council. The Graduate Council (chaired by the Graduate Dean) considers graduate education policy and policy changes, and the creation of or revisions to graduate degree programs, majors, concentrations, certificates, and other graduate education initiatives. All faculty members who serve on supervisory committees or who direct master’s theses and doctoral dissertations must first be appointed to the Graduate Faculty. University of Florida faculty members who are appointed to full-time faculty positions in tenured or tenure-accruing positions are appointed to the Graduate Faculty as a matter of course, shortly after the time of their appointment to the university faculty. For all others, a graduate degree program’s academic unit nominates faculty members for appointment to the Graduate Faculty. Nominations must be approved by the Department Chair/Director, the College Dean, and a vote of the current graduate faculty members in the nominating unit. The appointment is formally made by the Graduate Dean. The academic unit determines the level of duties for each Graduate Faculty member, though it is expected that all Graduate Faculty members should be available and willing to serve as external members of doctoral dissertation committees throughout the University of Florida.

Graduate Deans

Henry T. Frierson
Ph.D. (Michigan State University), Dean of the Graduate School, Associate Vice President, and Professor of Research and Evaluation Methodology

R. Paul Duncan
Ph.D. (Purdue University), Senior Associate Dean of the Graduate School and Malcom and Christine Randall Professor of Health Services Research, Management and Policy

Graduate Council (2020-2021)

Henry T. Frierson
Chair, Ph.D. (Michigan State University), Dean of the Graduate School and Associate Vice President

Monika Ardelt
Ph.D. (University of North Carolina at Chapel Hill), Professor, Department of Sociology, Criminology & Law

Ph.D. (University of California, Santa Barbara), Professor, Department of Mechanical and Aerospace Engineering

Prabir Barooah

Jason Blackburn
Ph.D. (Louisiana State University), Associate Professor, Department of Geography

Joyce Bono
Ph.D. (University of Iowa), Professor, Department of Management

Edward Braun
Ph.D. (University of New Mexico), Professor, Department of Biology

Ian Flood
Ph.D. (University of Manchester, UK), Holland Professor, M.E. Rinker School of Construction Management

Wendy Graham
Ph.D. (Massachusetts Institute of Technology), Professor and the Carl S. Swisher Eminent Scholar in Water Resources and the Director of the Water Institute, Department of Agricultural and Biological Engineering

Cynthia Griffin
Ph.D. (Purdue University), Professor, School of Special Education, School Psychology, and Early Childhood Studies

David Janicke
Ph.D. (Virginia Polytechnic Institute and State University), Professor and Associate Department Chair, Department of Clinical and Health Psychology

Tanya Koropecky-Cox
Ph.D. (University of Pennsylvania), Associate Professor, Department of Sociology, Criminology, and Law

Lori Pennington-Gray
Ph.D. (Michigan State University), Professor, Department of Tourism, Recreation and Sport Management

Karen Awura-Adjoa Ronke Coker
Graduate Student Council Representative

Jonathan Orsini
Graduate Student Council Alternate

History

Graduate study at UF existed while the University was still on its Lake City campus. However, the first graduate degrees, two Master of Arts with a major in English, were awarded on the Gainesville campus in 1906. The first Master of Science was awarded in 1908, with a major in entomology. The first programs leading to the Ph.D. were approved in 1930, and the first degrees were awarded in 1934, one with a major in chemistry and the other with a major in pharmacy. The first Ed.D. was awarded in 1948. Graduate study has grown phenomenally at UF. In 1930, 33 degrees were awarded in 12 fields. In 1940, 66 degrees were awarded in 16 fields. In 1988-1989, UF awarded 7,778 graduate degrees in more than 140 fields, including 957 Ph.D. degrees.
Graduate Deans and Years of Service

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<tr>
<td>May 2007 to Present</td>
<td>Henry T. Frierson, Dean</td>
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<tr>
<td>2004-2007</td>
<td>Kenneth J. Gerhardt, Interim Dean</td>
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<td>1999-2004</td>
<td>Winfred M. Phillips, Dean</td>
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<tr>
<td>1998-1999</td>
<td>M. Jack Ohanian, Interim Dean</td>
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<tr>
<td>1993-1998</td>
<td>Karen A. Holbrook, Dean</td>
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<tr>
<td>July-September 1993</td>
<td>Gene W. Hemp, Acting Dean</td>
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<tr>
<td>1985-1993</td>
<td>Madelyn M. Lockhart, Dean</td>
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<tr>
<td>1983-1985</td>
<td>Donald R. Price, Acting Dean</td>
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<tr>
<td>September 1982-January 1983</td>
<td>Gene W. Hemp, Acting Dean</td>
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<tr>
<td>1980-1982</td>
<td>Francis G. Stehli, Dean</td>
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<tr>
<td>1979-1980</td>
<td>F. Michael Wahl, Acting Dean</td>
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<tr>
<td>1973-1979</td>
<td>Harry H. Sisler, Dean</td>
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<tr>
<td>1971-1973</td>
<td>Alex G. Smith, Acting Dean</td>
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<td>1969-1971</td>
<td>Harold P. Hanson, Dean</td>
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<td>1952-1952</td>
<td>L. E. Grinter, Dean</td>
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<td>1951-1952</td>
<td>C. F. Byers, Acting Dean</td>
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<td>1938-1951</td>
<td>T. M. Simpson, Dean</td>
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<td>James N. Anderson, Dean</td>
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Governance

Florida State Board of Education

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Sebring

Marva Johnson, Vice Chair
Winter Garden

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Tallahassee

Tom Grady
Naples

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Contact a member of the Board of Governors:

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State University System of Florida
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Ph.D., Executive Chief of Staff for the Office of the President
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Scott Stricklin
B.S.M., Director of Athletics

Deans
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Ph.D., Dean, Herbert Wertheim College of Engineering
Chimay Anumba
Ph.D., D.Sc., P.E., Dean, College of Design, Construction, and Planning
Jacqueline K. Burns
Ph.D., Dean for Research, Institute of Food and Agricultural Sciences
Henry T. Frierson
Ph.D., Dean, Graduate School, and Associate Vice President, Academic Affairs
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D.D.S., M.P.H., Dean, College of Dentistry
Glenn Good
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M.F.A., Dean, College of the Arts
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Michael B. Reid
Ph.D., Dean, College of Health and Human Performance
David E. Richardson
Ph.D., Dean, College of Liberal Arts and Sciences
Laura A. Rosenbury
J.D., Dean, Levin College of Law
Judith Russell
M.S., Dean, University Libraries
Elaine Turner
Ph.D., Dean, College of Agricultural and Life Sciences
Joseph A. Tyndall
M.D., M.P.H., F.A.C.E.P., Interim Dean, College of Medicine
Leonardo A. Villalon
Ph.D., Associate Vice President for Student Affairs and Dean of Students
Dana N. Zimmel
D.V.M., D.A.C.V.I.M, Dean, College of Veterinary Medicine

Mission, Vision, Values
Mission of the University
The University of Florida is a comprehensive learning institution built on a land grant foundation. We are The Gator Nation, a diverse community dedicated to excellence in education and research and shaping a better future for Florida, the nation, and the world.

Our mission is to enable our students to lead and influence the next generation and beyond for economic, cultural and societal benefit.

Vision of the University
UF will be a premier university that the state, nation, and world look to for leadership through:

1. an exceptional academic environment, achieved by a diverse community of students, faculty, and staff;
2. an outstanding and accessible education that prepares students for work, citizenship, and life;
3. a preeminent faculty;
4. growth in research and scholarship that improves the lives of the world’s citizens;
5. strengthened public engagement;
6. successful and appreciative alumni; and
7. a physical infrastructure and efficient administration and support structure that enable preeminence.
The environment will foster new discoveries and inventions, enabling UF to build on its excellent national ranking in technology transfer and licensing. This will spur new businesses and state economic development to accompany UF's emphasis on service and outreach to State citizens.

**Vision, Mission, and Values of the University of Florida Graduate School**

**Vision**
Excellence in all aspects of graduate education at the University of Florida

**Mission**
The UF Graduate School is committed to providing services to the campus community that maintain integrity and excellence in graduate education through clear and consistent policies, high standards, efficient procedures, and direct student support. We seek to support all graduate students, faculty, and staff by fostering relationships, increasing communications and collaborations, and delivering comprehensive research and data resources to inform and advance graduate education. The Graduate School:

- **Provides** opportunities through funding support, professional development activities, support for student groups, student funding to enhance recruitment and retention, and graduate degree completion;
- **Partners** with academic units in providing underrepresented minority and international outreach and support in recruiting potential students;
- **Promotes** efficiency and effectiveness in graduate education so UF graduate students can achieve their educational and professional potential and contribute to the university, the state, the nation, and the world.

**Values**

- Excellence in graduate education
- Recruitment and graduation of outstanding students
- Ethical conduct in graduate studies and research
- Diversity among students, faculty, and staff
- Communication and collaboration throughout the graduate community
- Graduate student professional development
- Preservation of academic standards
- Maintaining accurate data and records
ADMISSION

The information in this catalog is current as of July 2020. Please contact individual programs for any additional information or changes.

How to Apply

To apply for admission, go online to the Office of Admissions Graduate Admissions website (https://admissions.ufl.edu/apply/graduate/) for basic information and contact the academic unit of interest for specific deadlines, requirements, and procedures. To find websites for academic units, go online to http://graduateschool.ufl.edu/prospective-students/explore-uf/colleges-schools-and-departments/. The Office of Admissions refers applications that meet minimum standards to the graduate admission committees of the pertinent academic units for approval or disapproval. Applicants must meet the requirements of both the academic unit and the Graduate School to be admitted for graduate study. Admission to some programs is limited by what resources are available.

Requirements for Admission:

A recognized baccalaureate, graduate or professional degree from a regionally accredited U.S. institution or a comparable degree from an international institution.

For applicants with a bachelor’s degree only, a minimum grade point average of B (3.0), calculated from all grades and credits after the semester where the applicant reached 60 semester hours or 90 quarter hours is required. Applicants should refer directly to their intended academic units for Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT) requirements. If required, academic test scores are used in the context of a holistic credential review process.

For applicants from countries where English is not the official language, a minimum score on one of these English Language Skills tests:

• Test of English as a Foreign Language (TOEFL): 550 paper, or 80 Internet;
• International English Language Testing System (IELTS): 6; or
• Documented successful completion of the University of Florida English Language Institute program.

Graduate study in Law: Applicants must hold the Juris Doctor or equivalent degree. Consult the Levin College of Law catalog, http://www.law.ufl.edu/programs/, for the specific programs of interest.

Satisfactory conduct record.

Proof of medical immunization. Visit the following website http://shcc.ufl.edu/services/primary-care/immunizations/ for more information. Should you feel you have been discriminated against or need further information regarding this policy, feel free to contact the Office of Institutional Equity and Diversity. The Title IX Coordinator’s mailing address is:

Box 115010
Gainesville, FL 32611-5010

http://hr.ufl.edu/manager-resources/recruitment-staffing/institutional-equity-diversity/

Admissions Examinations

Temporary COVID-19 Emergency Admission Examination Waiver: Due to current admission examination testing difficulties amid the COVID-19 pandemic, most University of Florida graduate degree programs are waiving the GRE, GMAT, and FE requirement for applicants seeking Fall 2020, Spring 2021, Summer A/B/C 2021, and Fall 2021 admission. This temporary emergency waiver applies only to admission for those four semesters. Admission examination scores are still required by the Warrington College of Business for full-time MBA and all PhD applicants, and by the College of Education for all PhD applicants. If you have questions, please contact the department to which you are applying.

Graduate Record Examination (GRE): Most applicants must submit GRE scores that are acceptable to the program of interest. In addition as some require that applicants submit an official copy of their transcript from each institution attended directly to their attention as well as the Office of Admissions. These transcripts must be received directly from the registrar of the institution where the work was done. Applicants who currently are enrolled at another institution must send updated transcripts as soon as they are available for any work completed after applying for admission.

Please note: If admitted without final official transcripts or test scores, final test scores or final credentials must be posted by the UF Office of Admissions before the end of the first term of enrollment.

Students failing to meet admission conditions are barred from continued registration after their first semester.

Admission requirements of an academic unit are often more rigorous than the minimum requirements set by the Graduate School. Because of resource limitations, most academic units do not accept all qualified applicants.

UF is committed to creating a community that reflects the rich, cultural, and ethnic diversity of the State of Florida and the United States of America. The greatest challenge in higher education is to enroll students and hire faculty and staff who are members of diverse racial, cultural, or ethnic minority groups. This pluralism enriches the University community, offers opportunity for robust academic dialogue, and contributes to better teaching and research. The University and its components benefit from the richness of a multicultural student body, faculty, and staff who can learn from one another. Such diversity empowers and inspires respect and understanding among us. The University does not tolerate the actions of anyone who violates the rights of another. By policy and practice, the University embodies a diverse community. Our collective efforts lead to a University that is truly diverse and a University that reflects the U.S. population.

The University encourages all qualified applicants to apply for admission. See UF’s Commitment to Equity and Diversity (http://catalog.ufl.edu/graduate/commitment-diversity/) for more information. Should you feel you have been discriminated against or need further information regarding this policy, feel free to contact the Office of Institutional Equity and Diversity. The Title IX Coordinator’s mailing address is:

Box 115010
Gainesville, FL 32611-5010

http://hr.ufl.edu/manager-resources/recruitment-staffing/institutional-equity-diversity/
to the General Test of the GRE, some academic units encourage the applicant to submit scores on one or more advanced subject tests. Scores on all tests taken are considered for admission. Applicants with a previous graduate or professional degree or equivalent from a regionally accredited U.S. institution may be exempt from the GRE and undergraduate GPA requirements. Contact the academic unit for specific requirements.

**Graduate Management Admission Test (GMAT):** All MBA applicants must submit satisfactory scores on the GMAT. GMAT scores may also be accepted by certain Master of Health Administration, Sport Management and Food and Resource Economics programs.

**Graduate Study in Engineering:** Some programs may use the Fundamentals of Engineering (FE) examination in lieu of the GRE for admitting students into the non-thesis master's degree programs.

**Required Immunizations**

The University of Florida requires that all new students show proof of certain immunizations prior to attending UF. The official form and instructions for how to complete it successfully are available at [http://healthcompliance.shcc.ufl.edu/immunizations-2/immunizations/](http://healthcompliance.shcc.ufl.edu/immunizations-2/immunizations/). Once received, your completed form will be reviewed by UF Health Compliance Office staff. PLEASE NOTE: Students will not be cleared to register for classes until all immunization requirements are met.

**About Health Compliance**

Students must comply with the University's immunization and health insurance requirements. More information and submission instructions about both of these prerequisites can be found at [http://healthcompliance.shcc.ufl.edu/](http://healthcompliance.shcc.ufl.edu/).

**Immunizations:** Vaccine-preventable diseases do still exist, and contracting these illnesses can have an adverse effect on a student's health, well-being, and ability to reach optimal academic performance. Students shall be required to show documentation of specific vaccinations or proof of immunity for Measles/Mumps/Rubella (MMR), Hepatitis B, and Meningitis. Please note that international students and those entering most academic health professions may have additional requirements including tuberculosis screening. Find the immunization form and instructions online at [http://healthcompliance.shcc.ufl.edu/immunizations/](http://healthcompliance.shcc.ufl.edu/immunizations/).

Should you need to obtain vaccinations, please contact the UF Student Health Care Center's Call Center regarding appointments and any applicable charges: (352) 273-2135.

**Insurance:** The University follows an Opt Out system where students who don't opt out by providing documentation of adequate health insurance will be automatically enrolled in the school-sponsored plan. They may either purchase outside health insurance that meets the requirements for comparable coverage or they can be auto-enrolled in the school-sponsored Student Health Insurance Plan.

If a student currently has insurance, they will be required to review their insurance coverage and check that it meets the requirements set forth as comparable coverage. They will then need to submit a waiver with their policy information for verification by the end of drop/add but ideally much earlier. The charge for the school-sponsored Student Health Insurance Plan will be removed once the submission is completed and verified. Once verified, the waiver is good for one year. All this can be done online at [http://healthcompliance.shcc.ufl.edu/insurance/waiver/](http://healthcompliance.shcc.ufl.edu/insurance/waiver/).

Still, have questions? You can contact the health compliance office for further assistance: healthcompliance@shcc.ufl.edu or (352) 294-2925.

**Computer Requirement**

Access to and ongoing use of a computer is required for all students to complete their degree programs successfully. The University of Florida expects each student to acquire computer hardware and software appropriate to his or her degree program. The university maintains general computing requirements which can be located at [http://www.it.ufl.edu/policies/student-computing-requirements/](http://www.it.ufl.edu/policies/student-computing-requirements/). However, individual colleges may have specific requirements to ensure students can complete their coursework. A list of each college's requirements, if any, are posted at [http://www.it.ufl.edu/policies/student-computing-](http://www.it.ufl.edu/policies/student-computing-). Competency in the basic use of a computer is a requirement for graduation. Class assignments may require the use of a computer, and official university correspondence is often sent via email.

While the university offers limited access to computers through its computer labs, most students will be expected to purchase or lease a computer that is capable of wireless and wired network connection to the Internet, graphical access to the World Wide Web, and productivity functions such as word processing and spreadsheet calculation. Costs of meeting this requirement will be included in financial aid considerations.

**Conditional Admission**

Academic units may, at their discretion, grant conditional admission to up to 10% of an incoming class. Conditional admission candidates must have all application materials submitted: a valid prior degree, admission exam scores, English test scores (if required), transcripts, statement of purpose and recommendation letters, along with records of postbaccalaureate grades or work histories of pertinent prior professional experience, if the academic unit is justifying conditional admission on the basis of either. Academic units granting conditional admission must include the terms of admission in the acceptance letter they send to the student.

Conditional admission cases due to graduate admission grade point averages below 3.0, missing or unofficial test scores, and English test scores (if required) below the required minimums (6 for IELTS, 80 for Internet TOEFL, 550 for Paper TOEFL or 140 for verbal GRE) must have final approval from the Graduate School. In such cases, no acceptance letter can be sent until the Graduate School gives final approval.

In cases of students conditionally admitted with missing official transcripts, final admission is deferred for one semester, until required final credentials are posted by the UF Office of Admissions.

Registration holds to block next-term pre-registration will remain on the records of conditionally admitted students until their first-semester grades are posted on their UF transcripts and show that they met the terms of their conditional admission. Students failing to meet any admission conditions are subject to being banned from continued enrollment after their first semester.
English Language Institute (ELI) Conditional Admission
International Students

International applicants, who require additional English language training in order to meet the Graduate School's English language minimum requirements, may be offered English Language Institute (ELI) Conditional Admission. Academic programs will assess an application for ELI Conditional Admission based on all of the materials in an applicant's file. If an applicant has a low or missing score on the IELTS or TOEFL test, or does not have a satisfactory score on the GRE Verbal section, but is otherwise academically qualified, a program may grant ELI Conditional Admission.

Such an offer of admission does not guarantee an applicant can enroll in graduate coursework. All ELI Conditionally Admitted students must complete one of the following two options before they can enroll:

1. he/she must complete the ELI Intensive English Program and receive an exit certificate from it, or;
2. he/she must provide official verbal GRE and IELTS or TOEFL scores that meet the required minimums.

An offer of ELI Conditional Admission may also contain additional conditions set by an applicant's prospective academic program. ELI will coordinate with an applicant's academic program, in order to assist in the student's entry into the Intensive English Program and obtain an appropriate visa.

Students with Disabilities

The Disability Resource Center (DRC) in the Division of Student Affairs celebrates disability identity as a valued aspect of diversity. We champion a universally accessible community that supports the holistic advancement of individuals with disabilities.

The DRC offers many student services to students with disabilities. These include setting up accommodation plans to help remove barriers in the learning environment, offering academic coaching, disability management counseling, assistive technology resources, and programs and outreach events that celebrate disability.

The DRC serves more than 3100 students each year. Our testing center proctors over 10,000 exams annually and students from various classifications and areas of study utilize DRC accommodations. We work with graduate students, professional school students such as medical, veterinary, law, nursing, and all other disciplines. We welcome graduate students to connect with our office!

The DRC staff is available for consultation with faculty, families, and students. Please contact the office at (352) 392-8565 or via email at accessUF@ufsa.ufl.edu to schedule an appointment or inquire about our services. If you are a graduate student who requires employment-related accommodations, please contact Ken Osfield in the University's ADA Compliance Office at (352) 392-1591 or kosfield@ehs.ufl.edu.

We look forward to connecting with you! Go Gators!

Disability Resource Center
Reid Hall, 1316 Museum Road
Gainesville FL 32611
www.drc.dso.ufl.edu (http://www.drc.dso.ufl.edu)
352-392-8565
Facebook: UF-DISABILITY-RESOURCE-CENTER
Twitter: @UFDFRC

Postbaccalaureate Students

Postbaccalaureate study is for students who have already received a baccalaureate degree and have not been admitted to the Graduate School. Admission for postbaccalaureate enrollment requires a recognized baccalaureate degree (or higher) from a regionally accredited college or university, or an international equivalent based on a 4-year curriculum, a minimum C (2.0) GPA on all junior and senior year undergraduate work, as computed by UF, and a satisfactory conduct record.

International applicants must submit a satisfactory score on one of the following: TOEFL (Test of English as a Foreign Language: paper=550, Internet=80) or IELTS (International English Language Testing System: 6).

Applicants who meet the following conditions may be exempt from the English language test requirements:

- International students whose native language is English
- International students who have spent at least 1 academic year enrolled full-time in a baccalaureate or postbaccalaureate degree program at a college or university in a country where English is the official language prior to your anticipated term of enrollment at UF.

The Postbaccalaureate Application

Applicants must ensure that transcripts are sent to the Office of Admissions from each post-secondary institution attended. Applications will not be referred for a decision until transcripts have been received by the Office of Admissions. Postbaccalaureate applicants may apply for Distance Education programs. Only students who have completed a baccalaureate degree in the College of Education may be admitted to postbaccalaureate status for the purpose of completing a teacher certification program. Other applicants may be admitted to postbaccalaureate status only for a limited time to fulfill prerequisites for admission to a master’s program. Applicants with degrees in other fields who are seeking teacher certification should apply for admission to a master’s program in the College of Education.

Postbaccalaureate students may enroll in graduate courses, but graduate credit is not generally accepted by the Graduate School for transfer. It is possible to transfer up to 15 semester credits of graduate coursework earned with a grade of A, A-, B+, or B by petition in clearly justified cases and in conformance with regulations on courses and credit.

Proof of immunization for measles and rubella or a tuberculosis skin test is required before registering for coursework.

For more information, visit the Office of Admissions website, http://www.admissions.ufl.edu/grad/postbacc.html.

Nondegree Registration

Nondegree enrollment is restricted to participants in special programs, off-campus programs, University-affiliated exchange programs, and those participants with non-degree educational objectives at UF. Students denied admission to UF for any term are not eligible for non-degree registration. If you previously have attended UF in a degree-seeking status and did not subsequently earn a degree, you are not eligible for non-degree registration. Students need prior approval from the academic unit(s) to take courses in a non-degree status. That coursework normally is not applied toward the graduate degree if the student is admitted to the Graduate School. By petition in clearly justified cases and in conformance
with regulations on courses and credit, it is possible to transfer up to 15 credits of graduate coursework earned with the grade of A, A-, B+, or B. A student should not remain in this classification for more than 1 term before being admitted as a post-baccalaureate or graduate student.

For a non-degree registration request form, click on this link: https://student.ufl.edu/cgi-bin/eaglec?MDASTRAN=nda-intro2

**Readmission**

This information applies only to students who have previously been enrolled in a graduate, postbaccalaureate or professional UF program. Former students who do not enroll at the university for three consecutive terms, including any summer term, must apply for readmission to the same program of their previous enrollment.

Students who wish to take a leave of absence for three or more consecutive terms should obtain written approval from their academic units before they leave. Students who skip a single term will be scheduled automatically for a registration appointment for one additional term.

All readmission applicants must meet the current admission requirements of the college or school they expect to enter. Readmission is not guaranteed and is subject to availability at the level, college and major. Consult the appropriate program’s admission requirements.

Readmission is for a specific term. If you are unable to enroll for the term for which you have been admitted, you must apply for readmission again to a different term.

Applicants must present a satisfactory record of conduct. Regardless of other qualifications, applicants who have experienced major or continuing difficulties with school or other authorities since their last enrollment at the University of Florida may find their application for readmission denied.

The readmission application must be submitted with a non-refundable $30.00 application fee.

For further information visit the Office of Admissions website http://www.admissions.ufl.edu/apply/more/ or student.ufl.edu/cgi-bin/eaglec?MDASTRAN=nda-intro2

**Faculty Members as Graduate Students**

UF faculty members in tenured or tenure-accruing positions, as designated by Regulations of the University of Florida, 7.003, normally may not pursue graduate degrees from this institution. Exceptions are made for the Florida Cooperative Extension Service (IFAS) county personnel, the faculty of the P.K. Yonge Laboratory School, and University Libraries faculty. Graduate Council policies have also established limited exceptions for persons holding faculty positions that do not include tenure or tenure accrual, and for specified degree programs, including the online MBA. Other exceptions to this policy must be approved by the Graduate Council. Such exceptions, if given, are rare and will only be approved if pursuit of the proposed graduate degree program is determined to be in the best interest of the University and the Colleges involved.

**Residency for Tuition**

**Policy and the Guidelines on Florida Residency for Tuition Purposes**

Florida Residency for Tuition Purposes is a policy comprised by state statute, and the residency rule adopted by the State Board of Education and the Board of Governors for the State University System. To implement Section 1009.21, Florida Statutes; Rules 6A-10.044 and 6A-20.003, Florida Administrative Code (FAC); and 7.005 Board of Governors (BOG) Regulation, the Articulation Coordinating Committee (ACC) adopted a Residency Guidelines document which is maintained by the Statewide Residency Committee, a subcommittee of the ACC. The Guidelines on Florida Residency for Tuition Purposes (https://dlss.fvc.org/documents/210306/217302/ACC+Residency+Guidelines+(PDF)/c2c47c2e-d01a-4699-905a-9fb3318e06ac/) are used for the determination of Initial Residency Classifications (https://admissions.ufl.edu/afford/residency/) and Residency Reclassifications (https://registrar.ufl.edu/services/residencychange.html).

**Florida Residency for Tuition Purposes Eligibility**

A Florida “resident for tuition purposes” is a person who has, or a dependent person whose parent or legal guardian has, established and maintained legal residence in Florida for at least twelve consecutive months preceding the first day of classes of the term for which Florida residency is sought. Residence in Florida must be as a bona fide domicile rather than for the purpose of maintaining a residence incident to enrollment at an institution of higher education. To qualify as a Florida resident for tuition purposes, you must be a U.S. citizen, permanent resident alien, or legal alien granted indefinite stay by the U.S. Citizenship and Immigration Services (USCIS).

Other persons not meeting the twelve-month legal residence requirement may be classified as Florida residents for tuition purposes only if they fall within one of the limited special categories authorized by the Florida Legislature and State Board of Education. All other persons are ineligible for classification as a Florida “resident for tuition purposes.”

Living in or attending school in Florida will not, in itself, establish legal residence. Students who depend on out-of-state parents for support are presumed to be legal residents of the same state as their parents. Residence for tuition purpose requires the establishment of legal ties to the state of Florida. Students must verify that they have broken ties to other states if the student or, in the case for dependent students, his or her parent, has moved from another state.

The burden of providing clear and convincing documentation that justifies the institution's classification of a student as a resident for tuition purposes rests with the student or if the student is a dependent, his or her parent. For documentation to be “clear and convincing,” it must be credible, trustworthy, and sufficient to persuade the institution that the student or, if that student is a dependent, his or her parent has established legal residency in Florida that is not solely for the purpose of pursuing an education and has relinquished residency in any other state for at least twelve (12) consecutive months prior to classification.

**Initial Residency Classification**

The initial residency classification is determined by the Office of Admissions for all new students, and current or former students who have applied for a new level (e.g. undergraduate to graduate or professional programs) and for those submitting a readmission application after a period of non-enrollment.
Residency Reclassification
A student wishing to establish residency reclassification should pick up the Request for Residency Reclassification Form (https://registrar.ufl.edu/services/residencychange.html) from the Office of the University Registrar, 222 Criser Hall, to review the information and items that may be requested when the student files for Florida residency for tuition purposes. The deadline for applying for a change in residency status, including receipt of all documentation, is each term’s fee payment deadline. Residency reclassification cannot be applied retroactively for previous terms.

Guidelines on Florida Residency for Tuition Purposes
You may view the full content of the Guidelines on Florida Residency for Tuition Purposes (https://dlss.flvc.org/documents/210036/217302/ACC+Residency+Guidelines+(PDF)/c2c47c2e-d01a-4699-905a-9fb3318e06ac/) online. Excerpts from these guidelines are provided below.

Exceptions and Qualifications
The following categories are statutory exceptions and qualifications for certain applicants who do not meet the twelve-month legal residency requirement. Documentation in support of any of the following exceptions will be required.

• Dependent children residing continuously with a legal resident adult relative other than the parent for at least 3 years immediately prior to the first day of classes of the term for which Florida residency is sought.
• Persons married to legal Florida residents and who intend to make Florida their permanent home. These applicants must relinquish their legal ties to any other state.
• Persons who were enrolled as Florida residents for tuition purposes at a Florida public institution of higher education, but who abandon Florida residency and then re-enroll in Florida within 12 months of the abandonment - provided that he/she continuously maintains the re-established domicile during the period of enrollment. (This benefit only applies one time.)
• Active duty members of the Armed Services of the United States residing or stationed in Florida (and spouse/dependent children), active-duty members of the Florida National Guard (and spouse/dependent children) who qualify under 250.10(7) and (8); or military personnel not stationed in Florida whose home of record or state of legal residence certificate, DD Form 2058, is Florida (and spouse/dependent children).
• Active duty members of the Armed Services of the United States and their spouses/dependent children attending a public community college or university within 50 miles of the military establishment where they are stationed, if such military establishments is within a county contiguous to Florida.
• Active duty members of a foreign nation’s military who are serving as liaison officers and are residing or stationed in this state, and their spouses and dependent children, attending a community college or state university within 50 miles of the military establishment where the foreign liaison officer is stationed.
• Qualified beneficiaries under the Florida Pre-Paid Post-secondary Expense Program per s. 1009.988(2). (Pre-Paid ID Card Required.)
• Linkage Institute participants receiving partial or full exemptions from S. 1009.21, FS, based on criteria approved by the Florida Department of Education per S. 288.8175, FS, which establishes linkage institutes between post-secondary institutions in this state and foreign countries.

Eligible Categories for Non-U.S. Citizens
Residency rule 6A-10.044, FAC, and the BOG Residency Regulation Resolution allow certain non-U.S. Citizens such as lawful permanent residents, temporary permanent residents, asylees, parolees, and refugees who have applied for and been approved for such status and who otherwise meet the 12-month legal residence requirements, to be eligible to establish Florida residency for tuition purposes. Provided that the non-U.S. citizen has proof of his or her permanent immigration status, he or she may be classified as a Florida resident 12 months from the time he or she establishes legal Florida residence for tuition purposes (e.g., 12 months from the time he or she purchases a Florida home, obtains a Florida driver’s license, etc.). It is not necessary to wait 12 months from the date he or she becomes an eligible alien (e.g., the date of the resident alien card (I-551) is issued).

Review the Guidelines on Florida Residency for Tuition Purposes (https://dlss.flvc.org/documents/210036/217302/ACC+Residency+Guidelines+(PDF)/c2c47c2e-d01a-4699-905a-9fb3318e06ac/) for a list of nonimmigrant categories which are eligible to establish Florida residency for tuition purposes.

Dependent or Independent Student
The determination of dependent or independent student status is important because it is the basis for whether the student has to submit his/her own documentation for residency (as an independent) or his/
her parent's or guardian's documentation of residency (as a dependent). Evidence that the student meets one of the following criteria will be requested by the higher education institution.

Independent Student

A student who meets any one of the following criteria may be classified as an independent student for the determination of residency for tuition purposes:

- The student is 24 years of age prior to the start of the term for which residency is sought.
- The student is married.
- The student has children who receive more than half of their support from the student.
- The student has other dependents who live with and receive more than half of their support from the student.
- The student is a veteran of the United States Armed Forces or is currently serving on active duty in the U.S. Armed Forces for purposes other than training.
- Both of the student's parents are deceased or the student is or was (until age 18) a ward/dependent of the court or in foster care.
- The student is determined an unaccompanied homeless by a school district homeless liaison, emergency shelter or transitional housing program.
- The student is working on a master's or doctoral degree during the term for which residency status is sought at a Florida institution.

A student who does not meet one of the criteria outlined above may be classified as an independent student only if he or she submits documentation that he or she provides fifty (50) percent or more of the cost of attendance for independent, in-state students as defined by the financial aid office at Florida State University (exclusive of federal, state, and institutional aid or scholarships). When tax returns are collected for the purpose of proving independent status by virtue of providing more than fifty (50) percent of his/her support for the year, the social security number should be blacked out. However, the income information must be provided to show that this requirement has been met.

Dependent Student

A student, whether or not living with his or her parent, who is eligible to be claimed by his or her parent under the federal income tax code shall be classified as a dependent student. When tax returns are collected for the purpose of proving independent status by virtue of providing support to others, the social security numbers and income figures should be blacked out as the only relevant information of this form relates to whether or not an exemption has been claimed for the student.

Appeals Process

In cases where the applicant expresses a desire to appeal the residency classification, the matter will be referred to the designated residency appeal committee at the institution of higher education, in accordance with the institution's official appeals process.

The residency appeal committee will be comprised of at least three members to consider student appeals in accordance with the institution's official appeal policy. The committee will render to the applicant the final residency determination in writing. The college and/or state university will advise the applicant of the reasons for the determination.

Tuition Payments

Florida resident tuition payments are available to graduate assistants and fellows who meet the eligibility requirements. Any change in the student's academic or employment status after processing a tuition payment will result in the original payment being updated, reduced, or voided as appropriate.

Non-Florida resident tuition payments are available to out-of-state students who hold graduate assistantships or fellowships and who meet the eligibility requirements. Any change in the student's academic or employment status after processing a tuition payment will result in the original payment being updated, reduced, or voided as appropriate.
GRADUATE ACADEMIC REGULATIONS

The information in this catalog is current as of July 2020. Please contact individual departments or programs for any additional information or updates.

The student is responsible for becoming informed and observing all program regulations and procedures. The student must be familiar with Graduate Catalog general regulations and requirements, specific degree program requirements, and offerings and requirements of the major academic unit. Rules are not waived for ignorance. Any exceptions to the policies stated in the Graduate Catalog must be approved by the Dean of the Graduate School. After admission to the Graduate School, but before the first registration, the student should consult the college and/or the graduate coordinator in the major academic unit about courses and degree requirements, deficiencies if any, and special regulations of the academic unit. The dean (or representative) of the college where the degree program is located must oversee all registrations. Once a supervisory committee is appointed, registration approval is the responsibility of the committee chair.

Key information is contained or disseminated through several electronic sites. Each student must regularly check the Graduate Information Management System (GIMS) (http://www.graduateschool.ufl.edu/faculty-staff/resources/gims/) for accuracy and currency of the degree program and associated milestones. In addition, each student is required to create, maintain, and regularly check a GatorLink email account (http://gatorlink.ufl.edu). Critical information is sent directly to the address listed as the student’s UF Business Email.

Catalog Year

The catalog year determines the set of academic requirements that must be fulfilled for graduation. Students graduate under the catalog in effect when they first enroll as degree-seeking students at UF provided they maintain continuous enrollment. Students who are not registered for 3 or more consecutive terms (including any summer term) must reapply for admission and will be assigned the catalog in effect when enrollment is resumed. With the approval of their college dean’s office, students or the graduate coordinator in the major academic unit about courses and degree requirements, deficiencies if any, and special regulations of the academic unit. The dean (or representative) of the college where the degree program is located must oversee all registrations. Once a supervisory committee is appointed, registration approval is the responsibility of the committee chair.

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Classification of Students

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<th>Classification</th>
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<td>Postbaccalaureate students: Degree-holding students who have been admitted to postbaccalaureate status</td>
</tr>
<tr>
<td>7</td>
<td>Graduate students seeking a first master's degree</td>
</tr>
</tbody>
</table>

Graduate students who have earned a master's degree, or who have earned 36 or more credits while seeking a graduate degree, and who have not been admitted to doctoral candidacy

Confidentiality of Student Records

The University ensures the confidentiality of student educational records in accordance with State University System rules, state statutes, and FERPA (https://www2.ed.gov/policy/gen/guid/fpco/pdf/ferparegs.pdf), the Family Educational Rights and Privacy Act of 1974, as amended, also known as the Buckley Amendment.

Student directory information that can be released to the public is limited to

- Student name
- Local/permanent addresses
- Listed telephone number(s)
- Email address
- Class and college
- Major
- Enrollment status (e.g., undergraduate or graduate level; full time or part time)
- Dates of attendance at UF
- Degree(s) and awards received at UF
- Most recent previous educational institution attended
- Weight and height of university athletes
- Publication titles (theses and dissertations)
- Nature and place of employment at UF

Currently enrolled students must contact the appropriate agency/agencies to restrict the release of directory information. The Office of the University Registrar, the Department of Housing and Residence Education, and Human Resource Services routinely release directory information to the public. Directory information may also be released by other university departments and/or employees.

- Students who want to restrict directory information must do so at the Office of the University Registrar in 222 Criser Hall.
- Students who live on campus also must request this restriction from the Department of Housing and Residence Education (next to Beaty Towers).
- Students who are university employees also must request this restriction from Human Resource Services.
- Students who do not want their addresses, phones or personal information published on the Web should update their directory profile (https://registrar.ufl.edu/addresschange.html).

Student educational records may be released without your consent to school officials who have a legitimate educational interest in accessing the records. School officials shall include:

- An employee, agent or officer of the university or State University System of Florida in an administrative, supervisory, academic, research or support staff position;
• Persons serving on university committees, boards and/or councils;
• Persons employed by or under contract to the university to perform a special task, such as an attorney or an auditor.

**Legitimate educational interest** shall mean any authorized interest or activity undertaken in the name of the university for which access to an educational record is necessary or appropriate to the operation of the university or to the proper performance of the educational mission of the university.

The university also may disclose information from your educational record without your consent to individuals or entities permitted such access under applicable federal and state law.

You have the right to review your own educational records for information and to determine accuracy. A photo I.D., other equivalent documentation or personal recognition by the custodian of record will be required before access is granted. Parents of dependent students, as defined by the Internal Revenue Service, have these same rights upon presentation of proof of your dependent status. Each spring when the catalog is published, students are notified of their FERPA rights (https://catalog.ufl.edu/UGRD/academic-regulations/ferpa-confidentiality-student-records/).

If you believe your educational record contains information that is inaccurate, misleading or in violation of your rights, you can ask the institution to amend the record. The UF Student Guide (http://sccr.dso.ufl.edu/students/student-conduct-code/) outlines the procedures for challenging the content of a student record, as well as the policies governing access to and maintenance of student records.

If you who believe the university has not maintained the confidentiality of your educational record as required by law, you may file a complaint by contacting:

The Family Policy Compliance Office  
U.S. Department of Education  
400 Maryland Avenue SW  
Washington, D.C. 20202-5901

**Academic Integrity**

In 1995, the UF student body enacted an Honor Code and voluntarily committed itself to the highest standards of honesty and integrity. In adopting this Honor Code, the students of the University of Florida recognize that academic honesty and integrity are fundamental values of the University community. Students who enroll at the University commit to holding themselves and their peers to the high standard of honor required by the Honor Code. Any individual who becomes aware of a violation of the Honor Code is bound by honor to take corrective action. Student and faculty support are crucial to the success of the Honor Code. The quality of a University of Florida education is dependent upon the community acceptance and enforcement of the Honor Code. The University of Florida is committed to preserving an open learning environment for all those who participate in the university community. Such an environment requires respect for self-expression, civil discourse in and out of the classroom, and trust, from all members of UF. All students must participate in academic research and learning at the university in a manner consistent (in accordance) with these values. Dishonesty, plagiarism, and other forms of misconduct are serious violations of academic integrity, and should be discouraged by all members of the university community.

Please review the Student Honor Code found at the following site: (https://sccr.dso.ufl.edu/students/student-conduct-code/). All students are expected to follow these expectations.

**Academic Honesty**

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following Honor Pledge: “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.” You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.”

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g., assignments, papers, quizzes, exams). As such, Gators do not cheat, plagiarize, misrepresent, conspire, or fabricate. Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action.

Academic Integrity requires graduate students to:

1. Appropriately acknowledge the work of others, in conducting and reporting one’s own research;
2. Be academically honest, in representing one’s academic work according to the research standards and methodology that are appropriate for her field of study;
3. Use his or her own work in research and graded coursework, not inappropriate and un-cited materials, or work produced by a third-party
4. Conduct responsible research which complies with federal laws, and promotes open and active scientific and knowledge inquiry;
5. Treat other students with respect, to ensure their right to pursue their educational goals without interference

To understand the University's expectations regarding academic integrity, view the Dean of Students Academic Integrity Module found at the following site: https://sccr.dso.ufl.edu/process/resources/academic-integrity/.

**Research Expectations**

Plagiarism includes but is not limited to quoting oral or written materials including but not limited to those found on the Internet UF expects all of its students to pursue research with integrity and responsibility. All research to be submitted for a grade should follow UF’s Honor Code. For those students working on research which requires IRB approval, UF provides training throughout the year. For those students supported by NSF funding, you must participate in UF’s Responsible Conduct of Research Training.
Student Conduct Code and Conflict Resolution

Student Conduct Code

The University of Florida is an institution which encourages the intellectual and personal growth of its students as scholars and citizens. As an educational institution, the University recognizes that the transmission of knowledge, the pursuit of truth and the development of individuals requires the free exchanges of ideas, self-expression and the challenging of beliefs and customs.

In order to maintain an environment where these goals can be achieved safely and equitably, the University promotes civility, respect, and integrity among all members of the community. Students are expected to exhibit high standards of behavior and concern for others.

The University strives to protect and guide the educational community by establishing a Student Conduct Code, which promotes individual and social responsibility. Choosing to join the University of Florida community obligates each member to a code of civilized behavior. Individuals and student organizations are expected to adhere to the policies and regulations of the University of Florida and the State of Florida. University policies have been designed to protect individuals and the campus community and to create an environment conducive to achieving the academic mission of the institution. Please review the Student Conduct Code found at the following site: (https://sccr.dso.ufl.edu/students/student-conduct-code/). All students are expected to follow these expectations.

The purpose of the Student Conduct Code is to set forth the specific authority and responsibility of the University in maintaining social discipline, to establish guidelines which facilitate a just and civil campus community, and to outline the educational process for determining student and student organization responsibility for alleged violations of University regulations. The Student Conduct and Conflict Resolution process will follow established procedures to ensure fundamental fairness and an educational experience that facilitates the development of the individual and of the organization and wherever possible to help the student who violated University regulations to repair any harms committed through their behavior. In addition to formal adjudication procedures, SCCR can also assist with other conflict resolution processes.

The University believes in offering a variety of conflict resolution options in general and deciding, based on the individual circumstances, which conflict resolution option is best for a given situation. The various conflict resolution options include: conflict coaching, facilitated dialogue, mediation, restorative justice, informal adjudication (administrative review) and formal adjudication (administrative hearing and committee hearing). For more information on these options, please visit our website at https://sccr.dso.ufl.edu/.

What is the Student Conduct Code?
The Student Conduct Code is a set of standards and regulations which describe the rights, privileges, and responsibilities for all currently enrolled students at the University of Florida.

Included are

1. A list of general student rights and responsibilities (including what is considered inappropriate conduct).
2. The procedural rights of students allegedly involved in Conduct Code violations.
3. How to file a conduct complaint.
4. Rights of reporting parties of sexual harassment, sexual assault/ misconduct, dating violence, domestic violence and stalking, and other offenses.
5. Possible sanctions for conduct violations.

Conduct Process

Use our incident report form found at the following site: (https://forms.dso.ufl.edu/public_report/index.php/pid880308/) to report a conduct violation. You may also report in-person by visiting SCCR. While you can submit information anonymously, if you choose to do so, SCCR staff may be very limited in its ability to address the behavior. If you are concerned about possible retaliation, the University of Florida has a zero tolerance policy for retaliatory behavior. Anyone who retaliates against a Reporting Party will face swift and severe interim action, including but not limited to, a campus ban and interim suspension. This retaliation policy applies to all reported violations of the student conduct code, including but not limited to, sexual harassment, sexual assault, dating violence, domestic violence, stalking, and other forms of harassment and hazing.

After reporting, the Director of Student Conduct and Conflict Resolution or designee will meet with you and review your statement to decide if further investigation is necessary. Additionally, SCCR staff members will discuss the conduct process, your rights and options for a hearing as well as answer any questions that you have. If no investigation is needed, a decision on charging will be made within 2 business days in most cases.

If a student has been charged with an alleged violation of the Student Conduct Code, they will receive notice of appointment for a preliminary informational meeting. This notification will inform the student of the charges with sufficient detail and with time to prepare for a hearing. This preliminary meeting will be held with the Director of Student Conduct and Conflict Resolution or designee. In these cases, informational meetings are typically scheduled with the Respondent within 10 business days after charging. At this initial meeting, they will be notified of their rights and provided a verbal summary of the currently available information and informed of the nature and source of the information to be used in resolving the case. They will also be provided with an overview of the conduct process and resolution options available to them based on the nature of the incident.

Both the Responding Party and Reporting Party (where appropriate) may choose to have their cases resolved through either:

1. an administrative review without witnesses with the Director of Student Conduct and Conflict Resolution or designee (note this option is not available with cases which may result in suspension or expulsion),
2. an administrative hearing with witnesses, if available, before the Director of Student Conduct and Conflict Resolution or designee (this will typically be scheduled a minimum of 10 business days following the initial meeting with the accused student), or
3. a committee hearing with witnesses before the Student Conduct Committee, which is composed of faculty, staff and students (this will typically be scheduled a minimum of 10 business days following the initial meeting with the accused student).

The student can choose not to provide any information in an effort to avoid self-incrimination. If there are pending criminal charges, either party may request up to a 30-day delay in the conduct proceeding to allow for the criminal case to move closer to resolution. Hearings are scheduled based on the availability of relevant parties, including the Responding
What Rights Does a Reporting Party Have If He/She Pursues Disciplinary Action?

1. The right to be informed of the available resolution options under the Student Conduct Code.
2. The right to be treated with dignity and respect no matter which resolution option is chosen.
3. The right to be informed of campus resources to assist in working through the situation.
4. The right to be kept informed of the status of the case throughout the process upon request.
5. The right to have an advisor present during the hearing. This person may be a victim advocate, attorney, friend, faculty member, family member. This person may not address the witnesses, accused student, committee or any other party or otherwise directly participate in the proceedings.
6. The right to have a support person present during the hearing. This person shall play no role other than as emotional support to the Reporting Party.
7. The right to remain present throughout the remainder of the hearing. The Reporting Party may participate in the hearing from another room so long as this does not infringe upon the Reporting Party’s right to question the Reporting Party and witnesses.
8. The right to submit potential questions to the hearing chair prior to and during the hearing and to ask relevant questions of the Reporting Party and witnesses who give statements or provide information during the hearing. Repetitive questions are not permitted. All questions will be submitted in writing to the chair of the committee and all relevant questions will be asked by the chair of the committee. The SCCR staff and/or chair of the committee will review any submitted information/questions and will inform the Reporting Party if any of the information is disallowed for the hearing and the rationale for that decision.
9. The right to submit a written impact statement to be considered by the committee, if the Responding Party is determined responsible for violating the Student Conduct Code but before sanctions are determined.
10. The right to have unrelated and irrelevant sexual behavior excluded from the hearing.
11. The right to appeal the decision of the hearing body under the same standards the Responding Party can appeal.

What Kind of Sanctions Can Be Imposed Upon Me?

If a student is found responsible for the alleged violations of the Student Conduct Code, one or more of the following sanctions may be imposed:

• Written Reprimand
• Conduct Probation w/o Loss of Privileges
• Conduct Probation w/ Loss of Privileges
• Deferred Suspension
• Suspension from the University
• Expulsion from the University
• Community Service
• Educational Sanctions
• Loss of Privileges
• Reduced or Failing Grades
• Restitution for Damages
• Room Transfer/Removal from Housing

The purpose of these sanctions is to help you understand as a student how your behavior impacted the community, whom you harmed, how they were harmed, to teach better decision making and to protect the campus community.
Can I Appeal the Decision?
Yes. Appeals must be filed in writing and contact must be made with the reviewing authority within 10 University business days from the date of the decision letter. Written appeals must be submitted to the appropriate official in the Dean of Students Office or the Office of the Vice President for Student Affairs. If both parties have the right to appeal, once one party files an appeal, that appeal will be shared with the other party and they will have 10 University business days from that notification to respond to the appeal. Generally, appeal decisions will be made within 10 University business days of receipt by the appellate officer.

What Criteria Are Required for Filing an Appeal?
1. The student's rights were violated in the hearing process.
2. There is new material evidence which could not have been discovered at the time of the hearing.
3. The evidence did not support the decision.
4. The sanctions imposed were not appropriate for the violation.

Statement Regarding the Conduct Process
The conduct process is not a legal process. It is an educational, administrative process and thus criminal rules of procedures are not followed. The goal of the process is to have all relevant information come forward so the hearing authority can make the appropriate decision. As such, the process is not intended to be as adversarial as the criminal process and is much less formal.

Keep in mind that while your situation is very important to us, SCCR staff are also dealing with many other cases. We strive to contact you within 24 hours of any message you leave with us, however, if you don't hear from us, it is likely because there are no new developments in your case. Please be patient; we will update you anytime there is new information to share with you. We strive to resolve cases within 60 days, unless a 30-day postponement is granted for either party.

Remember, if the hearing authority determines that the Responding Party is not responsible, this doesn't mean that the event that you reported didn't happen or even that you weren't believed, it simply means that the hearing authority didn't find that the weight of the evidence was present to hold the student responsible for violating the Student Conduct Code under the preponderance of the evidence standard. If this is the outcome of your case, please speak to a victim advocate or SCCR staff about other ways we can try and provide a safe environment for you such as finding alternative housing or academic accommodations.

Reporting an incident to SCCR does not preclude you from reporting the incident to law enforcement. If the incident occurred on campus, you can report to UPD. If it occurred off campus, you can report the incident to GPD or ACSO, depending on the location. Your victim advocate can work with you and assist you with this process. If you do choose to go to the hospital for a forensic exam, that evidence can be used and would be helpful in a student conduct hearing. It is best not to shower or change clothes if you wish to have a forensic exam completed as doing so can wash away any evidence.

Hazing & Harassment
Hazing is defined as any action or situation that recklessly, by design, or intentionally endangers the mental or physical health or safety of a student, embarrasses or demeans an individual, negatively impacts the academic abilities of a student or forces a student to violate state or federal law for any purpose including but not limited to initiation or admission into or affiliation with any student group or organization. Examples of hazing include but are not limited to, beating, forced calisthenics, forced alcohol consumption, sleep deprivation, and forced servitude. The fact that someone agreed to participate in these hazing activities is not a defense under the Student Conduct Code or state law. Use our hazing report form found at the following site: [https://sccr.dso.ufl.edu/organizations/hazing/report/] to report any potential hazing violation. Online harassment, stalking, and bullying can greatly impact a student's UF experience. The UF Student Conduct Code does address these behaviors. If you experience bullying, harassment or stalking either in person or online, please report that behavior to Student Conduct and Conflict Resolution and learn about your options.

Conflict Resolution
The conflict resolution services provide students an avenue to address and resolve interpersonal conflicts which may include but are not limited to conflicts between members of a student organization, roommates, students within a class or study group, faculty/staff and students, and friends. The UF Conflict Resolution Program has become nationally recognized for its work at helping parties successfully resolve conflicts. Conflict resolution staff are also available to come to groups, classes and organizations to present workshops on conflict resolution and to provide training on resolving conflicts. The various conflict resolution options include conflict coaching, facilitated dialogue, mediation, and restorative justice practices. SCCR staff are trained in all of these forms of conflict resolution. In addition, they train student peers to help resolve conflict on campus as well. SCCR partners with Gators for Alternative Dispute Resolution and the Conflict Resolution Initiative at the Levin College of Law to assist in providing these services. The conduct process will follow established procedures for ensuring fundamental fairness and an educational experience that facilitates the development of the individual and of the organization. Individuals and student organizations are expected to observe the policies, rules, and regulations of the University of Florida and the State of Florida.

For referral or to request conflict resolution services, visit [https://sccr.dso.ufl.edu/students/conflict-resolution/]

FERPA & the Buckley Amendment (The Family Education Rights and Privacy Act of 1974)
In accordance with State University System rules, state statutes and the Family Education Rights and Privacy Act of 1974 (Buckley Amendment), the University of Florida assures the confidentiality of student educational records. The complete policy can be found in the Undergraduate Catalog. The Buckley Amendment allows the university to access confidential information for normal business purposes. Directory information (name, class, college, major, and telephone) can be publicly released. Non-directory information (grades, disciplinary records, medical records, etc.) will not be released to a third party without the written consent of the student. The exception to the rule is for parents of dependent students, as defined by the IRS. Upon presentation of proof, noting this exception, to the University Registrar's Office, parents have the same rights as their students. All students, however, will be notified of the release of the information to a third party.

Parental Notification of Drug and Alcohol Cases
The following policy is in effect to notify parents or guardians of students in alcohol and other drugs cases at the University of Florida.

If a registered student who is claimed as a dependent by his or her parents or guardians pursuant to the Internal Revenue Services Code is found responsible for violating the Student Conduct Code's underage consumption, possession, or drug rules twice during the same term or for a third time regardless of the length of time between violations, the
There are several options for you to report Title IX violations:

1. Confidential Reporting – Allows you to speak with someone who is not a mandated reporter but who can maintain your confidentiality and provide you with a variety of support services. If you wish your report to be confidential, you can report to the Victim Advocates at UPD (http://www.police.ufl.edu/victim-services/), the Counseling and Wellness Center (http://www.counseling.ufl.edu/cwc/) or a practitioner at the Student Health Care Center (https://shcc.ufl.edu/). Victim Advocates can assist in filing criminal charges with the University of Florida Police Department, Gainesville Police Department, or other law enforcement agency. They can assist you in filing conduct charges if the person who harmed you is a student. They can also serve as your advisor or support person during any proceedings or meetings you have with a University official while addressing the matter or within the legal system. Victim Advocates can help in obtaining restraining orders, no contact orders, finding alternative living arrangements, alternative transportation arrangements, work accommodations, and academic accommodations including changing classes among other things.

2. Anonymous Reporting – Allows you to report that the incident happened while requesting your name not be revealed to the alleged perpetrator and/or asking that no investigation or action be initiated. Please note that this may severely limit the University’s ability to hold anyone responsible for harming you. If you think at some point, you may wish to pursue any kind of action against the individual that harmed you, please remember the importance of preserving evidence from the very beginning. It is advisable that you talk with law enforcement about evidence collection as soon as possible and before you shower or dispose of anything you were wearing at the time of the incident. Be assured the University will always consider your anonymous reporting a priority, however, further action may be necessary to ensure a safe and nondiscriminatory environment for all community members.

3. Reporting for Action – Allows you to request action be taken to investigate the matter for possible University action (via the student conduct process) and criminal action (via the criminal justice system). In these cases, you can contact the University Title IX Coordinator, Dr. Russell Froman, at titleix@ad.ufl.edu or (352) 273-1094. The Title IX Coordinator can assist if you wish for the University to take action and can help connect you with the appropriate sources if you wish to also report the incident for criminal action.

Many sexual assault cases are decided on the issue of whether or not there was effective consent for the sexual activity. Consent must be freely given and mutually understood, it is an affirmative action or statement by an informed person. Under the Student Conduct Code, someone is not able to give consent if they are incapacitated due to force, coercion, or become impaired due to alcohol or drug use. If someone has been drinking and/or has used drugs and you are not positive they are able to consent to sexual activity, the safe choice is to not engage in sexual activity with them.

If you are concerned about possible retaliation, the University of Florida has a zero tolerance policy for retaliatory behavior. Anyone who retaliates against a Reporting Party will face swift and severe interim action, including but not limited to, a campus ban and interim suspension. This retaliation policy applies to all reported violations of the student conduct code, including but not limited to, sexual harassment, sexual assault, dating violence, domestic violence, stalking, and other forms of harassment and hazing.

SCCR staff, including members of the Student Conduct Committee, receive a significant amount of training on interpersonal violence including rape myths, victimization, as well as what it is like to be accused prior to hearing these types of cases.

### Registration Requirements

The University of Florida operates on a semester system consisting of two 16-week terms and two 6-week summer terms. One semester credit equals 1.5 quarter credits. “Term” is used hereafter, instead of “semester.”

### Required Full-Time Registration

**Graduate Assistants:** The full-time registration requirement is reduced for students who are graduate assistants, based on the appointment’s FTE. The most common assistantships have an FTE of .25 -.74 and require the following registration: 9 credits for fall and 9 credits for spring. Summer A appointees must be registered for 3 credits, and Summer B appointees must be registered for 3 credits. For students on appointment for Summer C, registration must equal 6 credits. The chart below provides additional details regarding appropriate registration for various circumstances.

Students on appointment are financially liable for credits in excess of the required number. If a student on appointment drops below the required registration at any time in the semester, the student becomes financially liable for the entire registration. Students who do not register properly are not permitted to remain on appointment.

### Graduate Assistantship Tuition Waiver and Registration Requirements

<table>
<thead>
<tr>
<th>FTE of Graduate Assistantship</th>
<th>Registration Requirements &amp; Waiver</th>
</tr>
</thead>
<tbody>
<tr>
<td>.01-.24 FTE</td>
<td>12 credits (no waiver - Petition Required by Graduate School)</td>
</tr>
<tr>
<td>.25-.74 FTE</td>
<td>9 credits (waiver)</td>
</tr>
<tr>
<td>.75-.99 FTE</td>
<td>6 credits (waiver)</td>
</tr>
<tr>
<td>1.00 FTE</td>
<td>3 credits (waiver)</td>
</tr>
</tbody>
</table>

### Summer A Semester

- **Fall and Spring Semesters:**
  - .01-.24 FTE: 12 credits (no waiver - Petition Required by Graduate School)
  - .25-.74 FTE: 9 credits (waiver)
  - .75-.99 FTE: 6 credits (waiver)
  - 1.00 FTE: 3 credits (waiver)
Tuition Waiver and Registration Requirements

Pre-doctoral Fellowship Memorandum of Understanding (MOU)

Register properly are not permitted to remain on the pre-doc fellowship. Becomes financially liable for the entire registration. Students who do not below the required registration at any time in the semester, the student

Students on a pre-doctoral fellowship with a stipend of more than $4,000 is 3 credits for fall and spring. Pre-doc fellows, whose stipends are more than $2,000 are required to register for 4 credits in the appropriate combination of Summer A, B, or C terms (see chart below). Pre-doc fellows with stipends of less than $2,000 are required to register for 2 credits in the appropriate combination of Summer A, B, or C terms (see chart below).

Students on a pre-doctoral fellowship with a stipend of more than $4,000 (or $2,000 for summer terms) are financially liable for credits in excess of the required number. Likewise, if a student on pre-doc fellowship drops below the required registration at any time in the semester, the student becomes financially liable for the entire registration. Students who do not register properly are not permitted to remain on the pre-doc fellowship.

Pre-Doctoral Fellowship Memorandum of Understanding (MOU)

Tuition Waiver and Registration Requirements

<table>
<thead>
<tr>
<th>Stipend</th>
<th>Registration Requirements &amp; Waiver</th>
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</thead>
<tbody>
<tr>
<td>Fall and Spring Semesters</td>
<td></td>
</tr>
<tr>
<td>Earning $4,000 or more</td>
<td>12 credits (waiver)</td>
</tr>
<tr>
<td>Earning less than $4,000</td>
<td>3 credits (no waiver)</td>
</tr>
<tr>
<td>Summer A Semester</td>
<td></td>
</tr>
<tr>
<td>Earning $2,000 or more</td>
<td>4 credits in either A or C or A &amp; C (waiver); cannot be in B</td>
</tr>
<tr>
<td>Earning less than $2,000</td>
<td>2 credits in either A or C or A &amp; C (no waiver); cannot be in B</td>
</tr>
</tbody>
</table>

Summer B Semester

Earning $2,000 or more | 4 credits in either B or C or B & C (waiver); cannot be in A
Earning less than $2,000 | 2 credits in either B or C or B & C (no waiver); cannot be in A

Summer C Semester

Earning $4,000 or more | 8 credits in either A & B or A & C or B & C or C (waiver); cannot be all in A or all in B
Earning less than $4,000 | 2 credits in either A & B or A & C or B & C or C (no waiver); cannot be all in A or all in B

Registration as Graduate Students

Full-time registration is 9 to 12 credits. Students not on an appointment may want to enroll full time to finish their degrees in the minimum time frame or may be required to enroll full time by external funding agencies or their academic units.

Registration for fewer than 9 to 12 credits may be considered equivalent to full-time enrollment in specific circumstances, such as internships or fieldwork required for all students within the degree program, or lockstep programs (e.g., M.B.A.). Upon petition by the academic unit and under circumstances directed by Graduate Council policy, the Graduate School may certify specified students as meeting full-time equivalency.

Part-time registration: Students not on an appointment and without a specific registration requirement by the academic unit, external funding agency, or government may register as a part-time student. Minimum registration is 3 credits in fall or spring and 2 credits in summer.

Part-time registration and financial aid: Graduate students should be aware that in order to qualify for most financial aid programs (federal, state, or institutional), students must be enrolled at least half-time. For financial aid purposes, a grad student must be enrolled for five hours during fall or spring term, four hours during summer term. In addition, due to limited funds, priority is generally given to full-time students.

- For more information: http://www.sfa.ufl.edu/receiving/enrollment-requirements

Employee registration: UF staff employed on a permanent, full-time basis may be permitted to waive fees up to a maximum of 6 credits per term on a space-available basis. Enrollment is limited to courses that do not increase direct costs to the University. Courses that increase direct costs can include TBA (to be arranged), computer courses, individualized courses, distance learning, internships, and dissertation and master’s thesis courses. Laboratory courses are permitted on a space-available basis.

- For updated information: http://www.hr.ufl.edu/

Undergraduate registration in graduate courses: Upper-division undergraduate students may enroll in 5000-level courses with consent of the instructor. Normally, a student must have a GPA of at least 3.00.
To enroll in 6000-level courses, a student must have senior standing, consent of the instructor, and an upper-division GPA of at least 3.00.

After a student is accepted to graduate school, up to 15 credits of graduate-level courses earned with a letter grade of B or better taken under this provision may be applied toward a graduate degree at UF; if credit for the course has not been used for an undergraduate degree, and if the transfer is approved by the academic unit and made as soon as the student is admitted to a graduate program.

Final term registration: During the term the final examination is given and during the term the degree is awarded, a student must be registered for at least 3 credits in fall or spring and 2 credits in summer. Thesis students must enroll in 6971 and doctoral students must enroll in 7980. Project students are required to take 3 credits of 6973/6979 (Project in Lieu of Thesis) in their final term (2 credits if the final term is summer). Non-thesis students must enroll in course work that counts toward the graduate degree. Students on a fellowship, traineeship, or assistantship must be registered appropriately for their appointments.

Clear prior: Clearing prior status is only possible for thesis and dissertation students who have met all published deadlines for the current term except Final Submission and/or Final Clearance from the Graduate Editorial Office. No other students are eligible. Clear Prior permits students to be exempt from registration for the term in which the degree will be awarded. Although not required to register during the term of degree award, students are required to file a new degree application for that term within all published deadlines for doing so, as degree applications do not carry over from semester to semester and are essential for the degree to be awarded.

A student requesting to clear prior must meet ALL of the following criteria:

- Student has successfully submitted a degree application for the current term within the published deadlines, as confirmed by print screen available from ONE.UF (https://one.uf.edu/)
- Student has appropriately satisfied the current term registration.
- Student has successfully met the current term first submission deadlines for the thesis or dissertation, as confirmed by the Editorial Office, via a confirmation email to the student and committee chair.
- Student has successfully met all other degree and administrative requirements, within the published deadlines for the current term, except Final Submission and/or Final Clearance with the Graduate School Editorial Office.
- Student is in the process of finalizing the thesis or dissertation with the Graduate School Editorial Office. No other students are eligible.

Drop/add: Courses may be dropped or added during drop/add without penalty. This period usually lasts 5 UF business days in the fall and spring semesters or 2 business days for summer semesters, starting with the first day of the term. Classes that meet for the first time after drop/add may be dropped without academic penalty or fee liability by the end of the next business day after the first meeting. This does not apply to laboratory sections. After this period, a course may be dropped and a W appears on the transcript. Students become financially liable for any course added or dropped after the deadline, including students with tuition waivers. Prior to the last day of classes for each term, students should personally verify all registration changes and any required adjustments online on ONE.UF (https://one.uf.edu/). Retroactive drop/add will not be permitted.

Retaking courses: In this context, repeating courses refers only to a repetition of the same course where no significant change in content has occurred. It does not include repetition of seminars, special problems, dissertation, thesis or other courses that have varying content. Normally, Graduate Students may only repeat courses in which a failing grade (C-, D+, D, D-, or E) was earned. Courses in which a C (2.0) or higher was earned can only be repeated if approved by the academic unit, the college, and the Graduate School via a formal petition process. Effective Spring 2020 term and forward, University of Florida coursework that is repeated will be counted in the computation of the UF grade point average as many times as grades for that course are recorded. Please note, however, credits will only be awarded once. Repeating a course for credit may not be used to resolve an incomplete grade. If enrollment is needed for completion, then auditing the course is the appropriate registration. The Student Information System will display an error message if attempting to enroll in a non-repeatable course. A similar error message will display if the attempt is for registration that would exceed the enrollment maximum (as established by the offering academic unit at the at the time the course was approved) for a repeatable course. In both cases, the course enrollment cannot be completed without manual coding by the Registrar’s Office. If you are requiring a graduate student to repeat a course that is non-repeatable, or you wish to request an exception to exceed the allowable maximum for repeatable courses, please request an enrollment exception by submitting the petition form available at http://graduateschool.ufl.edu/faculty-staff/resources/petition-guidelines/ This petition must be completed with approval signatures then submitted to the Registrar’s Office for processing. We have streamlined this process with the Registrar’s Office so a signature from the Graduate School is not required. If the allowable maximum for an approved repeatable course no longer meets the needs of the academic unit or college, you may wish to consider increasing the existing credit maximum. If you are interested in this option, please log into the approval.ufl.edu system, select the Course tab, the Modify or close a course then the Graduate menu selection. Additional information regarding this process is available at https://approval.ufl.edu/start-new-request/modify-course-graduate/.

Tuition/Fee Waivers

Waivers authorized through the UF Grad Letters of Appointment file for Graduate Research Assistants, Graduate Teaching Assistants, and Fellows will be automatically entered into your student account. Questions concerning the Letter of Appointment file or a graduate or fellow waiver should be directed to your department or to Academic Personnel (http://aa.ufl.edu/).

Attendance Policies

Students are responsible for meeting all academic objectives as defined by the instructor. Absences count from the first class meeting. In general, acceptable reasons for absences from class include illness, serious family emergencies, special curricular requirements, military obligation, severe weather conditions, religious holidays, and participation in official University activities. Absences from class for court-imposed legal obligations (e.g., jury duty or subpoena) must be excused. Other reasons also may be approved.

Students may not attend classes unless they are registered officially or approved to audit with evidence of having paid audit fees. After the end of drop/add, the Office of the University Registrar provides official class rolls/addenda to instructors. Students who do not attend at least one of the first 2 class meetings of a course or laboratory in which they are registered and who have not contacted the academic unit to indicate their intent may be dropped from the course. Students must not
assume that they will automatically be dropped if they fail to attend the first few days of class. The academic unit will notify students dropped from courses or laboratories by posting a notice in the academic unit office. Students may request reinstatement on a space-available basis if documented evidence is presented. The University recognizes the right of the individual professor to make attendance mandatory. After due warning, professors may prohibit further attendance and then assign a failing grade for excessive absences. Students who have registration changes, at any time during the semester, should verify their registrations before the last day of class of the term. Retroactive drop/add or other registration changes will not be permitted.

**Change of Graduate Degree Program**

Graduate staff in the academic unit should do a "Plan Change" to the current, active Graduate Career in the new Student Information System (SIS) if a student wishes to change their major/degree within your College. Please contact the Graduate School at graddata@ufl.edu for assistance with the required "Program Change" in SIS if a student wishes to change their major program outside of your College and with Discontinuing the Old Graduate Career. Graduate Staff may add a new Career in SIS for a student who wishes to work toward a major/degree in addition to their Current, Active Degree Program. If the student is no longer pursuing a graduate degree, the academic unit can request the Graduate Career be Discontinued in SIS. Directions for the above procedures are located in the Student Program/Plan Training toolkits on the following webpage: https://learn-and-grow.hr.ufl.edu/toolkits-resource-center/student-information-systems/student-program-plan/.

Any changes to degree programs, including thesis/non-thesis/project option, MUST occur before the published midpoint deadline of the student’s final term.

Contact the Graduate School at graddata@ufl.edu for further assistance.

**Courses and Credits**

Undergraduate courses (1000-2999) may not be used to satisfy any graduate degree requirements. All 1000- and 2000-level courses may be taken on a satisfactory/unsatisfactory (S/U) basis.

Six credits of undergraduate courses (3000-4999) outside the major may count when taken as part of an approved graduate program. Consult the Academic Unit before registering.

Courses numbered 5000 and above are limited to graduate students, with the exception described under Undergraduate Registration in Graduate Courses. Courses numbered 7000 and above are normally for advanced graduate students.

No more than 5 credits each of 6910 (Supervised Research) and 6940 (Supervised Teaching) may be taken by a graduate student at UF. Students who have taken 5 credits of 6910 cannot take 7910; the rule also applies to 6940 and 7940. Courses numbered 7979 and 7980 are not eligible to count toward a master-level degree program.

Audited courses at any level do not count toward any graduate degree requirements.

For a complete list of approved graduate courses, see the Programs Section of this catalog (http://catalog.ufl.edu/UGRD/programs/). Academic units decide which of these graduate courses to offer in a given term. Contact the academic unit for information on available courses.

Generally, graduate courses may not be repeated for credit. However, there is no limit on courses numbered 6971 (but the Graduate School will only count a maximum of 6 credits of 6971 toward a thesis master’s-level degree), 6972, 6979, 7979, and 7980. Other courses repeated for credit indicate “max” after the single term credit, as listed in the Programs Section of this catalog (http://catalog.ufl.edu/UGRD/programs/).

**Professional course work:** Graduate students may receive credit toward their degrees for courses in professional programs (e.g., J.D., D.V.M., or M.D.) when their advisers and graduate coordinators certify that the course work is appropriate for their programs and when the students receive permission from the academic units and colleges offering the courses. The courses must be letter-graded and earned with a grade of B or better. However, the associated grades in these professional courses are not included in the calculations of the overall GPA, major GPA, and minor GPA. A list of UF professional courses for each student must be filed with Graduate Student Records (121 Grinter) on or before the midpoint deadline within the intended term of degree award. Professional courses earned at other institutions must be approved by the Graduate School via the transfer credit process. In all cases, these credits are limited to a maximum of 9 credits toward the master’s degree and 30 credits toward the doctorate.

**Grades**

**Passing, Non-Punitive and Failing Grades:** The Office of the University Registrar records student grades. The word "credit" refers to one semester hour, generally representing one hour per week of lecture or two or more hours per week of laboratory work.

The only passing grades for graduate students are A, A-, B+, B, B-, C+, C, and S. Grades of B-, C+ or C count toward a graduate degree if an equal number of credits in courses numbered 5000 or higher have been earned with grades of B+, A- and A, respectively. Grade points are not given for S and U grades; S and U grades are not used to calculate grade point averages. All letter-graded courses eligible to count toward the graduate degree, except 1000- and 2000-level courses, are used to calculate the cumulative grade-point average. Letter grades of C, D+, D, D- or E are not considered passing at the graduate level, although the grade points associated with these letter grades are included in grade point average calculations.

**Satisfactory/Unsatisfactory:** Grades of S and U are the only grades awarded in courses numbered 6910 (Supervised Research), 6940 (Supervised Teaching), 6971 (Research for Master’s Thesis), 6972 (Engineer’s Research), 7979 (Advanced Research), and 7980 (Research for Doctoral Dissertation). Additional courses for which S and U grades apply are noted in the academic unit offerings in the Programs Section of this catalog (http://catalog.ufl.edu/UGRD/programs/).

All language courses regardless of level may be taken S/U if the student’s major is not a language and the courses are not used to satisfy a minor, with approval from the student’s supervisory committee chair and the instructor of the course. S/U approval should be made by the published deadline date. All 1000 and 2000 level courses may be taken S/U. No other courses (graduate, undergraduate, or professional) may be taken for an S/U grade.

**Deferred grade H:** The grade of H is not a substitute for a grade of S, U, or I. Courses for which H grades are appropriate must be so noted in their catalog descriptions, and must be approved by the Graduate Curriculum Committee and the Graduate School. This grade may be used only in special situations where the expected unit of work may be developed
over a period of time greater than a single term. All grades of H must be removed before a graduate degree can be awarded.

Incomplete grades: Grades of I (incomplete) received during the preceding term should be removed as soon as possible. Grades of I carry zero grade points and become punitive after 1 term.

All grades of I must be changed before a graduate degree can be awarded.

Grades and Grade Points Prior to Summer A 2009

<table>
<thead>
<tr>
<th>Grades</th>
<th>Grade Points</th>
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<tbody>
<tr>
<td>A</td>
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Grades and Grade Points Effective Summer A 2009

<table>
<thead>
<tr>
<th>Grades</th>
<th>Grade Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4.0</td>
</tr>
<tr>
<td>A-</td>
<td>3.67</td>
</tr>
<tr>
<td>B+</td>
<td>3.33</td>
</tr>
<tr>
<td>B</td>
<td>3.0</td>
</tr>
<tr>
<td>B-</td>
<td>2.67</td>
</tr>
<tr>
<td>C+</td>
<td>2.33</td>
</tr>
<tr>
<td>C</td>
<td>2.0</td>
</tr>
<tr>
<td>C-</td>
<td>1.67</td>
</tr>
<tr>
<td>D+</td>
<td>1.33</td>
</tr>
<tr>
<td>D</td>
<td>1.0</td>
</tr>
<tr>
<td>D-</td>
<td>0.67</td>
</tr>
<tr>
<td>E</td>
<td>0</td>
</tr>
<tr>
<td>WF</td>
<td>0</td>
</tr>
<tr>
<td>I</td>
<td>0</td>
</tr>
<tr>
<td>NG</td>
<td>0</td>
</tr>
<tr>
<td>S-U</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: The degree-granting college may require a minimum grade of C in particular courses. GPA calculations are truncated (not rounded) and displayed on the transcript to the hundredths place.

Non-Punitive Grades and Symbols:

Non-Punitive Grade, Zero Grade Points, Not Counted in GPA | Grade Points
-------------|-------------|
W             | Withdrew    |
U             | Unsatisfactory |

Failing Grades:

<table>
<thead>
<tr>
<th>Failing Grade, Zero Grade Points, Counted in GPA</th>
<th>Grade Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>Failure</td>
</tr>
<tr>
<td>WF</td>
<td>Withdrew failing</td>
</tr>
<tr>
<td>NG</td>
<td>No grade reported</td>
</tr>
<tr>
<td>I</td>
<td>Incomplete</td>
</tr>
</tbody>
</table>

Unsatisfactory Progress or Unsatisfactory Scholarship

Any graduate student may be denied further registration if progress toward completing the program becomes unsatisfactory to the academic unit, college, or Dean of the Graduate School. Unsatisfactory scholarship is defined as failure to maintain a B average (3.00) in all work attempted. Graduate students need an overall GPA of 3.00 truncated and a 3.00 truncated GPA in their major (and in the minor, if a minor is declared) at graduation. Students with less than a 3.00 GPA may not hold an assistantship or fellowship.

Examinations

Foreign Language Examination

A foreign language examination is not required for all degree programs. For specific information on foreign language requirements, contact the graduate coordinator of your academic unit.

Examinations

The student must register for sufficient and appropriate graduate credits during the term any examination is taken. The student's supervisory committee is responsible for administering the written and oral qualifying examinations and the final oral examination for the defense of the thesis, project, or dissertation.

On rare occasion by virtue of scheduling conflicts beyond the control of the student, examinations may occur on days between terms (break period) with the approval of the supervisory committee. This approval does not, by any means, replace existing requirements to meet published registration and deadlines for degree certification in a particular term.

Qualifying Examinations and Final Examinations administered during a break period are only valid if the student was enrolled in at least one of the terms on either side of the break. The examination will always be associated with the term immediately preceding the break, provided the student was enrolled for that term. Otherwise, the examination will be associated with the term immediately following the break.

All members of the supervisory committee must sign the appropriate forms, including the Electronic Thesis and Dissertation (ETD) Signature Page, for the student to meet the requirements of the examination. Once a successful defense has occurred, the academic unit should submit the Final Exam form via the Student Information System (SIS); signed forms are to remain in the student's folder in the academic unit. Electronic information will be forwarded to the Graduate School via (SIS). Next, the student will then submit the UF Publishing Agreement with their preferred restriction selected via the Graduate Information Management System (GIIMS). The signed ETD Signature Page should be held by the academic unit.
Academic Unit until all Committee stipulations have been met regarding the document; however, it should be posted electronically to GIMS no later than the Final Submission Deadline for the intended term of degree award.

The qualifying and comprehensive oral examinations and the oral defense of a thesis, project, or dissertation may be conducted using video and/or other appropriate forms of telecommunication. The candidate and the supervisory committee chair or cochair must be physically present together at the same location. With approval of the entire committee, other members may attend the defense remotely, using modern communication technology. Abiding by the guidelines stipulating the student and the chair or cochair must be together at the time of defense, it remains the choice of the academic unit offering the degree program to clearly identify the program's requirement for the physical presence of the other committee members.

Supervisory Committees or academic units may set their own standards for attendance at oral examinations that exceed the minimum requirement stated above.

Students are responsible for coordinating the scheduling of oral examinations with their committee or academic unit and must follow the policies set by their committee or academic unit, and the Graduate School.

The written comprehensive examination for the non-thesis master's degree may be taken at a remote site. The academic unit's policy must specify arrangements for electronic security, proctoring, and the identification of the candidate.

### Preparation for Final Term

The student is responsible for meeting all requirements and observing every deadline. Deadlines are given in this catalog, in the Graduate Student Handbook, and online at the Graduate School website.

- **Thesis and Dissertation students**: When the thesis or dissertation is ready to be put in final form for submission to the Graduate School, the student should review the Format Requirements of the Graduate School Editorial Office (http://graduateschool.ufl.edu/about-us/offices/editorial/) and should work with the Application Support Center (http://helpdesk.ufl.edu/application-support-center/) to format the document in order to meet the minimum submission requirements of the Editorial Office. The Application Support Center offers students assistance with troubleshooting their documents free of charge. The Center also provides more extensive formatting and pdf-conversion services for reasonable fees to the student. It is highly recommended that all students writing theses and dissertations use the Center’s services; however, it should be posted electronically to GIMS no later than the Final Submission Deadline for the intended term of degree award.

- **All students**: Students must submit a Degree Application (https://registrar.ufl.edu/services/degreeapp.html) on ONE.UF (https://one.ufl.edu/) before the published deadline of the term and must meet minimum registration requirements. **Degree Applications do not carry over from one semester to the next.** If the degree is not awarded, the student must:
  - request that his or her academic unit remove their name from the current term degree list
  - re-apply for the degree award via ONE.UF (https://one.ufl.edu/) in a subsequent term, by the published deadline for that term; and
  - meet all other requirements for the term the degree will be awarded.

These requirements also apply when a thesis or dissertation student has been approved to clear prior by the Graduate School Editorial Office.

### Verification of Degree Candidate Status

This service is provided until 3 weeks before graduation. However, students who before that time have completed all requirements for the degree, filed the fully signed final examination report with their academic unit, and have achieved final clearance of the thesis or dissertation, may request verification to that effect. Verification of Degree Candidate Status Request Forms (http://www.graduateschool.ufl.edu/media/graduateschool/pdf-files/verification-letter.pdf) are filled out by the candidate; signed by the supervisory committee chair, department chair, college dean, and the Graduate School Editorial Office (128 Grinter Hall); then it is given to the Graduate Student Records (116 Grinter Hall) for verification and processing.

Although a student may have fulfilled academic requirements, the degree is not awarded until the Graduate School certifies the degree to the University Registrar. That is done at the end of fall, spring, and Summer C terms for all students who completed degree requirements and applied to graduate. Some employers and licensure boards require the degree statement on the transcript, which is available the day after certification in December, May, and August.

### Awarding of Degrees

The Graduate School authorizes a candidate to be awarded the degree appropriate to the course of study under the following conditions (see degree descriptions for details):

- The candidate must have completed all course requirements, including an internship or practicum if required, in the major and minor fields while observing time limits and limitations on transfer credit, on nonresident work, and on level of course work.
- The candidate's grade point averages must be at least B (3.00, truncated) in the major and overall (all courses eligible to count toward the graduate degree), including a minor where appropriate.
- All grades of H, I, N and NG must be changed. Furthermore, all grades of I assigned to course numbers 6971, 7979, and 7980 must be resolved with a final grade assignment of Satisfactory (S) or Unsatisfactory (U).
- The candidate must have satisfactorily completed all required examinations (qualifying, comprehensive, and final) and be recommended for the degree by the supervisory committee, major academic unit, and college.
- The dissertation or thesis must have been approved by the supervisory committee and accepted by the Graduate School. Projects must be approved by the academic unit, which then certifies completion to the Graduate School.
- Recommendations for awarding a degree include meeting all academic and professional qualifications as judged by the faculty of the appropriate academic unit.

All requirements for the degree must be met while the candidate is a registered graduate student. Degrees are certified 3 times per year: December, May, and August.

### Attendance at Commencement

Graduates who are to receive advanced degrees are urged to attend Commencement to accept in person the honor indicated by the appropriate hood. Through the University Bookstore, the student
may arrange to rent or buy the proper academic attire to be worn at Commencement. For more information regarding commencement, please speak with your academic unit's advisor and visit https://commencement.ufl.edu/.
FINANCIAL INFORMATION

The information in this catalog is current as of July 2020. Please contact individual programs for any additional information or changes.

Fees

Admission Application Fee
An individual who applies for admission to the University of Florida shall pay a non-refundable application fee of $30. (UF 3.0376, Regulations of the University of Florida).

Registration and Tuition Fees Liability
Pursuant to Section UF-3.037(1) Regulations of the University of Florida, registration shall be defined as consisting of two components:

1. formal enrollment in one or more credit courses approved by the university and
2. fee payment or other appropriate arrangements for fee payment (deferment or third-party billing) for the courses in which the student is enrolled as of the end of drop/add period.

Registration must be completed on or before the date specified in the university calendar. Students are not authorized to attend class unless they are on the class roll or have been approved to audit. Unauthorized class attendance will result in tuition and fee liability.

In addition to the matriculating term, a student must be registered during the terms of the qualifying examination and the final examination, and during the term the degree is awarded.

Tuition and Fee Liability – Pursuant to Section UF-3.037(2) Regulations of the University of Florida, a student is liable for all tuition fees associated with all courses for which the student is registered at the end of the drop/add period or for which the student attends after that deadline. The fee payment deadline is 3:30 p.m., on Friday of the second week of classes.

Assessment of Tuition Fees
Pursuant to UF-3.0375 Regulations of the University of Florida, tuition shall be assessed to students for enrollment in credit courses. In some instances, tuition waivers accompanying assistantships or fellowships include only the matriculation fee and where applicable the non-resident fee. All other fees must be paid by the student.

Students can pay their own tuition fees on ONE.UF (https://one.uf.edu/) portal.

Students can estimate their tuition and fees on the University Bursar website: http://www.fa.ufl.edu/bursar/current-students/.

Lack of written notification of the tuition fee debt does not negate the student's responsibility to pay by the published fee payment deadline.

University personnel will not be held accountable for assessment or accuracy of calculations.

Assessment of Student Tuition and Fees
Resident Tuition Cost, comprising the following, shall be defined as the tuition and fees charged an enrolled student who qualifies as a Florida resident as defined in BOG Regulation 7.005 and Section 1009.21 Florida Statute.

Non-Resident Tuition Cost, comprising the following, shall be defined as the tuition and fees charged an enrolled student who does not qualify as a Florida resident as defined in BOG Regulation 7.005 and Section 1009.21 Florida Statute.

Activity and Service Fee: All students must pay an activity and service fee that is assessed on a per-credit-hour basis or semi-annual basis and is included in the basic rate per credit hour (UF-3.0372 Regulations of the University of Florida).

Athletic Fee: All students must pay an athletic fee that is assessed on a per-credit-hour basis or semiannual basis and is included in the basic rate per credit hour. Half-time graduate research and teaching assistants enrolled for eight (8) or more credits during the fall or spring semesters and all other students enrolled for nine (9) or more credits are eligible to purchase athletic tickets at the student rate (UF-3.0372 Regulations of the University of Florida).

Audit Fee: Tuition and fees are assessed at the applicable resident or non-resident cost (UF-3.0376(18) Regulations of the University of Florida).

Diploma Replacement Fee: Each diploma ordered after a student's initial degree application can result in a diploma replacement charge not to exceed $10 (UF-3.0376(13) Regulations of the University of Florida).

Distance Learning Fee: Online courses may be assessed a per-credit-hour amount (1009.24 Florida Statutes).

Health Fee: All students must pay a health fee that is assessed on a per-credit-hour basis or semiannual basis and is included in the basic rate per credit hour. The health fee maintains the university's Student Health Service and is not part of any health insurance a student may purchase (UF-3.0372 Regulations of the University of Florida).

Material and Supply: Material and supply fees are assessed for certain courses to offset the cost of materials or supply items consumed in the course of instruction. A list of approved courses and fees (http://www.registrar.ufl.edu/soc/) is published in the Schedule of Courses each semester (UF-3.0374 Regulations of the University of Florida).

Off-campus Educational Activities: The president or designee will establish fees for off-campus course offerings when the location results in specific identifiable increased costs to the university. These fees will be in addition to the regular tuition and fees charged to students enrolling in these courses on campus. The additional fees charged are for the purpose of recovering the increased costs resulting from off campus vs. on campus offerings. As used herein, off campus refers to locations other than main campus, branch campuses and centers (UF-3.0376(19) Regulations of the University of Florida).

Registration for Zero Credits: The student is assessed the applicable resident or non-resident cost as set forth in Regulation UF-3.0375, for one credit hour (UF-3.0376(17) Regulations of the University of Florida).

Technology Fee: Regulations of the University of Florida): All students must pay a technology fee that is assessed on a per-credit-hour basis or semiannual basis and is included in the basic rate per credit hour (UF-3.0375 Regulations of the University of Florida).

Transcript Fee: Regulations of the University of Florida): An official transcript for currently registered students can be purchased for a fee of $6. The cost for a non-enrolled student and a student who has not been registered at the university for two or more terms is $10. The university
Payment of Tuition and Fees

Tuition and fees are payable on the dates listed in the academic calendar (http://catalog.ufl.edu/graduate/academic-calendar/). Deadlines are enforced. Tuition and fee payments (http://www.fa.ufl.edu/bursar/current-students/payments/) are processed by University Bursar.

Payments sent via U.S. mail must be received in the university cashier’s office by the established fee payment deadline. No payment due for the tuition deadline date is a receipt date, not a postmark date.

According to university policy, university cashiers will accept checks only for the amount due in payment of tuition fees, accounts receivable, and other student debts.

Checks from other countries must be payable through a United States bank in U.S. dollars.

The university can refuse two-party checks, altered checks, and checks that will not photocopy. The university does not have the authority to waive late payment fees unless extraordinary circumstances warrant such a waiver or the university is primarily responsible for the delinquency.

Online payment navigation for tuition fees and other charges can be made via the ONE.UF (https://one.ufl.edu/) portal.

Payment options on ONE.UF (https://one.ufl.edu/):

• Electronic check or ACH; there is no service charge for the electronic check payments.
• Credit cards: MasterCard, Discover, American Express, or Visa will include a 2.6% service charge.
• International Payment; is a wire transfer, provides a competitive rate of exchange for many international currencies.
• In person payments: check, money order, or cashier’s check. International paper checks or demand drafts must be drawn on a U.S. bank in U.S. dollars and amounts cannot be greater than the amount due. Any payment that is more than the amount due will not be refunded and automatically will be applied to a future debt.
• Cash and debit cards are not available payment options.

Returned Payments

Returned electronic checks or paper checks will be charged a service fee of $25 if the returned payment is less than $50; $30 if the returned payment is $50.01 - $299.99 and $40 if the returned payment is $300 or more. Payments for returned electronic check payments, returned paper checks and the returned service fee must be paid by money order or cashier’s check.

A $10 service fee will be charged if the bank information provided for the electronic check payment is inaccurate for electronic funds transfer. Payment for this type of return does not require a money order or a cashier’s check.

All financial obligations to the university will be applied on the basis of age of the debt. The oldest debt will be paid first.

Late Registration and Late Payment Fees

Late Registration Fee: If the student fails to register prior to the late registration date published in the academic calendar (http://catalog.ufl.edu/graduate/academic-calendar/) will be subject to a late registration fee of $100 (UF-3.037(3) Regulations of the University of Florida).

Late Payment Fee: Any student who fails to pay all tuition fees due or to make appropriate arrangements for tuition fee payment (deferment or third party billing) by the fee payment deadline published in the academic calendar (http://catalog.ufl.edu/graduate/academic-calendar/) will be subject to a late payment fee of $100 (UF-3.037(4) Regulations of the University of Florida).

Waiver of Late Fees: A student who believes that a late fee should not be assessed because of university error or extraordinary circumstances that prevented all conceivable means of compliance by the deadline may petition for a waiver. Late registration fee: Office of the University Registrar; Late payment fee: University Bursar. The university reserves the right to require documentation to substantiate these circumstances.

Deferment of Tuition and Fees

Deferment extends the deadline for payment of tuition fees for a specific term. A tuition fee deferment is granted based on information from Student Financial Affairs (financial aid deferments), the Office of the University Registrar (veterans) or Graduate and Fellowship Waivers; departments may provide Letters of Appointment (LOA) and tuition waivers to teaching, research, or graduate assistants, and fellowship students. Refer questions on eligibility to the appropriate office. A tuition fee deferment must be established by the tuition fee payment deadline for each term.

A tuition fee deferment is provided to students in the following circumstances:

• Students receiving benefits from state or federal financial assistance programs (1009.27, Florida Statutes).
• Students receiving veterans or other educational benefits under Chapter 30, Chapter 31, Chapter 32, Chapter 33, Chapter 34, Chapter 35, Chapter 1606 or Chapter 1607 Title 38 U.S.C.; or
• Students for whom formal arrangements have been made with the university for payment by an acceptable third-party sponsor.

A $100 late payment fee will be assessed if a student fails to pay all tuition fees due by the deferment deadline.

Non-payment of Tuition and Fees: The university shall temporarily suspend further academic progress of any student who has not satisfied the entire balance of his/her fee liability by the established deadlines. This will be accomplished by placing a financial hold on the student’s record, which will prevent the student from receiving grades, transcripts,
and/or diploma, and the student’s registration will be denied for future terms until the account has been satisfied (UF-3.037 Regulations of the University of Florida).

Students who have not paid any portion of their tuition fee liability by the established university payment deadline will continue to be held fee liable for these courses, but will not be allowed to attend these courses until payment is made in full and the student has been re-registered.

To re-register for courses, students must submit a Course Schedule Correction form to the Office of the University Registrar. Students who re-register after being withdrawn for non-payment of tuition and fees will be subject to both late registration and late payment fees.

Non-payment of Tuition and Fees: The university shall temporarily suspend further academic progress of any student who has not satisfied the entire balance of his/her fee liability by the established deadlines. This will be accomplished by placing a financial hold on the student’s record, which will prevent the student from receiving grades, transcripts, and/or diploma, and the student’s registration will be denied for future terms until the account has been satisfied (UF-3.037 Regulations of the University of Florida).

Students who have not paid any portion of their tuition fee liability by the established university payment deadline will continue to be held fee liable for these courses, but will not be allowed to attend these courses until payment is made in full and the student has been re-registered.

To re-register for courses, students must submit a Course Schedule Correction form to the Office of the University Registrar. Students who re-register after being withdrawn for non-payment of tuition and fees will be subject to both late registration and late payment fees.

Refund of Tuition and Fees
The following circumstances may constitute a tuition and fees refund:

- If notice of withdrawal from the University is approved prior to the end of the drop/add period and written documentation is received from the student.
- Credit hours dropped during drop/add
- Courses canceled by the university
- Involuntary call to active military duty
- Death of the student or member of the immediate family (parent, spouse, child, sibling)
- Illness of the student of such severity or duration, as confirmed in writing by a physician, that completion of the semester is precluded
- Exceptional circumstances, upon approval of the university president or his designee

A refund of twenty-five percent (25%) of the total fees paid (less late fees) is available for withdrawal of enrollment from the university prior to the deadlines listed in the academic calendar (http://catalog.ufl.edu/graduate/academic-calendar/).

Refunds are issued by University Bursar and will be initially applied against any university debts. The university reserves the right to set minimum amounts for which refunds will be produced for overpayments on student accounts.

Tuition refunds due to cancellation, withdrawal or termination of attendance for students receiving financial aid will first be refunded to the appropriate financial aid programs. If the student is a recipient of federal financial aid, such as Grad Plus Loan, Pell Grant, TEACH Grant, Supplemental Educational Opportunity Grant (SEOG), Perkins Loan, Federal Direct Stafford Loans or PLUS loans, federal rules require that any unearned portion of the federal aid must be returned to the U.S. Department of Education.

The amount the student has earned is based on the number of days the student attended classes as compared to the number of days in the entire term (first day of classes to the end of finals week). Any remaining refund then will be returned according to university policy.

Direct Deposit Requirement: Due to the university’s continuing support for sustainable practices, as well as the costs associated with producing, mailing, and tracking undelivered checks, direct deposit is now required for the delivery of refunds, whether financial aid or student overpayments. This electronic method will deposit any overpayments to the student’s checking account. Students must give authorization on their ONE.UF (https://one.uf.edu/) to have overpayments electronically credited to a U.S. bank or other U.S. financial institution checking account.

Deadlines: Deadlines are enforced. The university does not have the authority to waive late payment fees unless extraordinary circumstances warrant such waiver or the university is primarily responsible for the delinquency.

General Fiscal Information
Students can pay online at ONE.UF (https://one.uf.edu/) the exact amount of tuition fees and/or other amounts owed the university. The online payment system accepts the following payment methods: American Express, MasterCard, Discover, or Visa credit cards and electronic checks from checking and international payments via wire transfer.

Students can pay at the University Bursar office with personal checks, cashier’s checks and money orders, which can be placed in the 24-hour drop box located outside 113 Criser Hall. Payments on all financial obligations to the university will be applied on the basis of age of the debt. The oldest debt will be paid first.

University Bursar is not able to accept cash or debit card payments and does not cash checks or make cash refunds.

University Bursar is not able to accept cash or debit card payments and does not cash checks or make cash refunds.

It is the student’s responsibility to maintain a correct current address (https://registrar.ufl.edu/addresschange.html) in the UF directory.

Address changes should be made online at ONE.UF (https://one.uf.edu/).

Past-Due Student Accounts
All student accounts are payable at the University Bursar office or on ONE.UF (https://one.uf.edu/) at the time such charges are incurred. Graduating students with outstanding financial obligations will have a hold placed on their records withholding release of a diploma, transcript, and other university services until the debt is satisfied.

University regulations prohibit the following for any student whose account with the university is delinquent until the debt has been satisfied:

- Registration
- Release of transcript, diploma, grades or schedules
- Loans
• The use of UF facilities and/or services
• Admission to UF functions and athletic events

Delinquent accounts, including those debts for which the student’s records have a financial hold, may require payment by cashier’s check or money order.

Delinquent debts may be placed with a billing agent, reported to a credit bureau and referred to collection agencies without further notice or litigated, at which time additional collection costs will be assessed in accordance with UF-3.0376(20) Regulations of the University of Florida. All payments received are applied to the oldest debt first.

For additional information about fees governing UF students, please consult https://catalog.ufl.edu/UGRD/academic-regulations/fees-fiscal-information/ (https://catalog.ufl.edu/UGRD/academic-regulations/fees-fiscal-information/)
FINANCIAL AID

The information in this catalog is current as of July 2020. Please contact individual programs for any additional information or changes.

Graduate Assistantships and Fellowships

Graduate Assistantships are available through individual academic units. Stipend rates paid are determined by the employing academic unit. Interested students should ask their academic-unit offices about the availability of assistantships and the procedure for applying. Early inquiry is essential to be assured of meeting application deadlines. Appointments are made on the recommendation of the academic unit chair, subject to admission to the Graduate School and to the approval of the Dean of the Graduate School. Initial appointment requires clear evidence of superior ability and promise. Reappointment to assistantships requires evidence of continued good scholarship.

For fall appointments, apply to the appropriate academic unit chair, on or before February 15th of each year, unless otherwise specified. Deadlines for appointments for other terms are determined by the employing unit.

Fellows, trainees, and graduate assistants must pay appropriate tuition and fees. Fellows receiving stipends of $4,000 or greater per term (prorated for summer) are expected to devote full time to their studies. Students who accept fellowships and traineeship are required to register appropriately. Trainees are also expected to devote full time to their studies. Graduate assistants have part-time teaching or research duties; they are required to register for reduced credit loads, according to the schedule for their appointment. Students on appointment are financially liable for excess credits beyond the required registrations. If a student on appointment drops below the required registration at any time in the semester, the student becomes financially liable for the entire registration.

University-Wide Fellowships

Graduate School Preeminence and Funding Awards

The Graduate School Preeminence (GSPA) and the Graduate School Funding Award (GSFA) represent one of the most prestigious graduate student awards available at the University. Funded at competitive levels, these desirable awards support students in all programs and departments of the University awarding a Ph.D. or M.F.A.

To ensure that Graduate School Preeminence Award and Graduate School Funding Award recipients receive every opportunity to succeed, the GSPA and GSFA will provide four years of stipend support. Tuition and health insurance are also provided for new students formally admitted into Ph.D. programs. M.F.A. students receive three-year GSFA awards. Students may be appointed as graduate assistants, research assistants, or teaching assistants.

The University expects Graduate School Preeminence and Graduate School Funding Award recipients to demonstrate high levels of academic achievement and active participation in university life. GSPA and GSFA recipients are selected by their departments or programs of their major field of study. For more information on the GSF program, please contact the graduate coordinator for the degree program of interest.

Grinter Fellowship

Named in honor of Dr. Linton E. Grinter, Dean of the Graduate School from 1952 to 1969, this fellowship provides stipend supplements to assist in recruiting exceptional graduate students. Currently enrolled graduate students are not eligible, except when entering a Ph.D. (or other terminal degree) program. Stipend supplements are $2000 to $4000 per year for up to three years. Continuing the Grinter Fellowship beyond the first year depends on satisfactory student progress. Students in the Colleges of Engineering and Law are not eligible for this award.

For further details, please contact the appropriate major academic unit.

Title VI: Foreign Language and Area Studies Fellowship

Title VI fellowships are available to graduate students whose academic programs are Latin America, Africa, or Europe oriented.

Applicants must be U.S. citizens or permanent residents and must be registered for a full-time course load including a language relevant to the area of their choice: specifically, Portuguese or Haitian Creole for recipients through the Center for Latin American Studies; Akan, Amharic, Arabic, Swahili, Wolof, Yoruba, Zulu or other African languages for which appropriate instruction can be arranged, for recipients through the Center for African Studies; and Czech, Greek (modern), Hungarian, Italian, Polish, Portuguese, Russian, Turkish, or other lesser and least commonly taught European languages for which appropriate instruction can be arranged for recipients through the Center for European Studies. Academic year and summer fellowship programs have separate application processes.

For more information, contact:

- Center for Latin American Studies
  (319 Grinter Hall, http://www.latam.ufl.edu);
- Center for African Studies
  (427 Grinter Hall, http://www.africa.ufl.edu); or
- Center for European Studies

Office of Student Veteran Services and Social Security Administration Benefits Information

Veterans Benefits

For information regarding veteran education benefits please visit the UF Student Veterans Services (http://veterans.ufl.edu/). For further GI Bill information, please visit http://www.benefits.va.gov/gibill/.

Social Security Benefits

Inquiries related to Social Security benefits should be directed to the student’s local Social Security Office. The Office of the University Registrar will complete enrollment certificates issued by the Social Security Administration for students eligible to receive educational benefits. A full-time graduate load is nine hours.

External Fellowships for Graduate Students

For information on external fellowships, small grants, and other funding opportunities:
http://research.ufl.edu/faculty-and-staff/funding-funding/external-funding-opportunity-resources.html (http://graduateschool.ufl.edu/prospective-students/funding/dissertation/graduate-school-doctoral-dissertation-award/)

The COS/Pivot Funding Opportunities database and the GrantForward Database are keyword searchable and highly recommended as information resources
http://guides.uflib.ufl.edu/content.php?pid=215478&sid=1953084

The Graduate School posts information concerning external funding opportunities at

**Graduate School Support Programs**

**Dissertation Completion Assistance**

**Graduate School Dissertation Awards:** The Graduate School Dissertation Award is a competitive award created to provide final term funding for UF Ph.D. candidates in selected majors in the humanities, arts, and social sciences to complete their dissertations through defense, final clearance by the Editorial Office, and graduation. This program is for students who have exhausted all funding and is meant to allow recipients the time and resources to focus exclusively on completing their dissertation by the end of the award period.

The program provides a stipend for approximately four to six months. The award periods will be:

1. **Summer C** plus Fall,
2. Fall,
3. Spring, or
4. Spring plus **Summer C**.

Up to 5 credits of tuition at the in-state rate will be provided depending on the award period. Students are expected to graduate at the end of the award period. While under this award, applicants may not receive a fellowship, assistantship, or other funding with this award.

The application and deadlines are posted on the website: http://graduateschool.ufl.edu/prospective-students/funding/dissertation/.

**Graduate School Doctoral Research Travel Awards:** The Graduate School Doctoral Research Travel Award provides support for research-related travel expenses for UF Ph.D. students in the humanities, arts, and social sciences. This program is for students who have inadequate departmental funding to effectively conduct doctoral dissertation research away from UF.

Students selected for the Graduate School Doctoral Research Travel Award can receive up to $6,000 for doctoral research-related travel for one semester—Fall, Spring, or Summer C. A limited number of awards will be available each semester depending on the level of available funding.

For more information and application process and deadlines, see website: http://graduateschool.ufl.edu/prospective-students/funding/travel/graduate-school-doctoral-research-travel-award/.

**Supplemental Retention Scholarship Award:** This award assists doctoral students in completing their degrees by providing tuition support at the in-state level and involves their participation in Graduate School-sponsored workshops. Students within three semesters of completing their Ph.D., who no longer have funding available through an assistantship or fellowship, are eligible to receive limited tuition assistance for the remaining semesters. The tuition assistance is not given in the form of cash, employment, tuition, or fee waiver; it is paid directly to Student Financial Services as a scholarship.

Applications may be obtained at: http://graduateschool.ufl.edu/prospective-students/funding/dissertation/graduate-school-doctoral-dissertation-award/ (http://graduateschool.ufl.edu/prospective-students/funding/dissertation/graduate-school-doctoral-dissertation-award/).

**Office of Graduate Diversity Initiatives (OGDI) Student Support**

The following fellowships and programs are administered by the Graduate School’s Office of Graduate Diversity Initiatives (OGDI) http://graduateschool.ufl.edu/about-us/offices/division-of-graduate-student-affairs-dgsa/graduate-diversity-initiatives-ogdi/ (http://graduateschool.ufl.edu/about-us/offices/division-of-graduate-student-affairs-dgsa/graduate-diversity-initiatives-ogdi/)

**Mailing address:**
121 Grinter P.O. Box 115500
Gainesville, FL 32611
Phone: (352) 392-6444, (800) 753-9798
Email: ogdi@ufl.edu

**Florida Board of Education (BOE) Summer Program:** BOE is held during Summer B and is an orientation program for ethnic/cultural minorities, first-generation college students, students from a low socio-economic background, and students who are underrepresented in various academic disciplines. This program provides opportunities for newly admitted Ph.D. students to build support networks and become acclimated to UF and the Gainesville community. Participants receive a $3,500 stipend, health insurance, and payment of four credits for Summer B. Students who meet the criteria for eligibility and who have been admitted to a UF graduate program are invited to apply online at: http://graduateschool.ufl.edu/about-us/offices/division-of-graduate-student-affairs-dgsa/graduate-diversity-initiatives-ogdi/ogdi-programs/board-of-education-boe-summer-fellowship/

**Florida A&M University (FAMU) Feeder Program:** UF is one of over 40 universities in the FAMU Feeder Program aimed at increasing the number of FAMU students in graduate programs. FAMU administrators nominate students with at least a 3.0 GPA to participating feeder institutions for admission into their graduate programs. OGDI is UF’s main contact for the feeder program. UF offers five fellowships every year to qualified FAMU Feeder students who have been admitted to a Ph.D. program. Each fellow receives a base annual stipend of $25,251.48 in-state tuition, and health insurance for up to three years. For more information, please visit: http://graduateschool.ufl.edu/prospective-students/funding/fellowships/famu-feeder-program/

**McKnight Doctoral Fellowship Program:** The Florida Education Fund (FEF) awards McKnight Doctoral Fellowships (MDF) to African American and Hispanic students who are U.S. citizens and newly admitted into Ph.D. programs at a Florida institution. Students must submit an application for the McKnight Doctoral Fellowship to FEF by January 15. Awardees are selected from students who are newly admitted to Ph.D. programs and who have submitted a complete application to FEF. The McKnight Doctoral Fellowship at UF provides a base annual salary of $25,251.48, in-state tuition, fees, and health insurance for up to five years, provided there is satisfactory progress toward completing the degree. To apply for the McKnight Doctoral Fellowship, students should contact FEF for applications and more information and visit the MDF website: http://www.fefonline.org/mdf.html

Application deadline: January 15

Florida Education Fund
201 East Kennedy Blvd.
Suite 1525
Tampa, FL 33602
University of Florida/Santa Fe College Faculty Development Project: This partnership initiative allows UF doctoral students to teach as adjunct professors at Santa Fe College. Participants teach two courses per year at SFC and help SFC administrators recruit and retain underrepresented students. The program provides a $15,000 stipend, in-state tuition, fees, and health insurance for fall and spring semesters only. Students are selected for participation based on the academic and personnel needs of Santa Fe College. Faculty Development Project applicants must be from a minority/underrepresented group, and hold a master's degree or 18 credit hours of graduate level credit in one of the approved disciplines. For additional information: http://graduateschool.ufl.edu/prospective-students/funding/other/ufsanta-fe-college-faculty-development-project/

National Consortium for Graduate Degrees in Engineering and Sciences, Inc. (GEM) Fellowship: This fellowship program supports African American, Native American, and Hispanic students in pursuing the Master of Science degree in engineering and the Doctor of Philosophy degree in engineering and/or science disciplines. The GEM Fellowship Program provides funding for under-represented minority students at the master’s and Ph.D. level through fellowships and paid summer internships. The GEM Consortium assists in the matching of industry with students for paid internships. Students matched for a paid internship are eligible to receive a stipend for both masters and doctoral fellowship recipients. Each M.S. applicant must be a junior, senior, or graduate of an engineering program with at least a 3.0 GPA. Each Ph.D. applicant must be a junior, senior, or graduate of an engineering program with at least a 3.0 GPA. For additional information: http://www.gemfellowship.org or call (703) 562-3646

Delores Auzenne Dissertation Award: The Delores Auzenne Dissertation Award is a competitively awarded program for underrepresented Ph.D. students in the advanced writing stages of their dissertation. While under this award, applicants may not receive a fellowship, assistantship, or other funding with this award. The award provides for half a year (Spring semester and the following Summer C or Summer C and the following Fall semester) of support, which includes in-state tuition assistance of up to three hours of in-state dissertation credit hours, and up to a $12,000 stipend. This award does not provide health insurance coverage. Recipients may only receive this award once. The application deadlines are in April and November each year. Students must adhere to the following application guidelines to qualify for full consideration: Awardees will be expected to participate in at least two Professional Development Programs organized by the Graduate School, and provide regular updates of their writing progress. For more information: http://www.graduateschool.ufl.edu/prospective-students/funding/dissertation/delores-auzenne-dissertation-award/ (http://www.graduateschool.ufl.edu/prospective-students/funding/dissertation/delores-auzenne-dissertation-award/)

Ronald E. McNair Graduate Assistantship Program: UF provides a limited number of research assistantships for newly enrolled McNair scholars who are entering a UF Ph.D. program. The program provides a base stipend of $25,251.48, in-state tuition, fees, and health insurance for up to 5 years for a Ph.D. or up to 3 years for an MFA degree. Currently enrolled doctoral students are not eligible for this program. Interested students who meet the eligibility requirements are invited to apply. For more information: http://www.graduateschool.ufl.edu/prospective-students/funding/graduate-assistantships/lauf-grad-student-afairs-dgsa/graduate-diversity-initiatives-ogdi/ 

Bridge to the Doctorate Fellowship: The Bridge to the Doctorate (BD) Grant is awarded to UF by the National Science Foundation through the Florida-Georgia Louis Stokes Alliance for Minority Participation (FG-LSAMP) to enhance recruitment and retention of underrepresented minority students in Science, Technology, Engineering and Mathematics (STEM) disciplines. The BD program provides stipends of up to $32,000 per year for the first two years of doctoral studies for former LSAMP students who are entering Ph.D. programs after completing baccalaureate degrees. In addition, the grant provides funds for in-state tuition, fees and health insurance.

For additional information about any of the above offerings, you may contact the OGDI office at 121 Grinter P.O. Box 115500 Gainesville, FL 32611 Phone: (352) 392-6444, (800) 753-9798 Website (http://www.graduateschool.ufl.edu/about-us/offices/division-of-graduate-student-affairs-dgsa/graduate-diversity-initiatives-ogdi/)

Office for Student Financial Affairs
Financial aid is available to qualified graduate students through the Office for Student Financial Affairs (SFA) in S107 Criser Hall, mainly through work or loan programs.

Applying for financial aid at UF, including loans, begins with the FAFSA, the Free Application for Federal Student Aid. Apply on or soon after October 1, 2018 for the 2019-20 FAFSA. UF’s “On-Time” deadline to receive the results of your 2019-20 FAFSA from the federal processor is December 15, 2018. Apply well before December 15 to ensure that the federal processor has time to analyze and send the results of your 2019-20 FAFSA to UF SFA.

Apply as early as possible to be considered for the most, and best aid. Students should not forget to reapply each year. Financial aid is not renewed automatically.

Although you must be accepted for enrollment at UF before you receive financial aid, you should apply for aid before being admitted. More information on financial aid can be found at http://www.sfa.ufl.edu/. 

Loans
UF participates in the Federal Direct Loan Program. There are other loan programs available including UF Long Term Loans, UF Short Term Loans and Alternative Loans. Your eligibility is based on your classification, enrollment status, cost of attendance, and a number of other factors.

Short-term loans: UF has Short-Term Loans (STL) available to students enrolled at least half-time to help meet temporary, emergency financial needs related to educational expenses. Registered students with valid repayment sources may borrow up to $1,000 if tuition is paid or deferred, or the amount of their in-state tuition. Interest is computed monthly at the rate of 1% on the unpaid balance from the date the loan is disbursed. A minimum of one month's interest will be charged if the loan is paid in full within 30 days. Short-Term Loans must be repaid either when the
repayment source is received, or by the established repayment deadline for the semester in which the loan was received, whichever comes first.

For more information regarding specific loan programs, please visit SFA’s loan page at http://www.sfa.ufl.edu/types-of-aid/loans/.

**Part-Time Employment**

UF offers part-time student jobs through three employment programs: Federal Work-Study jobs, including the Federal Community Service component; Other Personnel Services (STAS); and off-campus jobs.

Federal Work-Study jobs are based on financial need. To apply for Federal Work-Study jobs, students must complete a FAFSA. STAS jobs are not based on financial need.

To search and apply for on-campus jobs, including all Federal Work-Study (FWS), Federal Community Service, and STAS positions, go to GatorJobs (https://jobs.ufl.edu/). Choose “Search Postings.” For “Job Type,” choose “Student.”


For more information and how to apply: http://www.sfa.ufl.edu/types-of-aid/employment/.

**Satisfactory Academic Progress Policy for Financial Aid Recipients**

Students receiving financial aid must be making satisfactory academic progress under UF’s published standards. UF’s financial aid Satisfactory Academic Progress policy is available on the Office for Student Financial Affairs (SFA) website at http://www.sfa.ufl.edu/process/additional-information/satisfactory-academic-progress-policy/.
The information in this catalog is current as of July 2020. Please contact individual units for any additional information or changes.

Gator 1 Card (http://catalog.ufl.edu/graduate/resources-available-students/), Office of the University Ombuds (http://catalog.ufl.edu/graduate/resources-available-students/), and Workshops for Teaching Assistants information (http://catalog.ufl.edu/graduate/resources-available-students/) can be found by visiting the Resources section of this catalog. (https://ufl-preview.courseleaf.com/graduate/resources/)

Career Connections Center
The Career Connections Center has award-winning services to help graduate students identify their interests that will guide them into professional opportunities beyond graduation.

The center prepares graduate students for their next steps by helping them:

- Assess interests, values and skills to explore a career path
- Polish CVs and statements
- Make meaning of experiences including research and teaching

The Career Connections Center also hosts several career fairs, attracting recruiters from hundreds of organizations to network with students about full-time positions.

Located on the first level of the Reitz Union, the office welcomes walk-in students from 9 a.m. - 4 p.m. daily on weekdays. For more information, please visit, career.ufl.edu (http://career.ufl.edu/graduate/)

Graduate International Outreach
The Office of Graduate International Outreach (OGIO) in the UF Graduate School serves as a catalyst for collaboration with regard to international outreach, recruitment, and student success within the university community. The office is a resource for information on international outreach opportunities and leverages existing structures and initiatives to advance international outreach and increase graduate student success. The OGIO also builds cooperative resources with partner units and offices within and outside UF to enhance international outreach/recruitment efforts at UF.

Graduate Diversity Initiatives
The Office of Graduate Diversity Initiatives (OGDI), within the Division of Graduate Student Affairs of the Graduate School, is a dedicated resource for underrepresented graduate students. OGDI provides graduate students with programs and services to assist and support the pursuit of a successful graduate education. OGDI provides students with social, informational, referral, and financial support. OGDI maintains partnerships across campus to assist and promote graduate education. OGDI hosts a variety of programs and activities as a part of its recruitment support, and degree completion initiatives.

Recruitment
OGDI assists colleges and academic units in recruiting underrepresented graduate students. OGDI coordinates several funding opportunities for incoming doctoral students. These include: Florida A&M University (FAMU) Feeder Program, McKnight Doctoral Fellowships, McNair Graduate Assistance Program and the NSF Florida-Georgia Louis Stokes Alliance for Minority Participation Bridge to the Doctorate Program as well as diversity enhancement awards.

In collaboration with the UF Career Connections Center, OGDI conducts UF’s annual Gator Graduate Programs Fair and Graduate Education Week. Additionally, OGDI represents the university at a variety of national and regional conferences, as well as visiting and seeking to establish relationships with institutions to attract prospective underrepresented students.

Support
OGDI conducts the Florida Board of Education (BOE) Summer Fellowship Program to assist entering underrepresented doctoral students to become more quickly acclimated to the university setting. OGDI supports social activities to facilitate student socialization and networking, and professional development activities such as dissertation and other writing groups are offered through OGDI.

Completion
OGDI coordinates several funding opportunities to assist underrepresented PhD students to successfully complete their programs. These opportunities include: the Supplemental Retention Scholarship Award, the Delores Auzenne Dissertation Award, and Doctoral Support Assistance. For additional information about the Office of Graduate Diversity Initiatives or any of its programs and funding opportunities, please visit OGDI’s website (http://graduateschool.ufl.edu/about-us/offices/division-of-graduate-student-affairs-dgsa/graduate-diversity-initiatives-ogdi/).
Graduate Professional Development

The Office of Graduate Professional Development (OGPD) in the Division of Graduate Student Affairs provides resources and opportunities for graduate students to gain information, insights, and skills they can use in academia and the job market. Currently, OGPD initiatives include:

- Professional Development Workshop series (fall/spring). These workshops are now offered as webinars to our online graduate students and cover topics such as effective time management, research strategies, preparing for examinations and final defenses, and publishing manuscripts. Video recordings of the previous workshops and webinars can be found in the Graduate Information Management System (GiMS).
- OGAP also works closely with the Organization for Graduate Student Advancement and Professional Development (OGAP), a graduate student organization that focuses on providing more opportunities for graduate students with respect to teaching, mentoring, and ethics. OGAP signature events include:
  - Graduate Student Research Day (GSRD) in the spring
  - Three Minute Thesis© in the fall
- Grants and Fellowship Conference (Spring) that provides information for both graduate and undergraduate students on funding options through grants and fellowships. This includes information regarding specific fellowships like the "National Science Foundation's Graduate Research Fellowship Program," "National Institute of Health Fellowships," "Fellowships and Grants for the Arts and Humanities," as well as more general information on "How to Find Funding Using Key Words and Proper Databases" and "How to Write a Proposal."

Announcements of these events, and deadlines for all award programs are made through the graduate student listserv.

For more information, visit the website at http://graduateschool.ufl.edu/about-us/offices/division-of-graduate-student-affairs-dgsa/graduate-diversity-initiatives-ogdi/ or email Bradley Osburn at bradjo88@ufl.edu.

Graduate School Editorial Office

With staff located in Grinter Hall, the Graduate School Editorial Office provides editorial assistance to UF’s graduate students completing the thesis or dissertation process. The Editorial Office provides information about format requirements (http://www.graduateschool.ufl.edu/media/graduate-school/pdf-files/Guide-for-ETDs.pdf) on the editorial page (http://graduateschool.ufl.edu/about-us/offices/editorial/) of the Graduate School website in order to help students prepare their manuscripts for submission to the Graduate School. The Editorial Office also helps to the Editorial Office. The Graduate School Editorial Office facilitates the thesis and dissertation process, by providing clear guidelines (http://www.graduateschool.ufl.edu/about-us/offices/editorial/format-requirements/) and checklists (http://www.graduateschool.ufl.edu/graduate-life/graduation/graduation-checklist/), and by outlining the procedures to follow when completing the thesis or dissertation. In order to complete degree requirements, all thesis and dissertation students must gain final clearance status with the Editorial Office by each of the posted deadlines (http://graduateschool.ufl.edu/about-us/offices/editorial/editorial-deadlines/) for the term in which they intend for the degree to be awarded.

The following procedures apply to the Graduate School's editorial services provided to graduate students:

- Upon submission to the Graduate School Editorial Office, a thesis or dissertation should be near-final and must be completely formatted. It will not be accepted as meeting first submission requirements in draft form.
- Additionally, master’s theses must be orally defended before making submission to the Graduate School Editorial Office. Accordingly, the Final Exam data must be posted to GIMS by the department, before the document can be submitted to the Editorial Office for review. Subsequently, a master’s student who does not defend the thesis prior to the first submission deadline will not be eligible for a degree award in the current term; nor is the student a clear-prior candidate to the following term, since they were unable to meet the first submission requirement.
- The thesis or dissertation must be of publishable quality and must be in a form suitable for publication, using the Graduate School’s format requirements (http://www.graduateschool.ufl.edu/about-us/offices/editorial/format-requirements/) found here and within the Guide for Preparing Theses and Dissertations (http://www.graduateschool.ufl.edu/media/graduate-school/pdf-files/Guide-for-ETDs.pdf).
- The student’s department is responsible for academic merit, quality, and scholarship.
- Graduate Council requires the Graduate School Editorial Office, as agents of the Dean of the Graduate School, to briefly review theses and dissertations for acceptable format, and to make recommendations as needed.

Located in the Hub, the Application Support Center (http://helpdesk.ufl.edu/application-support-center/), although not a part of the Graduate School Editorial Office, provides assistance to students seeking help with the guidelines of the Editorial Office free of charge. Their services are invaluable to students concerned about meeting the submission standards of the Editorial Office. Students should avail themselves of these services long before making first submission to the Graduate School. Appointments are encouraged, particularly well in advance of deadlines, because seats are extremely limited.

The Graduate School Editorial Office maintains a list of formatters, editors, and binders that students may hire for a fee, if needed; however, the Application Support Center (http://helpdesk.ufl.edu/application-support-center/) also offers many formatting and conversion services at reasonable rates as well.

- Checklist for master’s theses:
  - graduateschool.ufl.edu/editorial/checklists/thesis
- Checklist for doctoral dissertations:
  - graduateschool.ufl.edu/editorial/checklists/dissertation
- Graduate School Editorial Office:
  - graduateschool.ufl.edu/graduation/thesis-and-dissertation
- Format requirements:
  - graduateschool.ufl.edu/about-us/offices/editorial/format-requirements
- Format examples:
  - graduateschool.ufl.edu/about-us/offices/editorial/format-requirements

For more information, contact:

Graduate School Editorial Office
Contracting these illnesses can have an adverse effect on a student's health, well-being and ability to reach optimal academic performance. Students shall be required to show documentation of specific vaccinations or proof of immunity for Measles/Mumps/Rubella (MMR), Hepatitis B, and Meningitis. Please note that international students and those entering most academic health professions may have additional requirements including tuberculosis screening. Find the immunization form and instructions online at: http://healthcompliance.shcc.ufl.edu/immunizations/

Insurance: The University follows an Opt Out system where students who don’t opt out by providing documentation of adequate health insurance will be automatically enrolled in the school-sponsored plan. They may either purchase outside health insurance that meets the requirements for comparable coverage or they can be auto-enrolled in the school-sponsored Student Health Insurance Plan.

If a student currently has insurance, they will be required to review their insurance coverage and check that it meets the requirements set forth as comparable coverage. They will then need to submit a waiver with their policy information for verification by the end of drop/add but ideally much earlier. The charge for the school-sponsored Student Health Insurance Plan will be removed once submission is completed and verified. Once verified, the waiver is good for one year. All this can be done online at http://healthcompliance.shcc.ufl.edu/insurance/waiver/

Still have questions? You can contact the health compliance office for further assistance: healthcompliance@shcc.ufl.edu or (352) 294-2925.

University of Florida & UF Health Speech and Hearing Center

Student Health Care Center
Building a Healthy Foundation for The Gator Nation

The Student Health Care Center (SHCC) is an accredited outpatient clinic offering a wide variety of student-focused services, including: Primary Care (Illness & Injury Care); Allergy Shots & Immunizations (seasonal flu shots, vaccinations for travel, etc.); Gynecological Services; LGBTQ+ Care; Sports Medicine Clinic; Sexual Health services (STD/STI Testing, GYT Clinic) and Nutrition Services. Additionally, SHCC has in-house Pharmacy, Lab, X-ray & EKG services.

Students are encouraged to review basic information about scheduling an appointment with SHCC by visiting http://shcc.ufl.edu/newstudents/. Call FIRST before coming for same-day appointment availability (main phone: 352-392-1161), or request an appointment more than 24 hours prior through your MyUFHealth portal at mychart.shands.org (http://mychart.shands.org) (for established patients). PLEASE NOTE: To avoid a no-show fee, call your primary care team or specialty clinic directly to cancel at least 24 hours before your scheduled appointment.

The health fee, paid as part of tuition, helps pay for basic evaluations, but does not cover all possible charges at the SHCC. Patients are financially responsible for items including, but not limited to: physicals; procedures; X-rays; lab tests; medications; medical equipment; and physical therapy. Private health insurance plans are accepted for payment of covered services, so be sure to bring all health insurance information to your first appointment. For more information about charges, billing and health insurance, please visit http://shcc.ufl.edu/fees-and-insurance (http://shcc.ufl.edu/fees-and-insurance/).

About Health Compliance

Students must comply with the University’s immunization and health insurance requirements. More information and submission instructions about both of these prerequisites can be found at: http://healthcompliance.shcc.ufl.edu/.

Immunizations: Vaccine-preventable diseases do still exist and contracting these illnesses can have an adverse effect on a student's health, well-being and ability to reach optimal academic performance. Students shall be required to show documentation of specific vaccinations or proof of immunity for Measles/Mumps/Rubella (MMR), Hepatitis B, and Meningitis. Please note that international students and those entering most academic health professions may have additional requirements including tuberculosis screening. Find the immunization form and instructions online at: http://healthcompliance.shcc.ufl.edu/immunizations/

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Still have questions? You can contact the health compliance office for further assistance: healthcompliance@shcc.ufl.edu or (352) 294-2925.

University of Florida & UF Health Speech and Hearing Center

University Writing Studio

The Writing Studio is part of the University Writing Program, located in 302 Tigert Hall. The Studio’s graduate student tutors provide one-on-one writing help for both undergraduate and graduate students. In 30-minute sessions, the Studio advises students on papers written for graduate school classes and theses or dissertations. The Studio also provides help with application essays and personal statements for graduate school applications. Students can make appointments—for daytime sessions in Tigert or evening sessions in Library West—at www.writing.ufl.edu (http://www.writing.ufl.edu). Phone: (352) 846-1138.
CENTERS, INSTITUTES, AND OTHER RESEARCH FACILITIES

The information in this catalog is current as of July 2020. Please contact individual programs for any additional information or changes.

The University of Florida has approximately 180 approved Centers and Institutes (http://www.ir.ufl.edu/centers/Active_Centers.pdf) that have been established over the years to enhance the university's teaching and research functions by facilitating interdisciplinary cooperation and providing campus research instrumentation facilities and services. Ten of these centers and institutes with campus-wide missions report to the Vice President for Research: http://www.research.ufl.edu/or/about/centers-and-institutes.html. (http://www.research.ufl.edu/or/about/centers-and-institutes.html)

For more information, visit http://centers.ufl.edu/ and http://institutes.ufl.edu/ to contact the centers (http://centers.ufl.edu/) or institutes (http://institutes.ufl.edu/) directly.
RESOURCES AVAILABLE TO GRADUATE STUDENTS

The information in this catalog is current as of July 2020. Please contact individual programs for any additional information or changes.

Additional Centers, Institutes, and Other Research Facilities

Career Resource Center (p. 38), Student Health Care Center (p. 38), and University Writing Studio (p. 38) information may be found by visiting the Student Services (p. 38) section of this catalog.

University Galleries

University Galleries is comprised of three art galleries that play an integral role in the cultural life of the University of Florida and the entire greater Gainesville community. Housed in the College of the Arts at the University of Florida, and in association with the School of Art + Art History, the University Galleries bring together town and gown.

University Gallery, located at the intersection of SW 13th Street and SW 4th Avenue, just south of Tigert Hall, presents primarily contemporary exhibitions that rotate every two to eight weeks. For the past 16 years University Gallery has collaborated with myriad UF colleges, community and regional entities in creating a trans-disciplinary venue for visual arts. Exhibitions feature nationally and internationally known artists in fall, a bi-annual studio art faculty exhibition, juried student art show MFA graduating thesis project shows in the spring. The 3,000 square foot space is a lively, exciting and beautiful venue that is utilized for many interesting events throughout the academic year.

University Gallery is open Tuesdays, Wednesdays and Fridays 10 am–6 pm; Thursdays 10 am–7 pm; and Saturdays 12–4 pm.

The gallery is closed Mondays, Sundays and academic holidays.

arts.ufl.edu/galleries (http://arts.ufl.edu/galleries/)
(352) 273-3000

UFIT Computer Labs

Services available to graduate students from the UF Computing Help Desk include electronic thesis and dissertation computing support, phone and walk-in application support, technical & mobile device consulting, email and Wi-Fi support, software distribution (including statistical software) and GatorLink account help.

UFIT also provides computer classrooms are available for personal and academic use. They are equipped with both Windows and Macintosh computers, laser printers, plotters, scanners, and a wide variety of software. Students can find a complete list of each lab’s hours, services, and software available for use at https://labs.at.ufl.edu/.

Instructors and Teaching Assistants may use the online, e-Learning course management system, e-Learning in Canvas, to provide online course tools such as syllabus, content and secure grade posting. Instructors may reserve a computer classroom or multimedia lecture classroom for class sessions.

For more information about these, other UFIT services, and contact information, please see our site: https://it.ufl.edu (https://it.ufl.edu/)

Field and Fork

The Field and Fork Campus Food Program is a university-wide collaboration to provide experiential learning opportunities in sustainable agriculture and food systems, and offer spaces at UF where individuals can take courses, engage with demonstrations, and participate in activities focusing on sustainable agriculture and food systems at multiple scales from a home, community garden, or small/urban farm to large-scale production. An interdisciplinary program housed within UF/IFAS College of Agricultural and Life Sciences, it runs the on-campus farm and provides healthy food for those in need through the Alan and Cathy Hitchcock Pantry.

- The Pantry
  The Alan and Cathy Hitchcock Pantry is intended to assist members of our campus community who experience food insecurity. We will not ask guests of The Pantry to verify income or need. We will trust that guests will use The Pantry only when they have a need to use the service. We recognize that some people who use The Pantry will have a chronic need for food while others may only have a temporary need that may not be reflected in a financial statement of need.

- The Farm and Gardens
  The Teaching Farm hosts a variety of productions systems that can be used for experiential learning. From Art and History to Engineering and Agronomy, the farm is designed to allow for all disciplines to be able to explore and experience food systems concepts and sustainable agriculture in practice. At the farm and gardens, volunteers and interns work together to manage the space and to provide food for themselves, as well as to donate food to the Alan and Cathy Hitchcock Pantry and local charities. This space also offers demonstrations that showcase world cultures and their relationships to plants, home gardening, and the link between agriculture and natural resources. The Gardens can also be used for classes, tours, and events.

Contact
aprizzia@ufl.edu; (352) 294-1780
The Pantry is located at 564 Newell Drive, adjacent to McCarty and the Food Science and Human Nutrition buildings. The Farm and Gardens are located on Museum Drive, next to the Bat Houses and across from Lake Alice.
fieldandfork@ufl.edu

Florida Museum of Natural History

The Florida Museum of Natural History was created by the Legislature in 1917 as a department of the University of Florida. Through its affiliation with the University, it carries dual responsibility as the official State Museum of Florida and as the University museum. The public education and exhibits division of the Museum is in Powell Hall, on Hull Road at the western edge of campus, situated between the Harn Museum of Art and the Phillips Center for the Performing Arts. Powell Hall is devoted exclusively to permanent and traveling exhibits, educational and public programs, special events, and includes the “Butterfly Rainforest.” It is staffed by specialists in interpreting natural history through exhibits and educational programs. Consult the website for hours and admission fees (https://www.floridamuseum.ufl.edu). The Museum also operates as a center of research in anthropology and natural science. The research and collections division is in Dickinson Hall, at the corner of Museum Road and Newell Drive. This building is not open to the public. The Department of Natural History houses the state's natural history collections and is staffed by scientists and support personnel concerned with the study of modern and fossil plants and animals and historic and prehistoric
people and their cultures. Scientific and educational faculty curators hold appointments in appropriate UF academic units. Through these appointments, they participate in both undergraduate and graduate teaching programs. The Museum’s McGuire Center for Lepidoptera and Biodiversity opened in 2004. This world-class facility features a 46,000-square-foot Lepidoptera center housing one of the world’s largest and most comprehensive Lepidoptera collections, and state-of-the-art research facilities for their study. It also contains dynamic public exhibitions and a live “Butterfly Rainforest” exhibit with a walking trail, educational exhibits and hundreds of living butterflies.

The Randell Research Center at the Pineland archaeological site near Fort Myers, Florida, is dedicated to learning and teaching the archaeology, history and ecology of Southwest Florida.

The Herbarium at UF is also a division of the Museum. It contains specimens of vascular and nonvascular plants. The research collections are in the care of curators who encourage scientific study of the Museum’s holdings. Materials are constantly being added to the collections both through gifts from friends and as a result of research activities by Museum staff. The archaeological and ethnographic collections are noteworthy, particularly in the aboriginal and Spanish colonial material remains from the southeastern United States and the Caribbean. There are extensive study collections of birds, mammals, mollusks, reptiles, amphibians, fish, invertebrate and vertebrate fossils, plant fossils, tissue and genetic material, and a bioacoustic archive of original recordings of animal sounds. Opportunities are provided for students, staff and visiting scientists to use the collections. Research and field work are presently sponsored in the archaeological, paleontological and zoological fields.

Students interested in these specialties should apply to the appropriate academic units. Graduate assistantships are available in the Museum in areas emphasized in its research programs.

Gator 1 Card
The Gator 1 Card is the official photo ID of the University of Florida. A valid Gator 1 Card must be presented to transact business at the University Bursar, ride the RTS buses for free, secure athletic event tickets, and check out materials at the University Libraries.

Students can link their Gator 1 Card to a number of vital campus accounts for those who would like to access their meal plans, purchase snacks on campus, or buy books at the UF Bookstore. Staff can even link to their Wells Fargo Checking account and use their Gator 1 Card as an ATM card.

Students, faculty, staff, retirees and spouses/domestic partners of UF students, faculty and staff, can purchase their Gator 1 Card for $15.00 at any of the three Gator 1 Central Office locations. Payment can be made with cash, check, or a credit card.

http://gator1.ufl.edu
Gator1Central@bsd.ufl.edu
(352) 392-8343

Graduate Student Email Listserv and GIMS
The Graduate School communicates directly with enrolled graduate students via email using UF business email addresses — as a norm, the student’s GatorLink account. Students must establish a GatorLink account and must check it regularly. Students can set up their required GatorLink accounts online at this website: http://www.gatorlink.ufl.edu. The Graduate School cannot maintain personal email addresses.

The UF business email addresses of all currently enrolled graduate students are automatically added to the Graduate School’s Graduate Student listserv. A student cannot opt out of receiving these messages. Messages contain time-sensitive information about important deadlines. An archive of messages is online at http://lists.ufl.edu/archives/gradstudent-l.html.

The Graduate Information Management System (GIMS) (https://gradschool.ufl.edu/gimsportal/gatorlink/portal.asp) has information about important milestones, grants and fellowships, workshops, and many other pertinent items relevant to graduate education. Students must check GIMS on a regular basis.

Graduate Student Handbook
The Graduate School provides additional information in the online Graduate Student Handbook: http://gradschool.ufl.edu/media/graduate-school/pdf-files/handbook.pdf

Housing
Graduate students and their families are housed in graduate and family housing villages. All applicants must apply to the University and have a UF ID number. Due to limited space, all students are not guaranteed on campus housing.

For information, go to the Housing website, https://www.housing.ufl.edu/housing/.

To be eligible for Graduate and Family housing, all residents must make normal progress toward a degree in consultation with academic departments and Graduate and Family Housing policies. Please inquire at villages@housing.ufl.edu for more information about general eligibility and/or eligibility as it relates to academic status.

Applying for Housing
Each student must make personal arrangements for housing, either by applying to the Department of Housing and Residence Education for assignment to University housing facilities or by obtaining accommodations off campus.

For application information and to submit an application for campus housing: https://www.housing.ufl.edu/living-options/apply/graduate-family-housing/

For off-campus housing information: http://www.offcampus.ufl.edu/

Graduate and Family Housing
Village apartments are unfurnished. Residents in all villages must provide their own linens, dishes, rugs, curtains, or other similar items. Electricity is an additional expense and is billed with the rent. For questions about Graduate and Family Housing, please email villages@housing.ufl.edu, or call 352.392.2161.

The Continuum is UF affiliated off-campus Housing. To qualify for residency, Continuum residents must be matriculated, full-time or part-time (or equivalent) students enrolled in a graduate or professional school or a faculty or staff member at UF.
Additional information about all Graduate and Family Housing facilities is available at the following website:
https://www.housing.ufl.edu/housing/

**Off Campus Life**

Off Campus Life is a UF office that provides resources, services, education and support for students living off-campus.

Off Campus Life resources & services include:

- **Off Campus Housing Locator**: http://housing.offcampus.ufl.edu this online service allows students to search for apartments, post and search for subleases, and search for roommates.
- **Gator Guide to Off Campus Life**: www.offcampus.ufl.edu/gator_guide (http://www.offcampus.ufl.edu/gator_guide/) the Gator Guide includes everything you need to know about living off-campus including tips for finding off-campus housing, average rental costs, lease information, safety information, transportation information and much more.
- **Individual Meetings**: www.offcampus.ufl.edu/appointments (http://www.offcampus.ufl.edu/appointments/) Off Campus Life also provides one-on-one meetings for students searching for off-campus housing.

To schedule an appointment or for questions:

- visit the OCL website www.offcampus.ufl.edu (http://www.offcampus.ufl.edu)
- complete the appointment request form www.offcampus.ufl.edu/appointments (http://www.offcampus.ufl.edu/appointments/)
- call Off Campus Life at (352) 392-1207
- visit the Off Campus Life office located inside the Housing Office at 1304 Diamond Road, Bldg. 753.

Off Campus Life also hosts monthly events for students, to learn more visit OCL's social media pages.

Like OCL on Facebook: www.facebook.com/UFOffCampusLife (http://www.facebook.com/UFOffCampusLife/)

Follow OCL on Twitter:
https://twitter.com/UFOffCampusLife (https://twitter.com/UFOffCampusLife/)

Follow OCL on Instagram:
www.instagram.com/ufoffcampuslife (http://www.instagram.com/ufoffcampuslife/)

**Libraries**

The libraries of the University of Florida (UF Libraries) form the largest information resource system in the state of Florida and include seven libraries. Six are in the system known as the George A. Smathers Libraries (http://cms.uflib.ufl.edu/), and one (the Lawton Chiles Legal Information Center (https://www.law.ufl.edu/library/)) is part of the College of Law. The University of Florida Gator1 card provides access to library services at all libraries.

All of the libraries serve the entire community, but each has a special mission to be the primary support of specific colleges, degree programs and research initiatives. Because of the interdisciplinary nature of research, scholars may find collections held in one library to serve a specific discipline or constituency to be of great importance to their own research in a different field.

The Smathers Libraries home page offers a wealth of information about the libraries and links to a vast array of resources. Print and electronic collections can be accessed through the library catalog (https://uf.catalog.fcla.edu/uf.jsp?To=1) as well as through general and subject-specific databases (http://www.uflib.ufl.edu/databases.html). Library Guides (http://guides.uflib.ufl.edu/?b=s) are available by subject and topic to assist with the location and use of appropriate resources. Many online resources can be accessed both on and off campus. Print materials not available locally can be quickly located and borrowed through Interlibrary Loan (http://cms.uflib.ufl.edu/access/support/InterlibraryLoan/). Reference service is available in each library as well as via phone, email and chat (http://cms.uflib.ufl.edu/ask/). All of the libraries provide special services to help students and faculty with disabilities (http://www.uflib.ufl.edu/accessibility/).

The Libraries participate in UBorrow which allows users to request materials through the online library catalog directly from participating libraries in the State University System (SUS) and the Florida College System (FCS). If a book is unavailable in the University of Florida collection but is available elsewhere in the SUS or FCS, the UBorrow icon will appear on the library catalog search page. Clicking this link will take users to the statewide catalog, where they can provide their library credentials, and specify a pickup site. UBorrow loans usually arrive within a few days. This unmediated borrowing service creates a virtual statewide library of over 16 million items.

The Smathers Libraries’ hours (http://www.uflib.ufl.edu/ps/hours/) are at the top of the homepage. Hours differ for each library building.

Lactation Rooms are located in Library West (second floor), Marston Science Library (third floor) and the Education Library (first floor). The key can be requested at the Information Desk in each of these libraries. Gender Neutral/Family Restrooms are located in Library West (second floor), Marston Science Library (first floor) Smathers Library (second floor) and the Education Library (first floor).

Workstations in UF libraries provide access to the whole array of electronic resources and services, most of which can be accessed from a classroom, office, lab or any other on-campus location with access to the UF network as well. Licensing for library databases, e-journals and e-books restricts off-campus access (http://web.uflib.ufl.edu/ufproxy.html) to staff, students, and faculty. Instructions for remote access (http://www.uflib.ufl.edu/ufproxy.html) are available.

Library orientation programs (http://guides.uflib.ufl.edu/workshops/instruction/) are offered at the beginning of each term. In addition, instruction and liaison librarians will work with faculty and teaching assistants to develop and present course-specific library instruction sessions for their students. Subject specialists (http://apps.uflib.ufl.edu/staffdir/SubjectSpecialist.aspx), who work closely with faculty and graduate students to select materials for the collections, also advise graduate students and other researchers who need specialized bibliographic knowledge to define local and global information resources available to support specific research. The Academic Research & Consulting Services, known as ARCS (http://arcs.uflib.ufl.edu/), is comprised of functional specialists who offer unique expertise and services to support research activities in all disciplines, through data collection to dissemination of results to evaluation of outputs to archiving.
Library West houses most of the humanities and social science collections; professional collections in support of business, health and human performance, journalism and public relations; as well as the circulating collections for African Studies, Asian Studies, and the Isser and Rae Price Library of Judaica. Library West offers 200 public computers, a KIC Bookeye high speed scanner, 18 group study rooms and 39 individual graduate study carrels that are assigned for the academic year. Priority is given to those graduate students completing doctoral dissertations in the humanities or social sciences. An online application form (http://cms.uflib.ufl.edu/librarywest/studycarrels/) is available. In addition, the sixth floor of Library West is a study area reserved for graduate students. Access is provided after students register at the Circulation Desk.

Marston Science Library houses collections in agriculture, life sciences, engineering and physical sciences. The first floor Collaboration Commons includes a multipurpose conference room with a multi-touch visualization wall. It is also the location for the MADE@UF lab, a collaboration space created by the Libraries and Academic Technology to be used for creative activities such as mobile app development, and other “maker” initiatives including virtual and augmented reality. Marston offers more than 130 public computers, 24 study rooms, a KIC Bookeye high speed scanner, 3D printing services (including printers you can borrow), and both quiet and collaborative study spaces.

Health Science Center Libraries (HSCL) serve the academic, research and clinical information needs of the Colleges of Dentistry, Medicine, Nursing, Pharmacy, Public Health, Health Professions and Veterinary Medicine, as well as the affiliated research institutes, hospitals and clinics. The library in Gainesville is located in the Communicore. The Veterinary Medicine Education Center in the College of Veterinary Medicine Building, while not a branch library, is supported by the HSCL. The Gainesville location has 160 public computers, including 26 big screen monitors, 18 individual study and 14 group study rooms. A 24/7 space is available with preapproved Gator 1 card access. The Borland Library serves UF Health Jacksonville. The library has 24 public computers, a practice/ large group study room and 24 individual carrels. The HSCL was an early leader among health sciences libraries in providing liaison librarian services, is integrated into the curricula of the health science colleges and collaborates with faculty in the provision of instruction and on other projects. Librarians at the HSCL also provide clinical rounding, basic bioinformatics, data management support and systematic review services.

Smathers Library (formerly known as Library East) holds the Latin American and Caribbean Collection, the Map & Imagery Library and Special and Area Studies Collections, including rare books and manuscripts, the Baldwin Library of Historical Children’s Literature, P. K. Yonge Library of Florida History, and the University Archives (custodian of the University’s historically significant public records including the administrative files of its past presidents). It also is the location of the Grand Reading Room (the original library), the Judaica Suite (a beautiful multipurpose space that houses about 8,000 rare and non-circulating books from the Price Library of Judaica), and the Panama Canal Gallery.

Architecture & Fine Arts Library, located on the second floor in Fine Arts Building A, holds research materials in architecture, art, art history, historic preservation, interior design, landscape architecture, museum studies and music, with key resources for building construction and urban & regional planning. In addition to bound volumes (books, journals, musical scores), the library holds over 12,000 sound and video recordings. Special equipment available to users includes multi-format audio listening equipment, scanners for documents up to 18x24” and a 3D scanner. Tripods, small video cameras and digital projectors are available for checkout. The library’s mid-century interior, with its 20-ft high ceiling reading room and double-decker carrels is a popular destination for quiet study.

The Education Library, located in Norman Hall, holds education, child development, higher education, school psychology and school counseling collections. In addition to electronic and print research materials, there are other specialized collections such as the Children's and Young Adult Literature Collection and the K-12 Textbook Collection. The library has 44 public computers, seven group study rooms, 3D printing and a KIC Bookeye high speed scanner. A makerspace includes die cuts for students to create visual learning aids for K-12 education.

Lawton Chiles Legal Information Center holds resources for law and related social sciences with over $95,000 volumes and equivalents. It is named in honor of the former governor and senator and housed in a completely renovated facility. The Lawton Chiles Legal Information Center occupies the bottom three floors of Holland Hall with computer support on the top floor. The facility includes 13 student study rooms, a lactation/ meditation room, lounge seating, open reserve area, and carrels, as well as a beautiful rare book room.

UF Digital Collections (http://ufdc.ufl.edu/) (UFDC) comprise a constantly growing collection of digital resources from the University of Florida’s library collections, as well as partner institutions. The collection hosts more than 300 outstanding digital collections, containing nearly 14 million pages, covering over 78,000 subjects in rare books, manuscripts, antique maps, children’s literature, newspapers, theses and dissertations, data sets, photographs, oral histories and more, for permanent access and preservation. Among the preeminent collections in UFDC are the Florida Digital Newspaper Library (http://www.uflib.ufl.edu/fnp/) and the Digital Library of the Caribbean (http://www.dloc.com/) (dLOC).

Offsite Storage Facilities near the Gainesville Regional Airport offer an extensive collection of federal government documents as well as other low use books and journals. The 2.2 million items located in the facilities can be requested through the catalog.

Oak Ridge Associated Universities
Since 1948, UF students and faculty of the University of Florida have benefited from its membership in Oak Ridge Associated Universities (ORAU). ORAU is a consortium of 98 colleges and universities and a contractor of the U.S. Department of Energy in Oak Ridge, Tennessee. ORAU works with its member institutions to help their students and faculty gain access to federal research facilities throughout the country; to keep its members informed about opportunities for fellowship, scholarship, and research appointments; and to organize research alliances among its members.

Through the Oak Ridge Institute for Science and Education (ORISE), the DOE facility that ORAU operates, undergraduates, graduates, postgraduates, and faculty enjoy access to a multitude of opportunities for study and research. Students can participate in programs covering a wide variety of disciplines including business, earth sciences, epidemiology, engineering, physics, geological sciences, pharmacology, ocean sciences, biomedical sciences, nuclear chemistry, and mathematics. Appointment and program lengths range from 1 month to 4 years. Many of these programs aim to increase the number of underrepresented minority students pursuing degrees in science- and engineering-related disciplines. A comprehensive list of these programs and other opportunities, their disciplines, and details on locations and benefits can be found in the ORISE Catalog of Education and Training.
Office of Research

The University of Florida’s Office of Research facilitates and manages the university’s external research funding enterprise. The office provides many services for UF faculty, staff and students, from identifying a grant opportunity to managing proposals and awards and promoting intellectual property. The Division of Sponsored Programs facilitates institutional approval for all extramural proposal submissions, accepts and administers grant awards, and negotiates contracts and other research-related agreements on behalf of the University of Florida. The Division of Research Program Development identifies funding opportunities for faculty, manages internal funding programs and assists in planning and coordinating large, interdisciplinary research initiatives.

The Division of Research Compliance assists faculty, staff and students in conducting research in compliance with applicable research regulatory requirements and institutional policies. The goal of the Division of Research Compliance is to promote compliance while facilitating research. The Division of Research Operations and Services provides support that underpins the campus-wide services that are part of the Office of Research portfolio.

The University of Florida Research Foundation is a non-profit, direct-support organization that manages the university’s royalty and licensing enterprise. The Office of Technology Licensing (http://innovate.research.ufl.edu/tech-licensing/) handles patenting, marketing and licensing of intellectual property. OTL works closely with UF inventors in identifying and protecting new inventions. All patents, copyrights and trademarks are processed and managed by OTL, which also helps researchers develop confidentiality, mutual secrecy, and material transfer agreements.

The Office of Research provides funds for the Grinter Fellowship program. These fellowships are part of funding packages awarded by academic units to support recruitment of outstanding new graduate students. The Office of Research also supports individual graduate students by offering competitive travel grants and other types of awards. This office also provides an important centralized location for other internal and external funding opportunities by offering a host of resources at http://www.research.ufl.edu/research-program-development/internal-competitive-funding.html.

Ombuds

The Office of the University Ombuds was established by the state legislature and reports through the Provost to the President. The Office helps students resolve problems and conflicts. It offers an informal avenue of redress for students’ problems and grievances that arise in the course of interacting with the institution. By considering the problems in an unbiased way, the Ombuds works to achieve a fair resolution while protecting the rights of all involved parties.

Resolving student academic issues: The Office of the Ombuds deals with student concerns of an academic nature. In almost all instances, students should first contact the instructor, the academic unit chair, and the college dean before seeking help from the Ombuds, although in some rare circumstances earlier contact with the University Ombuds is beneficial.

Resolving student non-academic issues: In many instances, non-academic issues can be easily and readily resolved for students merely by facilitating direct communication and effective listening. For other problems not related to academic issues, the Offices of the Dean of Students and the University Ombuds may provide help or direct students to contact the appropriate campus office.

For more information, visit http://www.ombuds.ufl.edu.

Performing Arts Venues

University of Florida Performing Arts brings a diverse range of events to its venues each season, including theater, musicals, chamber, classical, dance, jazz, world performances and more. The 1,700-seat Phillips Center features computerized lighting and sound systems. Upstage performances feature both artist and audience seated on the Main Stage in a cabaret-style setting. The Squitieri Studio Theatre is used for experimental and more intimate productions, recitals and receptions. The historic University Auditorium seats 849 and provides a classic setting for concerts, spoken word engagements and lectures. The Baughman Center, a breathtaking pavilion on the shores of Lake Alice, is an inspirational setting for both contemplation and celebration.

UFPA offers discounted tickets (for most events) to students with a valid Gator 1 card. For more information about student tickets, please visit the website.

- For information about UFPA:
  Administrative offices
  Phone (352) 273-2457
- For event information or tickets:
  Phillips Center Box Office
  Phone (352) 392-ARTS
  Website http://www.performingarts.ufl.edu

University Press of Florida

The University Press of Florida is the official scholarly publishing agency of the State University System of Florida. The Press (just off campus, at 15 NW 15th Street) reports to the Provost of the University of Florida, who supervises the Press on behalf of the 11 state universities. The statewide Council of Academic Vice Presidents is the governing board for the Press.

An advisory board, consisting of representatives from each of the 11 state universities, determines whether manuscripts submitted to it reflect appropriate academic, scholarly, and programmatic standards of the Press.
In 2013, a new press was created specifically to meet the needs of UF faculty. The University of Florida Press has 11 board members from various colleges throughout the UF campus. In addition to the Books division, it also features a full-service Journals division.

The Press publishes scholarly works and journals of intellectual distinction and significance, books that contribute to improving the quality of higher education in Florida, and books of general and regional interest and usefulness to the people of Florida, reflecting their rich historical, cultural, and intellectual heritage and resources. The Press publishes works in the following fields:

- the Caribbean and Latin America;
- archaeology, American history and culture;
- African-American history and culture;
- forensic anthropology;
- medical geography;
- modernist and medieval literature;
- architecture;
- ethnicity;
- natural history;
- conservation biology;
- gardening;
- space history and studies;
- the fine arts; and
- Floridiana.

Submit manuscripts to:

The Editor-in-Chief,
University Press of Florida,
15 NW 15th Street,
Gainesville, FL 32611

Workshops for Teaching Assistants

The Graduate School and the Teaching Center offer an orientation and a series of workshops for teaching assistants to improve their instructional skills. Orientation is mandatory for all graduate students starting teaching assignments. Some topics included in the workshop series are oral presentation skills and lecture planning, techniques for improving student attention and motivation, group dynamics, testing and grading, use of technology to enhance learning, how to be a great online/hybrid TA, the flipped classroom, and tips for international TAs in UF classrooms. TAs who complete a significant percentage of the workshops are awarded certificates. To register or for more information go to TA Development at https://www.teachingcenter.ufl.edu, call the Teaching Center, 392-2010, or visit the office on the ground level, Southwest Broward Hall. Teaching at the University of Florida: A Handbook for Teaching Assistants is available at https://www.teachingcenter.ufl.edu/ta_development.html.
GRADUATE DEGREES

The information in this catalog is current as of July 2020. Please contact individual programs for additional updates.

Definitions

Degree is the title conferred by the University on completing the academic program, for example, Doctor of Philosophy. Some degrees include the name of the field of study (Master of Architecture, Master of Education). Others (Master of Arts, Master of Science) do not.

Program (also referred to as the major) is the student’s primary field of study. Programs offered at UF are approved by the Graduate Council, Faculty Senate, Board of Trustees, and Florida Board of Governors (specialist and doctoral degrees). The degree and program name appear on the student’s transcript. Available programs are identified under the degree name in the list of graduate degrees and programs.

Catalog year refers to the rules in effect during the first year a degree-seeking student enrolls in a program; the set of requirements a student must fulfill. If the student takes time off, then the catalog year is the academic year of readmission.

Co-major is a course of study allowing two majors for one Ph.D. degree. Each co-major must be approved by the Graduate Council.

Combined degree program is a combined bachelor’s and master’s degree program allowing an academically advanced undergraduate student to take graduate courses before completing the bachelor’s degree and to count 12 graduate credits toward both degrees. Students admitted into a combined program will normally have above average GPAs and superior scores on the verbal, quantitative, and analytical writing portions of the GRE. Individual academic units determine whether a combined degree program is appropriate. Combined degree programs established before January 1, 2003, may have other requirements.

Concentration is a subprogram in a major. Concentrations offered at UF are approved by the Graduate Council. The concentration, degree, and program may appear on the student transcript.

Concurrent degree program is simultaneous study on an individualized basis that leads to two master’s degrees in two different graduate programs or two master’s degrees in the same major. Such a program is initiated by the student and requires prior approval of each academic unit and the Graduate School. Graduate School approval for participation in a concurrent degree program must be obtained prior to the published midpoint deadline of the term in which the first degree is to be awarded. Retroactive requests will not be considered. Ultimately, it the student’s responsibility to follow up with the academic units to verify that all Graduate School approvals and deadlines have been met. If the student is approved to pursue two master’s degrees, no more than 9 credits of course work from one degree program may be applied toward the second master’s degree.

Cooperative degree program leads to a graduate degree awarded by UF with more than one institution authorized to provide course work.

Graduate certificate is a formal collection of courses that form a coherent program of study offered through an academic unit. They are certified by the college, approved by the Graduate Council, and listed on the transcript.

Jointly conferred degree program leads to a graduate degree awarded jointly by UF and another institution.

Joint degree program is a course of study that leads simultaneously to a graduate degree and a professional degree (i.e., D.M.D., D.V.M., J.D., M.D., Pharm.D.). Normally 12 credits of professional courses are counted toward the graduate degree and 12 credits of graduate courses are counted toward the professional degree. Individual academic units determine whether a joint degree program is appropriate. Joint programs established before January 1, 2003, may have other requirements.

Lockstep programs are defined as cohorts who move together in the same enrollment sequence with courses taught in a particular order, on a particular schedule. Students have no flexibility in their program or sequence, and may not drop in and out of courses independently.

Minor is a block of course work completed in any academic unit outside the major. The minor must be approved by the student’s academic unit and the academic unit offering the minor. If a minor is chosen, the supervisory committee must include a representative from the minor field. A minor requires at least 6 to 15 credits depending on the degree level. The minor appears on the student’s transcript along with the program name and the degree awarded.

Multi-college program is a degree program offered through more than one college.

Specialization is an informal designation used by academic units to indicate areas of research or scholarly strength, and has no formal significance. Track and emphasis are similar unofficial terms. No tracks, emphases, or specializations appear in official lists in this catalog or on the student transcript.

Supervisory Committee (thesis and dissertation degrees): All graduate degrees must have graduate faculty oversee the student’s program of study and progress. For thesis and dissertation degrees, this oversight authority is accomplished by a formal committee. These committees have slightly different criteria based on the particular degree. Thesis and dissertation committees are monitored by the Graduate School as part of degree certification using information entered into the Graduate Information Management System (GIMS).

Supervisory Committee (non-thesis degrees): For non-thesis degree programs, the oversight is at the academic unit/department/college level only. Non-thesis programs may choose to have a formal committee or an alternate structure as determined by the program’s graduate faculty and consistent with academic unit policies. The oversight authority will be considered as the supervisory committee. Units are able to enter their internal information into GIMS as a convenience. Regardless of degree program, any student with a minor must have the name of the graduate faculty member overseeing the minor entered into GIMS.

Student Transcript

Programs are the students’ primary fields of study; a program is the student’s major. The degree and program (major) name appear on the student’s transcript. Concentrations are subprograms within a major. The concentration, degree, and major may appear on the student transcript. Specializations are informal designations, used by academic units, to indicate areas of research or scholarly strength, and have no formal significance. Tracks and emphases are similar unofficial terms. No tracks, emphases, or specializations appear in official lists in this catalog or on the student transcript.
Graduate Degrees Offered by the University of Florida

See the listing of graduate majors within this catalog (http://catalog.ufl.edu/graduate/programs-az/) for hyperlinks to more information about the numerous majors and concentrations available through UF's many traditional or interdisciplinary graduate programs.

T= Thesis or dissertation
N= Non-thesis or no dissertation

- Degree names and correct abbreviations are listed in bold.
- Majors are listed in standard type.
- Concentrations are listed under the major in italics.

Master of Accounting (M.Acc.) N
- Accounting N
  - Auditing N
  - Taxation N

Master of Agribusiness (M.AB.) N
- Food and Resource Economics N
  - Tropical Conservation and Development N

Master of Architecture (M.Arch.) T
- Architecture T
  - Historic Preservation T
  - Sustainable Architecture T
  - Sustainable Design T

Master of Arts (M.A.) T/N
- Anthropology T/N
  - Historic Preservation T/N
  - Tropical Conservation and Development T/N
- Art T
  - Digital Arts and Sciences T
- Art Education T/N
- Art History T
- Arts in Medicine N
- Business Administration T/N
  - Marketing T/N
- Classical Studies T
- Communication Sciences and Disorders T/N
- Criminology, Law, and Society T/N
- Digital Arts and Sciences T/N
- Economics T/N
  - Financial Economics T/N
- English T/N
- French and Francophone Studies T/N
- Geography T
  - Applications of Geographic Technologies T
  - Climate Science T
  - Geographic Information Systems T
  - Tropical Conservation and Development T
  - Wetland Sciences T
  - German T/N
- History T/N
  - Historic Preservation T/N
  - Jewish Studies T/N
- Latin T
- Latin American Studies T/N
  - Tropical Conservation and Development T/N
- Linguistics T/N
- Museology T
  - Historic Preservation T
- Philosophy T/N
- Political Science - International Relations T/N
- Political Science T/N
  - Political Campaigning T/N
  - Public Affairs T/N
  - Tropical Conservation and Development T/N
- Psychology T/N
- Religion T/N
  - Jewish Studies T/N
  - Tropical Conservation and Development T/N
- Women's/Gender Studies T/N
- Sociology T/N
  - Tropical Conservation and Development T/N
- Spanish T/N
- Women's Studies T/N

Master of Arts in Education (M.A.E.) T
- Curriculum and Instruction T
  - Educational Technology T
- Early Childhood Education T
- Educational Leadership T
- Elementary Education T
- English Education T
- Marriage and Family Counseling T
- Mathematics Education T
- Mental Health Counseling T
- Program Evaluation in Educational Environments T
- Reading Education T
- Research and Evaluation Methodology T
- School Counseling and Guidance T
- School Psychology T
- Science Education T
- Social Studies Education T
- Special Education T
- Student Personnel in Higher Education T

Master of Arts in Mass Communication (M.A.M.C.) T/N
- Mass Communication T/N

Master of Arts in Teaching (M.A.T.) N
- Anthropology N
  - Tropical Conservation and Development N
- French and Francophone Studies N
- Latin N
- Mathematics N
• Political Science - International Relations
• Spanish

Master of Business Administration (M.B.A.)
• Business Administration
  • Business Analytics
  • Competitive Strategy
  • Finance
  • Human Capital
  • Marketing
  • Real Estate
  • Supply Chain Management

Master of Construction Management (M.C.M)
• Construction Management
  • Historic Preservation
  • Hydrologic Sciences
  • Sustainable Construction
  • Sustainable Design

Master of Education (M.Ed.)
• Curriculum and Instruction
  • Educational Technology
• Early Childhood Education
• Educational Leadership
• Elementary Education
• English Education
• Marriage and Family Counseling
• Mathematics Education
• Mental Health Counseling
• Reading Education
• Research and Evaluation Methodology
• School Counseling and Guidance
• School Psychology
• Science Education
• Social Studies Education
• Special Education
• Student Personnel in Higher Education

Master of Engineering (M.E.)
• Aerospace Engineering
• Agricultural and Biological Engineering
  • Geographic Information Systems
• Hydrologic Sciences
• Wetland Sciences
• Biomedical Engineering
• Chemical Engineering
• Civil Engineering
  • Geographic Information Systems
  • Hydrologic Sciences
  • Structural Engineering
  • Wetland Sciences
• Coastal and Oceanographic Engineering
• Computer Engineering
• Electrical and Computer Engineering
• Environmental Engineering Sciences
  • Geographic Information Systems
  • Hydrologic Sciences
  • Wetland Sciences
• Industrial and Systems Engineering
• Materials Science and Engineering
• Mechanical Engineering
• Nuclear Engineering Sciences

Master of Fine Arts (M.F.A.)
• Art
• Creative Writing
• Design and Visual Communications
• Theatre

Master of Fisheries and Aquatic Sciences (M.F.A.S.)
• Fisheries and Aquatic Sciences
  • Ecological Restoration
  • Geographic Information Systems
  • Natural Resource Policy and Administration
  • Wetland Sciences

Master of Forest Resources and Conservation (M.F.R.C.)
• Forest Resources and Conservation
  • Agroforestry
  • Ecological Restoration
  • Geographic Information Systems
  • Geomatics
  • Natural Resource Policy and Administration
  • Tropical Conservation and Development
  • Wetland Sciences

Master of Health Administration (M.H.A.)
• Health Administration

Master of Health Science (M.H.S.)
• Environmental and Global Health
  • One Health
• Occupational Therapy

Master of Historic Preservation (M.H.P.)
• Historic Preservation

Master of Interior Design (M.I.D.)
• Interior Design
• Historic Preservation
• Sustainable Design

Master of International Business (M.I.B.)
• International Business

Master of International Construction Management (M.I.C.M.)
• Construction Productivity
• International Construction Management
• Historic Preservation

Master of Landscape Architecture (M.L.A.)
• Landscape Architecture
  • Geographic Information Systems
  • Historic Preservation
  • Sustainable Design
  • Wetland Sciences

Master of Latin (M.L.)
• Latin

Master of Laws in Comparative Law (LL.M.Comp.Law)
• Comparative Law
  • Tropical Conservation and Development

Master of Laws in Environmental and Land Use Law (LL.M.E.L.U.)
• Environmental and Land Use Law

Master of Laws in International Taxation (LL.M.Int)
• International Taxation

Master of Laws in Taxation (LL.M.Tax.)
• Taxation

Master of Music (M.M.)
• Music
  • Choral Conducting
  • Composition
  • Electronic Music
  • Ethnomusicology
  • Instrumental Conducting
  • Jazz Studies
  • Music Education
  • Music History and Literature
  • Music Theory
  • Performance
  • Sacred Music
• Music Education
  • Choral Conducting
  • Composition
  • Electronic Music
  • Ethnomusicology
  • Instrumental Conducting
  • Music History and Literature
  • Music Theory
  • Performance
  • Piano Pedagogy

Master of Occupational Therapy (M.O.T.)
• Occupational Therapy

Master of Public Health (M.P.H.)
• Public Health
  • Biostatistics
  • Environmental Health
  • Epidemiology
  • Health Management and Policy
  • Population Health Management
  • Public Health Practice
• Social and Behavioral Sciences

Master of Science (M.S.)
• Aerospace Engineering
• Agricultural and Biological Engineering
• Agroecology
• Geographic Information Systems
• Hydrologic Sciences
• Wetland Sciences
• Agricultural Education and Communication
• Tropical Conservation and Development
• Agronomy
• Agroecology
• Geographic Information Systems
• Tropical Conservation and Development
• Animal Molecular and Cellular Biology
• Applied Physiology and Kinesiology
• Biobehavioral Science
• Clinical Exercise Physiology
• Exercise Physiology
• Human Performance
• Astronomy
• Biochemistry and Molecular Biology
• Biomedical Engineering
• Biostatistics
• Botany
• Biological Science
• Clinical Exercise Physiology
• Exercise Physiology
• Human Performance
• Business Administration
• Marketing
• Retailing
• Chemical Engineering
• Chemistry
• Civil Engineering
• Geographic Information Systems
• Hydrologic Sciences
• Structural Engineering
• Wetland Sciences
• Coastal and Oceanographic Engineering
• Computer Engineering
• Digital Arts and Sciences
• Computer Science
• Dental Sciences
Graduate Degrees

- Endodontics
- Operative and Esthetic Dentistry
- Orthodontics
- Periodontics
- Prosthodontics
- Digital Arts and Sciences
- Electrical and Computer Engineering
- Entomology and Nematology
- Environmental Engineering Sciences
- Geographic Information Systems
- Hydrologic Sciences
- Wetland Sciences
- Epidemiology
- Family, Youth and Community Sciences
- Community Studies
- Family and Youth Development
- Nonprofit Organization Development
- Finance
- Fisheries and Aquatic Sciences
- Geographic Information Systems
- Hydrologic Sciences
- Wetland Sciences
- Food and Resource Economics
- Agribusiness
- Tropical Conservation and Development
- Food Science and Human Nutrition
- Nutritional Sciences
- Forest Resources and Conservation
- Agroforestry
- Ecological Restoration
- Geographic Information Systems
- Geomatics
- Hydrologic Sciences
- Natural Resource Policy and Administration
- Tropical Conservation and Development
- Wetland Sciences
- Geography
- Applications of Geographic Technologies
- Climate Science
- Geographic Information Systems
- Hydrologic Sciences
- Tropical Conservation and Development
- Wetland Sciences
- Geology
- Climate Science
- Hydrologic Sciences
- Tropical Conservation and Development
- Wetland Sciences
- Health Education and Behavior
- Horticultural Sciences
- Environmental Horticulture
- Horticultural Sciences
- Industrial and Systems Engineering
- Interdisciplinary Ecology
- Agricultural and Biological Engineering
- Agricultural Education and Communication
- Agronomy
- Anthropology
- Architecture
- Biochemistry and Molecular Biology
- Botany
- Business Administration
- Chemistry
- Civil Engineering
- Climate Science
- Coastal and Oceanographic Engineering
- Economics
- English
- Entomology and Nematology
- Environmental Engineering Sciences
- Family, Youth and Community Sciences
- Farming Systems
- Fisheries and Aquatic Sciences
- Food and Resource Economics
- Food Science
- Forest Resources and Conservation
- Foundations of Education
- Geographic Information Systems
- Geography
- Geology
- Health and Human Performance
- Horticultural Sciences
- Hydrologic Sciences
- Landscape Architecture
- Mathematics
- Microbiology and Cell Science
- Nuclear and Radiological Engineering
- Philosophy
- Political Science
- Religion
- Sociology
- Soil and Water Science
- Statistics
- Tropical Conservation and Development
- Urban and Regional Planning
- Veterinary Medical Sciences
- Wetland Sciences
- Wildlife Ecology And Conservation
- Women's/Gender Studies
- Zoology
- Management
- Materials Science and Engineering
- Mathematics
- Mechanical Engineering
• Medical Sciences
  • Aging and Geriatric Practice
  • Biomedical Informatics
  • Biomedical Neuroscience
  • Forensic Medicine
  • Genetics and Genomics
  • Gerontology
  • Health Outcomes and Implementation Science
  • Medical Physics
  • Medical Physiology and Pharmacology
  • Molecular Cell Biology
  • Neuroscience
  • Pharmacology
  • Translational Biotechnology
  • Microbiology and Cell Science
  • Medical Microbiology and Biochemistry
  • Nuclear Engineering Sciences
  • Physics
  • Plant Molecular and Cellular Biology
  • Plant Pathology
  • Psychology
  • Real Estate
  • Soil and Water Sciences
  • Agroecology
  • Climate Science
  • Geographic Information Systems
  • Hydrologic Sciences
  • Sustainable Design
  • Sustainable Construction
  • Sustainable Architecture
  • Themed Environments Integration

Master of Science in Construction Management (M.S.C.M)
• Construction Management
• Historic Preservation
• Hydrologic Sciences
• Sustainable Construction
• Sustainable Design
• Sustainable Construction

Master of Science in Entrepreneurship (M.S.E)
• Entrepreneurship

Master of Science in Fire and Emergency Sciences (M.S.F.E.S)
• Fire and Emergency Sciences

Master of Science in Information Systems and Operations Management (M.S.I.S.O.M)
• Information Systems and Operations Management

Master of Science in Pharmacy (M.S.P)
• Pharmaceutical Sciences
• Clinical Pharmaceutical Sciences
• Clinical Toxicology
• Forensic DNA and Serology
• Forensic Drug Chemistry
• Forensic Science
• Medication Therapy Management
• Medicinal Chemistry
• Personalized Medicine
• Pharmaceutical Chemistry
• Pharmaceutical Outcomes and Policy
• Pharmaceutics
• Pharmacodynamics

Master of Science in Statistics (M.S.Stat.)
• Statistics

Master of Science in Teaching (M.S.T)
• Astronomy
• Botany
• Tropical Conservation and Development
• Wetland Sciences
• Chemistry
• Geology
• Climate Science
• Tropical Conservation and Development
• Wetland Sciences
• Mathematics
• Physics
• ZoologyN
  • Tropical Conservation and DevelopmentN
  • Wetland SciencesN

Master of Statistics (M.Stat.)N
• StatisticsN

Master of Sustainable Development Practice (M.D.P.)N
• Sustainable Development PracticeN
  • Climate ScienceN

Master of Urban and Regional Planning (M.U.R.P)T
• Urban and Regional PlanningT
  • Geographic Information SystemsT
  • Historic PreservationT
  • Sustainable DesignT
  • Tropical Conservation and DevelopmentT
  • Wetland SciencesT

Specialist in Education (Ed.S.)N
• Curriculum and InstructionN
  • Educational TechnologyN
• Educational LeadershipN
• Marriage and Family CounselingN
• Mental Health CounselingN
• School Counseling and GuidanceN
• School PsychologyN
• Special EducationN

Doctor of Audiology (Au.D.)N
• AudiologyN

Doctor of Education (Ed.D.)T
• Counseling and Counselor EducationT
  • Marriage and Family CounselingT
  • Mental Health CounselingT
  • School Counseling and GuidanceT
• Curriculum and InstructionT
  • Educational TechnologyT
• Educational LeadershipT
  • Educational PolicyT
• Higher Education AdministrationT
  • Educational PolicyT
• Research and Evaluation MethodologyT
• School Counseling and GuidanceT
• School PsychologyT
• Special EducationT

Doctor of Musical Arts (D.M.A.)
• Music
  • Choral Conducting
  • Composition
  • Instrumental Conducting
  • Performance

Doctor of Philosophy (Ph.D.)T
• Aerospace EngineeringT
  • Clinical and Translational ScienceT
• Agricultural and Biological EngineeringT
  • Geographic Information SystemsT
  • Global Systems AgroecologyT
  • Hydrologic SciencesT
  • Wetland SciencesT
• Agricultural Education and CommunicationT
  • Tropical Conservation and DevelopmentT
• AgronomyT
  • Global Systems AgroecologyT
  • ToxicologyT
  • Tropical Conservation and DevelopmentT
• Anatomical Sciences EducationT
• Animal Molecular and Cellular BiologyT
• Animal SciencesT
  • Animal Molecular and Cellular BiologyT
• AnthropologyT
  • Clinical and Translational ScienceT
  • Historic PreservationT
  • Tropical Conservation and DevelopmentT
  • Women’s/Gender StudiesT
• Art HistoryT
• AstronomyT
• Biomedical EngineeringT
  • Clinical and Translational ScienceT
• BiostatisticsT
• BotanyT
  • Tropical Conservation and DevelopmentT
  • Wetland SciencesT
• Business AdministrationT
  • AccountingT
  • FinanceT
  • Information Systems and Operations ManagementT
  • InsuranceT
  • ManagementT
  • MarketingT
  • Quantitative FinanceT
  • Real Estate and Urban AnalysisT
• Chemical EngineeringT
• ChemistryT
  • Clinical and Translational ScienceT
  • Imaging Science and TechnologyT
• Civil EngineeringT
  • Geographic Information SystemsT
  • Hydrologic SciencesT
  • Wetland SciencesT
• Classical StudiesT
• Coastal and Oceanographic EngineeringT
• Communication Sciences and DisordersT
• Computer EngineeringT
• Computer ScienceT
• Counseling and Counselor EducationT
• Marriage and Family Counseling
• Mental Health Counseling
• School Counseling and Guidance
• Counseling Psychology
• Criminology, Law, and Society
• Curriculum and Instruction
• Educational Technology
• Design, Construction, and Planning
• Construction Management
• Geographic Information Systems
• Historic Preservation
• Interior Design
• Landscape Architecture
• Urban and Regional Planning
• Economics
• Educational Leadership
• Educational Policy
• Electrical and Computer Engineering
• Clinical and Translational Science
• English
• Entomology and Nematology
• Global Systems Agroecology
• Environmental Engineering Sciences
• Geographic Information Systems
• Hydrologic Sciences
• Wetland Sciences
• Epidemiology
• Cancer Epidemiology
• Clinical and Translational Science
• Genetic Epidemiology
• Gero-Epidemiology
• Infectious Disease Epidemiology
• Psychiatric Epidemiology
• Fisheries and Aquatic Sciences
• Ecological Restoration
• Geographic Information Systems
• Natural Resource Policy and Administration
• Wetland Sciences
• Food and Resource Economics
• Tropical Conservation and Development
• Food Science
• Toxicology
• Forest Resources and Conservation
• Agroforestry
• Ecological Restoration
• Geographic Information Systems
• Geomatics
• Hydrologic Sciences
• Natural Resource Policy and Administration
• Toxicology
• Tropical Conservation and Development
• Wetland Sciences
• Genetics and Genomics
• Clinical and Translational Science
• Geography
• Climate Science
• Geographic Information Systems
• Hydrologic Sciences
• Tropical Conservation and Development
• Wetland Sciences
• Geology
• Climate Science
• Hydrologic Sciences
• Tropical Conservation and Development
• Wetland Sciences
• German
• Women's/Gender Studies
• Health and Human Performance
• Applied Physiology and Kinesiology
• Biobehavioral Science
• Clinical and Translational Science
• Exercise Physiology
• Health Behavior
• Historic Preservation
• Recreation, Parks, and Tourism
• Sport Management
• Health Services Research
• Higher Education Administration
• Educational Policy
• History
• Historic Preservation
• Women's/Gender Studies
• Horticultural Sciences
• Environmental Horticulture
• Horticultural Sciences
• Toxicology
• Human-Centered Computing
• Industrial and Systems Engineering
• Quantitative Finance
• Interdisciplinary Ecology
• Agricultural and Biological Engineering
• Agricultural Education and Communication
• Agronomy
• Anthropology
• Architecture
• Biochemistry and Molecular Biology
• Botany
• Business Administration
• Chemistry
• Civil Engineering
• Climate Science
• Coastal and Oceanographic Engineering
• Economics
• English
• Entomology and Nematology
• Environmental Engineering Sciences
• Family, Youth and Community Sciences
• Farming Systems
Graduate Degrees

- Fisheries and Aquatic Sciences
- Food and Resource Economics
- Food Science
- Forest Resources and Conservation
- Foundations of Education
- Geographic Information Systems
- Geography
- Geology
- Global Systems Agroecology
- Health and Human Performance
- Horticultural Sciences
- Hydrologic Sciences
- Landscape Architecture
- Mathematics
- Microbiology and Cell Science
- Nuclear and Radiological Engineering
- Philosophy
- Political Science
- Religion
- Sociology
- Soil and Water Science
- Statistics
- Tropical Conservation and Development
- Urban and Regional Planning
- Veterinary Medical Sciences
- Wetland Sciences
- Wildlife Ecology And Conservation
- Women's/Gender Studies
- Zoology
- Linguistics
- Mass Communication
- Clinical and Translational Science
- Materials Science and Engineering
- Clinical and Translational Science
- Mathematics
- Imaging Science and Technology
- Quantitative Finance
- Mechanical Engineering
- Clinical and Translational Science
- Medical Sciences
- Biochemistry and Molecular Biology
- Biomedical Informatics
- Cancer Biology
- Genetics
- Health Outcomes and Implementation Science
- Health Outcomes and Policy
- Imaging Science and Technology
- Immunology and Microbiology
- Medical Physics
- Molecular Cell Biology
- Neuroscience
- Pharmacology & Therapeutics
- Physiology and Functional Genomics
- Toxicology
- Microbiology and Cell Science
- Toxicology
- Music
- Composition
- Music History and Literature
- Music Education
- Nuclear Engineering Sciences
- Imaging Science and Technology
- Nursing Sciences
- Clinical and Translational Science
- Nutritional Sciences
- Clinical and Translational Science
- Pharmaceutical Sciences
- Clinical and Translational Science
- Clinical Pharmaceutical Sciences
- Medicinal Chemistry
- Pharmaceutical Outcomes and Policy
- Pharmacetics
- Pharmacodynamics
- Toxicology
- Philosophy
- Ethics of Technology
- Physics
- Imaging Science and Technology
- Plant Molecular and Cellular Biology
- Toxicology
- Plant Pathology
- Toxicology
- Political Science
- Educational Policy
- Tropical Conservation and Development
- Psychology
- Clinical and Health Psychology
- Clinical and Translational Science
- Women's/Gender Studies
- Public Health
- Environmental Health
- One Health
- Social and Behavioral Sciences
- Rehabilitation Science
- Clinical and Translational Science
- Communication and Swallowing Sciences and Disorders
- Neuromuscular Plasticity
- Religion
- Tropical Conservation and Development
- Women's/Gender Studies
- Research and Evaluation Methodology
- Romance Languages
- French and Francophone Studies
- Spanish
- School Psychology
- Early Childhood Studies
- Wildlife Forensic Sciences and Conservation
• Sociology
  • Tropical Conservation and Development
  • Women's/Gender Studies
• Soil and Water Sciences
  • Climate Science
  • Geographic Information Systems
  • Global Systems Agroecology
  • Hydrologic Sciences
  • Tropical Conservation and Development
  • Wetland Sciences
• Special Education
  • Early Childhood Studies
  • Wildlife Forensics and Conservation
• Statistics
  • Quantitative Finance
• Veterinary Medical Sciences
  • Animal Molecular and Cellular Biology
  • Clinical and Translational Science
  • Toxicology
• Wildlife Ecology and Conservation
  • Geographic Information Systems
  • Tropical Conservation and Development
  • Wetland Sciences
• Youth Development and Family Science
• Zoology
  • Animal Molecular and Cellular Biology
  • Tropical Conservation and Development
  • Wetland Sciences

**Doctor of Plant Medicine (D.P.M.)**

• Plant Medicine
• Tropical Conservation and Development

**Requirements for Master’s Degrees**

The master's degree is conferred only on completing a coherent and focused program of advanced study. Each academic unit sets its own minimum degree requirements beyond the minimum required by the Graduate Council.

**General Regulations for Master’s Degrees**

Graduate School regulations are as follows. Colleges and academic units may have additional regulations beyond those stated below. **Unless otherwise indicated in the next sections on master’s degrees, these general regulations apply to all master’s degree programs at the University.**

**Course requirements:** Graduate credit is awarded for courses numbered 5000 and above. The program of course work for a master’s degree must be approved by the student's adviser, supervisory committee, or faculty representative of the academic unit. No more than 9 credits from a previous master's degree program may apply toward a second master's degree. These credits are applied only with the written approval of the Dean of the Graduate School.

**Major:** Work in the major must be in courses numbered 5000 or above. For work outside the major, 6 credits of courses numbered 3000 or above may be taken if part of an approved plan of study.

**Minor:** Minor work must be in an academic unit other than the major. If an academic unit contributes more than one course (as specified in the curriculum inventory and/or the Graduate Catalog) to the major, the student is not eligible to earn a minor from the contributing academic unit. If a minor is chosen, at least 6 credits of work are required in the minor field. Two 6-credit minors may be taken with the major academic unit's permission. A 3.00 (truncated) GPA is required for minor credit.

**Degree requirements:** Unless otherwise specified, for any master’s degree, the student must earn at least 30 credits as a graduate student at UF. No more than 9 of the 30 credits (earned with a grade of A, A-, B+, or B) may be transferred from institutions approved for this purpose by the Dean of the Graduate School. At least half of the required credits (not counting 6971) must be in the major.

**Transfer of credit:** Only graduate-level (5000-7999) work with a grade of B or better, is eligible for transfer of credit. A maximum of 15 transfer credits are allowed. These credits include no more than 9 credits from institution/s approved by UF with the balance obtained from postbaccalaureate work at the University of Florida. Credits transferred from other universities are applied toward the degree requirements, but grades earned are not computed in the student's grade point average. Acceptance of transfer of credit requires approval of the student's supervisory committee and the Dean of the Graduate School.

Academic units must submit petitions for transfer of credit for a master's degree during the student's first term of enrollment in the Graduate School.

The supervisory committee is responsible for using established criteria to ensure the academic integrity of course work before accepting graduate transfer credits.

**Supervisory committee:** The student’s supervisory committee must be appointed as soon as possible after the student is admitted to the Graduate School and no later than the second term of graduate study.

Supervisory committees for graduate degree programs are initiated by the student, nominated by the respective academic unit chair, approved by the college dean, and appointed by the Dean of the Graduate School. The Dean of the Graduate School is an ex-officio member of all supervisory committees. Only Graduate Faculty may serve on a supervisory committee. If a student takes fewer than 12 credits in the first term, the deadline is the end of the term during which the student has accumulated 12 or more credits or the end of the second term. If a minor is designated for any degree, a representative from that minor is needed on the supervisory committee. If two minors are designated, two representatives are needed.

The supervisory committee for a master’s degree with a thesis should consist of at least two Graduate Faculty members, unless otherwise specified. If a minor is designated, the committee must include a Graduate Faculty member from the minor department.

For a master’s degree without thesis, oversight is at the academic unit/department/college level only. Non-thesis programs may choose to have a formal committee or an alternate structure as determined by the program’s graduate faculty and consistent with academic unit policies. The oversight authority will be considered as the supervisory committee. Units are able to enter their internal information into GIMS as a convenience. Any student with a minor must have the name of the graduate faculty member overseeing the minor entered into GIMS.
Changes to existing supervisory committee: A student, in consultation with his or her academic unit, may seek changes to an existing supervisory committee. Changes to a student’s committee are allowed until midpoint of the term of degree award if the defense has not occurred. No changes are allowed after the defense. For procedural details, contact the major academic unit.

Language requirements:

1. Each academic unit determines whether a reading knowledge of a foreign language is required. The requirement varies from one academic unit to another, and the student should check with the appropriate academic unit for specific information.
2. All candidates must be able to use the English language correctly and effectively, as judged by the supervisory committee.

Examination: Each candidate must pass a final comprehensive examination. Some programs use different terminology, such as capstone course. This examination must cover at least the candidate’s field of concentration. It must occur no earlier than the term before the degree is awarded.

Time limitation: All work (including transferred credit) counted toward the master’s degree must be completed within 7 years before the degree is awarded.

Leave of absence: Any student who will not register at UF for a period of more than 1 term needs prior written approval from the supervisory committee chair for a leave of absence for a designated period of time. This approval remains in the student’s departmental file. The Graduate School does not require notification. The student must reapply for admission on return. See Readmission and Catalog Year.

Master of Arts and Master of Science

The general requirements for the Master of Arts and the Master of Science degrees also apply to the following degrees: Master of Arts in Education, Master of Arts in Mass Communication, Master of Science in Construction Management, Master of Science in Pharmacy, and Master of Science in Statistics. There are additional requirements for specialized degrees.

Course requirements: A master’s degree with thesis requires at least 30 credits including up to 6 credits of Research for Master’s Thesis (6971). All thesis students must register for an appropriate number of credits in 6971.

A non-thesis Master of Arts or Master of Science degree requires at least 30 credits. No more than 6 of those credits can be from S/U courses. Non-thesis students cannot use Research for Master’s Thesis (6971).

For all master’s programs, at least half the required credits (not counting 6971) must be in the major. One or two minors of at least 6 credits each may be taken, but a minor is not required by the Graduate School. Minor work must be in an academic unit other than the major.

Non-thesis M.S. engineering programs: Students in engineering, if working at off-campus centers, must take half the course work from full-time UF faculty members and must pass a comprehensive written examination by a committee recommended by the Dean of the College of Engineering. This written comprehensive examination may be taken at an off-campus site.

Master’s thesis requirements: Each master’s thesis candidate must prepare and present a thesis that shows independent investigation. It must be acceptable, in form and content, to the supervisory committee and to the Graduate School. The work must be of publishable quality and must be in a form suitable for publication, guided by the Graduate School’s format requirements. The academic unit is responsible for quality and scholarship. Graduate Council requires the Graduate School Editorial Office, as agents of the Dean of the Graduate School, to briefly review theses and dissertations for acceptable format, and to make recommendations as required.

• Format requirements and example pages: graduateschool.ufl.edu/files/etd-guide.pdf (http://graduateschool.ufl.edu/files/etd-guide.pdf)
• Application Support Center/Electronic Theses and Dissertation Lab: https://asc.helpdesk.ufl.edu/

Gatorlink email requirement: UF requires students to maintain access to their Gatorlink email accounts. Accordingly, the Editorial Office only communicates with students through official Gatorlink email.

Thesis first submission: When first presented to the Graduate School Editorial Office, the thesis must be successfully orally defended. Therefore, the final examination data must be posted by the academic unit into the Student Information System (SIS), prior to the student attempting to submit their thesis document for review by the Graduate School’s editorial staff; accordingly, the defense must occur prior to the first submission deadline for the student’s intended term of degree award. Directly following the oral defense, the Academic Unit must submit the Final Exam Form through SIS, and the student must submit their UF Publishing Agreement through the Graduate Information Management System (GIMS). Should additional revisions be required by the committee to the thesis document itself, the ETD Signature Page should be held by the academic unit from posting until the issues are fully resolved. Please be aware, however, the student will remain unable to submit their final thesis for review by the Editorial Office until the ETD Signature Page is submitted; in turn, this should be posted by the final submission deadline within the student’s intended term of degree award.

Uploading and submitting the final pdf for Editorial Final Submission: After changes have been made to the satisfaction of the supervisory committee, the Electronic Thesis or Dissertation (ETD) Signature Page is submitted electronically to the Graduate School Editorial Office, via the Graduate Information Management System (GIMS) (https://gradschool.ufl.edu/gimsportal/gatorlink/portal.asp). This must be completed by the Editorial Office’s Final Submission Deadline. Once submitted, the student should upload and submit the final pdf of the electronic thesis, using the Editorial Package portal found within the Graduate Information Management System (GIMS) (https://gradschool.ufl.edu/gimsportal/gatorlink/portal.asp). Once submitted, the document will undergo a final review by one of the Graduate School Representatives. The Editorial Office ensures that the format is acceptable, that all indicated changes were made, and that all of the hyperlinks work within the document. The Graduate School Representative then emails the student regarding the status of the ETD. If accepted, no further changes are allowed. If changes are still required, the student should resubmit the corrected document as soon as possible. All documents must be confirmed with final approval.
emails from the Graduate School Editorial Office by the Final Clearance deadline. This deadline is firm, and no exceptions can be granted. When all changes have been made and approved, the Editorial Office will email the Committee Chair and the student with a message, indicating the student has achieved Editorial Final Clearance with the Graduate School’s Editorial Office.

**Editorial Final Clearance:** Among other requirements (see Checklist above), the final thesis must be confirmed as accepted, by email, by 5:00 p.m. on this deadline. This deadline only applies if all other posted deadlines for the term have been appropriately met. Since there are hundreds of students concurrently completing the process, most students complete all requirements well in advance, in order to ensure they do not face the chance of not graduating within their intended term.

**Copyright:** The student is automatically the copyright holder, by virtue of having written the thesis. A copyright page should be included immediately after the title page to indicate this.

**Thesis language:** Theses must be written in English, except for students pursuing degrees in Romance or Germanic languages and literatures. Students in these disciplines, with the approval of their supervisory committees, may write in the topic language. A foreign language thesis should have the Acknowledgments, Abstract, and Biographical Sketch written in English. All page titles before Chapter 1 should also be in English.

**Journal articles:** A thesis may include journal articles as chapters, if all copyright considerations are addressed appropriately. In such cases, Chapter 1 is a general introduction, tying everything together as a unified whole. The last chapter contains the general conclusions, once again tying everything together into a unified whole. Any chapter representing a journal article requires a footnote at the bottom of the first page of the chapter: “Reprinted with permission from …” giving the source, just as it appears in the list of references. The thesis must have only 1 abstract and 1 reference list.

**Change from thesis to non-thesis option:** Permission of the supervisory committee is needed to change from thesis to non-thesis option. This permission must be forwarded to the Graduate School by midpoint of the final term via the Graduate Information Management System (GIMS). The candidate must meet all the requirements of the non-thesis option as specified above. A minimum of 3 credits earned with a grade of S in 6971 (Research for Master’s Thesis) can be counted toward the degree requirements only if converted to credit as A, A-, B+, or B in Individual Work. The supervisory committee must indicate that the work was productive in and by itself and that the work warrants credit as a special problem or special topic course.

**Supervisory committee:** The student’s supervisory committee should be appointed as soon as possible after the student is admitted to the Graduate School and no later than the second term of graduate study. Supervisory committees for graduate degree programs are initiated by the student, nominated by the respective academic unit chair, approved by the college dean, and appointed by the Dean of the Graduate School. The Dean of the Graduate School is an ex-officio member of all supervisory committees. Only Graduate Faculty may serve on a supervisory committee. If a student takes fewer than 12 credits in the first term, the deadline is the end of the term during which the student has accumulated 12 or more credits or the end of the second term. If a minor is designated for any degree, a representative from that minor is needed on the supervisory committee. If two minors are designated, two representatives are needed.

**Thesis final examination:** When most of the student’s course work is completed, and the thesis is in final form, the supervisory committee must examine the student orally or in writing on:

1. the thesis,
2. the major subjects,
3. the minor or minors, and
4. matters of a general nature pertaining to the field of study.

The candidate and the supervisory committee chair or co-chair must be physically present together at the same location. With approval of the entire committee, other members may attend the defense remotely, using modern communication technology. If a supervisory committee member cannot be present at the student’s final defense, a Graduate Faculty member in the same academic unit may substitute for the absent committee member. No substitutions are allowed for the Chair.

The substitute should sign the Final Examination form in the space provided for committee members, noting the name of the absent member. The chair of the student’s major academic unit also must indicate the reason for the absence and state that the absent member agreed to this substitution at the final examination. The substitute should not sign the ETD signature page. The original committee member should sign that form.

The defense date must be fewer than 6 months before degree award. All forms should be signed at the defense: the candidate submits the UF Publishing Agreement form into GIMS; and the entire supervisory committee signs the ETD Signature Page and the Final Examination Report. If thesis changes are requested, the supervisory Committee Chair or the Committee’s designee may hold the ETD Signature Page, until all requirements are met regarding the thesis. Once all stipulations of the Committee members are satisfied, and before the Editorial Office’s Final Submission deadline for the term of intended degree award, verification of completion of this form must be submitted electronically via GIMS.

**Non-thesis final comprehensive examination:** Non-thesis students must pass a comprehensive written or oral examination on the major and on the minor if a minor is designated. This comprehensive examination must be taken no more than 6 months before the degree is awarded.

**Other Master’s Degrees**

Although the general requirements for the Master of Arts and the Master of Science degrees also apply to the following discipline-specific degrees, there are some important differences. For detailed requirements, see the Majors Section of this catalog (http://catalog.ufl.edu/graduate/programs-az/). In addition, the Graduate School monitors the following requirements for these specialized degrees.

**Master of Accounting**

The M.Acc. program offers three options: concentration in Auditing, concentration in Taxation, or no concentration.

The recommended curriculum to prepare for a professional career in accounting is the 3/2 five-year program with a joint awarding of the Bachelor of Science in Accounting and the Master of Accounting degrees on satisfactory completion of the 150-credit program. The entry point into the 3/2 is the start of the senior year.

Students who have already completed an undergraduate degree in accounting may enter the 1-year M.Acc. program, which requires 34 credits of course work. At least 20 credits must be in graduate-level accounting, excluding preparatory courses. All students must take a final
comprehensive examination. For details about requirements, see General Regulations for master's degrees.

**M.Acc./J.D. program:** This joint program culminates in both the Juris Doctor (J.D.) degree awarded by the College of Law and the Master of Accounting (M.Acc.) degree awarded by the Graduate School. The program is for students with an undergraduate degree in accounting, who are interested in advanced studies in both accounting and law. About 20 credits fewer are needed for the joint program than if the two degrees were earned separately. The two degrees are awarded after completing curriculum requirements for both degrees. Students must take the GMAT and also the LSAT before admission and must meet the admission requirements for the College of Law (J.D.) and the Fisher School of Accounting (M.Acc.).

**Master of Agribusiness**
The Master of Agribusiness (M.AB.) is a one-year, thirty-credit hour non-thesis degree program designed for students with no educational background in economics and offers advanced study for students seeking careers in sales, marketing, and management with organizations that operate mainly in the food industry and agribusiness sector. The courses complement the student's undergraduate education and prepare them for careers in private industry, state and federal government, education at secondary and post-secondary institutions, entrepreneurial pursuits, professional schools, financial analysis, agricultural production and marketing, food and consumer goods, and sales firms. The program includes a diversity of students from areas such as Animal Science, Food Science, Horticulture, Agricultural Education and Communication, Wildlife Ecology and Conservation, Agricultural and Biological Engineering, Turfgrass Management, Business Administration and Agronomy.

Contact the Graduate Program in 1170 McCarty Hall for information.

**Master of Architecture**
The Master of Architecture (M.Arch.) is an accredited graduate degree meeting the professional requirements of the National Architectural Accrediting Board for students who wish to qualify for registration and practice as architects. Candidates are admitted from architectural, related, and unrelated undergraduate backgrounds; professional experience is encouraged but not required.

The M.Arch. requires at least 52 credits, including no more than 6 credits in ARC 6971 Research for Master's Thesis (1-15 cr.) or ARC 6979 Master's Research Project (1-10 cr.). Course sequences in design history and theory, structures, technology, and practice must be completed. Students are encouraged to propose individual programs of study (outside of required courses), and interdisciplinary work is encouraged.

**Master of Arts in Education**
Although the general requirements for the Master of Arts and the Master of Science degrees also apply to the following discipline-specific degrees, there are some important differences. For detailed requirements, see the Majors Section of this catalog (http://catalog.ufl.edu/graduate/programs-az/).

**Master of Arts in Mass Communication**
The College of Journalism and Communications offers the Master of Arts in Mass Communication through two tracks—the Pro Master’s Track or the Ph.D./Research Track. There is also an available online Master’s program. In either track, students may choose from the following specializations: Journalism, Public Relations, Telecommunication, International/Intercultural Communication, or Science/Health Communication.

**Master of Arts in Teaching and Master of Science in Teaching**
These degrees (M.A.T., M.S.T.) combine graduate study in a discipline with selected education courses and a teaching internship, providing flexible curricula that prepare students for a variety of options including teaching and further graduate work.

Requirements for the degrees are as follows:

- A reading knowledge of one foreign language if required by the student’s major.
- Satisfactory completion of at least 36 credits while registered as a graduate student, with work distributed as follows:
  - At least 18 credits in the major and 6 credits in the minor.
  - Six credits in an academic unit internship in teaching (6943 Internship in College Teaching). Three years of successful teaching experience in a state-certified school may be substituted for the internship requirement, and credits thus made available may be used for further work in the major, the minor, or in education.
  - At least one course selected from three or more of the following: social and/or psychological foundations of education; education technology; counselor education; special education, and community college curriculum. Other areas may be added or substituted at the discretion of the supervisory committee. These courses may be used to comprise a minor.
  - Off-campus work: At least 8 to 16 credits (at the academic unit’s discretion), including at least 6 credits in one term, must be earned on the Gainesville campus. Beyond that, credits earned in off-campus UF courses approved by the Graduate School are accepted if they are appropriate to the student’s degree program as determined by the supervisory committee.
- The student must pass a final comprehensive examination (written, oral, or both). This examination covers the field of concentration and the minor.

At degree completion, the student needs at least 36 credits in the subject area for teaching certification purposes.

**Master of Arts in Urban and Regional Planning**
The degree of Master of Arts in Urban and Regional Planning (M.A.U.R.P.) is a graduate degree for professional urban and regional planners and meets the educational requirements for the American Institute of Certified Planners. The program is accredited by the Planning Accreditation Board. General requirements are the same as for other Master of Arts degrees with thesis, except that the minimum registration required is 52 credits including no more than 6 credits in URP 6971 Research for Master's Thesis (1-15 cr.) or URP 6979 Master's Research Project (1-6 cr.). All areas allow a project (requiring 6 credits) in lieu of thesis (with permission from the academic unit's Graduate Faculty). Please note that the Master of Arts in Urban and Regional Planning (M.A.U.R.P.) has been replaced by the Master of Urban and Regional Planning (M.U.R.P.) and is currently being phased out. All newly admitted students will be admitted for the M.U.R.P. program. Existing M.A.U.R.P. students should contact the academic unit for advisement on how to proceed.

**M.A.U.R.P./J.D. joint program:** A 4-year program leading to the Juris Doctor and Master of Arts in Urban and Regional Planning degrees is offered under the joint auspices of the College of Law and the College of Design, Construction, and Planning, Department of Urban and Regional Planning. For students interested in the legal problems of urban and regional planning, this program blends law studies with relevant course work in the planning curriculum. Students receive both degrees at the end
of a 4-year course of study whereas separate programs would require 5 years. Students must take the GRE and the LSAT before admission, must be admitted to both programs, and must complete the first year of law school course work before commingling law and planning courses. A thesis is required on completing the course work.

Interested students should apply to both the Holland Law Center and the Graduate School, noting on the application the joint nature of their admission requests. For more information on the program, contact the Holland Law Center and the Department of Urban and Regional Planning.

**Master of Business Administration**
The Master of Business Administration (M.B.A.) degree gives students

1. conceptual knowledge for understanding the functions and behaviors common to business organizations and
2. analytical, problem-solving, and decision-making skills essential for effective management.

Emphasis is on developing the student’s capacities and skills for business decision making.

The traditional MBA curriculum is structured so that students may extend their knowledge in a specialized field. The program offers certificate programs in: financial services, hospitality management, supply chain management, information systems and operations management, entrepreneurship and technology management, and global management; and concentrations in finance, security analysis, real estate, competitive strategy, marketing, entrepreneurship, information systems and operations management, management, global management, human resource management, Latin American business, international studies, and sports administration.

**Admission:** Applicants for admission must submit recent official scores from the Graduate Management Admission Test (GMAT) and official transcripts for all previous academic work. All program options require at least two years of full-time professional work experience performed after receiving an acceptable bachelor’s degree, along with written essays and personal recommendations from employers. All qualified applicants to the full-time (traditional) program are asked to interview as part of the admissions process. Applicants whose native, first language is not English must submit acceptable scores from one of the following: TOEFL (Test of English as a Foreign Language), IELTS (International English Language Testing System), MELAB (Michigan English Language Assessment Battery) or successful completion of the University of Florida English Language Institute program. Admission is competitive and class size is limited.

A diverse student body is seen as an important asset of the program. Accordingly, the backgrounds of students include a wide range of disciplines and cultures. With the exception of the Option B program, the curriculum assumes no previous academic work in business administration; however, enrolling students find introductory course work in statistics, calculus, and financial accounting beneficial.

For more specific information on other aspects of the program, contact the Office of Admissions, UF MBA Program

310 Hough Hall, P.O. Box 117152
Gainesville FL 32611-7152

or visit the website, http://www.floridamba.ufl.edu.

Course work: A minimum of 48 qualified credits of course work are required for the two-year option, and one-year Option A. The one-year Option B requires a minimum of 32 credits. Credits cannot be transferred from another institution or program.

**Options**

**Traditional MBA Two-Year Option:** This 48 credit program requires 4 terms of full-time study over two academic years. Students are admitted for the fall term only; many students spend the summer between academic years working at internships. This option requires at least two years of full-time, post-undergraduate work experience as well as a bachelor’s degree from an accredited four year institution.

**Traditional MBA One-Year, Option A:** This 48 credit program starts in late spring/early summer and students are expected to complete all coursework within 12 months. Successful candidates are expected to have a bachelor’s degree from an accredited four year institution and two years of post-undergraduate work experience.

**Traditional MBA One-Year, Option B:** This 32 credit program starts in mid-summer and students expected to complete all course work within 10 months. Applicants to this program are required to have a bachelor’s degree in business from a four-year accredited institution (conferred within the last seven years) and at least two years of post-undergraduate work experience. Students take primarily graduate business electives during summer B, fall, and spring terms and graduate in May.

**Executive MBA Program:** A 20-month program for working professionals, students attend classes one extended weekend per month (Friday-Sunday). The program is divided into five terms each lasting about four months. The program starts in August, and includes a one-week two credit international experience. The international study tour is a program requirement; students travel abroad in May for a week of experiential learning through lectures or discussions with local business and government leaders. The tour will include a combination of lectures, group projects and/or site visits. This option requires eight years of post-undergraduate work experience, and students are expected to have people or project management responsibilities in their current positions.

**Professional Two-Year MBA:** This 27-month program starts in August and January and is designed for professionals who work full time while pursuing their degrees part time. Students attend classes one weekend per month (Saturday-Sunday) and must attend a one-week in-residence elective class. This option requires two years of post-undergraduate work experience.

**Professional One-Year MBA:** For students with acceptable undergraduate degrees in business (completed within seven years before starting the program), this 16-month option starts in January. Students attend classes one weekend per month (Saturday-Sunday) and must attend a one-week in-residence elective class. The first meeting includes a one-week, on-campus foundations review of basic course work. This option requires two years of post-undergraduate work experience.

**Internet Two-Year MBA:** This 27-month program starts in September and February and allows students to earn their MBA primarily through class lectures downloaded to their laptops or iPads. Students interact with faculty and classmates via email, synchronous group discussion software, asynchronous class presentation software, and multimedia courseware. Students visit campus one weekend (Saturday-Sunday) every four months. This option requires two years of post-undergraduate work experience.
**Internet One-Year MBA:** For students with acceptable undergraduate degrees in business (completed within seven years before starting this program), this 16-month option starts in January and August and gives students and faculty the same interactive technology as the Internet Two-Year MBA. Students visit campus one weekend (Saturday-Sunday) every four months. The first meeting includes a one-week, on-campus foundations review of basic course work. This option requires two years of post-undergraduate work experience.

**Professional MBA in South Florida:** This 24-month program starts during the late summer, and is designed for professionals who wish to continue working full time while pursuing their degrees part time. This program includes a one-week two credit international experience. The international study tour is a program requirement; students travel abroad in November for a week of experiential learning through lectures or discussions with local business and government leaders. The tour will include a combination of lectures, group projects, and/or site visits. Students attend classes once every three weeks (Saturday-Sunday) at the UF MBA Sunrise Center in Sunrise, Florida. This option requires two years of post-undergraduate work experience.

**M.B.A./M.S. in medical sciences (biotechnology) program:** Concurrent studies leading to the Master of Business Administration and Master of Science degrees, offered in cooperation with the College of Medicine, are in response to the needs of businesses engaged in biotechnological sciences. Both degrees can be obtained in 3 years. The program requires 1 year of science courses, 1 year of business courses, and a year devoted to research and electives in business and science. Research is done in one of the Interdisciplinary Center for Biotechnology Research core laboratories. Students must meet the admission and curriculum requirements of both degrees. Requirements of the M.B.A. program are those in effect when an applicant is admitted to the program. A student must at all times remain in good standing in both degree programs to remain in the M.B.A. program. Applicants are expected to have previous professional work experience prior to starting the M.B.A. program.

**M.B.A./Ph.D. in medical sciences program:** Concurrent studies leading to the Master of Business Administration and Doctor of Philosophy degrees are offered in cooperation with the College of Medicine. This 120-credit program trains research scientists to assume responsibilities as managers of biotechnical industries. Estimated time to complete both degrees is 5 to 7 years. Students must meet the admission and curriculum requirements of both programs. Requirements of the M.B.A. program are those in effect when an applicant is admitted to the program. Applicants are expected to have previous professional work experience prior to starting the M.B.A. program.

**MBA./J.D. program:** A program of joint studies leading to the Master of Business Administration and Juris Doctor degrees is offered under the joint auspices of the Warrington College of Business Administration and the Levin College of Law. Current M.B.A. or J.D. students must declare their intent to apply for the second degree during their first year. Applications are then due according to admission schedules for that year. Both degrees are awarded after a 4-year course of study. Students must take both the LSAT and the GMAT before admission and meet the admission and curriculum requirements of both degrees. Requirements of the M.B.A. program are those in effect when an applicant is admitted to the program. Applicants are expected to have previous professional work experience prior to starting the M.B.A. program.

**M.B.A./Pharm.D. program in management and pharmacy administration:** A program of concurrent studies culminating in both the Master of Business Administration and Doctor of Pharmacy degrees allows students interested in both management and pharmacy administration to obtain the appropriate education in both areas. Candidates must meet the entrance requirements and follow the entrance procedures of both the Warrington College of Business Administration and the College of Pharmacy. The degrees may be granted after 5 years of study. Requirements of the M.B.A. program are those in effect when an applicant is admitted to the program. Applicants are expected to have previous professional work experience prior to starting the M.B.A. program.

**M.B.A./M.I.M. program in international management:** A dual degree program between the University of Florida (UF) and the American Graduate School of International Management (Thunderbird) makes it possible to earn both degrees after 3 years of study. Students start the program at UF and apply to Thunderbird in their first year. Requirements of the M.B.A. program are those in effect when an applicant is admitted to the program. This program requires 2 years of post-undergraduate work experience.

**Exchange programs:** The M.B.A. program offers second-year students exchange opportunities at numerous international universities. Currently, exchange programs exist with schools in Australia, Belgium, Brazil, Chile, China, Canada, Denmark, England, Finland, France, Germany, Italy, Japan, Korea, Liechtenstein, the Netherlands, Norway, Poland, Spain, Sweden, Taiwan, Thailand, and Turkey. For a complete list of exchange partners, see [http://warrington.ufl.edu/graduate/academics/maib/exchange.asp](http://warrington.ufl.edu/graduate/academics/maib/exchange.asp).

**Master of Construction Management**

The Master of Construction Management (M.C.M.) degree is for students pursuing advanced work in construction management, construction techniques, and research problems in the construction field.

General requirements are the same as for the Master of Science in Construction Management degree except that the M.C.M. requires at least 36 graduate credits. A thesis is not required. All candidates are required to pass a comprehensive examination at the completion of course work.

**Joint Program:** The M.C.M./J.D. program is offered in conjunction with the Levin College of Law.

**Master of Education**

The Master of Education (M.Ed.) degree program meets the need for professional personnel to serve a variety of functions required in established and emerging educational activities of modern society. A thesis is not required.

All M.Ed. programs require at least 36 credits, with at least half of these credits earned in courses in the College of Education. Up to 6 credits earned from 3000- and 4000-level courses taken outside the academic unit may be counted toward the minimum requirements for the degree provided they are part of an approved plan of study. (See also **General Requirements for Master's Degrees**.)

At least 16 credits must be earned while the student is enrolled as a graduate student in courses offered on the Gainesville campus of the University of Florida including registration for at least 6 credits in a single term. This requirement may deviate where distance education programs are considered.

**Master of Engineering**

Students may choose a thesis or non-thesis option for the Master of Engineering (M.E.) degree. To be eligible for admission to the M.E. program, students must have earned a bachelor's degree from an ABET-accredited college or they must complete articulation work for
equivalence. Admission requirements of the Graduate School must be met. The College of Engineering may use the Fundamentals of Engineering examination in lieu of the GRE for admitting students into the non-thesis master's degree programs. Students who do not meet the ABET requirement may be admitted to the Master of Science program (see section on Master of Arts and Master of Science).

The non-thesis M.E. degree is a 30-credit course-work-only degree (practice-oriented project or capstone course may be included in the 30 credits). At least 15 credits must be in the student's major at the 5000 level or higher. For work outside the major, courses numbered 3000 or above may be taken if they are part of an approved plan of study. If a minor is chosen, at least 6 credits are required. Two 6-credit minors may be taken. At the discretion of individual engineering academic units, an oral or written examination may be required.

The thesis option requires 30 credits of course work, including up to 6 credits of 6971 (Research for Master's Thesis). At least 12 credits (not counting 6971) must be in the student's major. Courses in the major must be at the 5000 level or higher. For work outside the major, up to 6 credits of courses numbered 3000 or above may be taken if part of an approved plan of study. If a minor is chosen, at least 6 credits are required. Two 6-credit minors may be taken at the discretion of the academic unit. A comprehensive oral and/or written final examination is required.

An off-campus (distance learning) student who is a candidate for the non-thesis M.E. degree must take half the course work from full-time UF faculty members and must pass a comprehensive written examination administered by a committee from the academic unit. If the student has a minor, the committee must include a member representing that minor.

Master of Fine Arts
The Master of Fine Arts (M.F.A.) degree is offered with majors in art, creative writing, and theatre. Requirements are the same as for the Master of Arts with thesis, except the M.F.A. requires at least 60 credits (54 for creative writing), including 6 to 9 credits in 6971 (Research for Master's Thesis). Students in art and theatre substitute 6973 (Individual Project) creative work in lieu of the written thesis.

Admission: Applicants requesting admission to any of the programs should have an earned baccalaureate degree in the same or a closely related field from an accredited institution. Students must fulfill the admission requirements of their disciplines and the Graduate School's admission criteria. In cases where the undergraduate degree is not in the area chosen for graduate study, the student must demonstrate a level of achievement fully equivalent to the bachelor's degree in the chosen graduate field. A candidate deficient in certain areas must remove the deficiencies by successfully completing appropriate courses.

Art or theatre candidates also must submit a portfolio of the creative work, or must audition, before being accepted into the program. Creative writing candidates must submit 2 short stories, 2 chapters of a novel, or 6 to 10 poems. Three years of work in residence are usually needed to complete degree requirements. If deficiencies must be removed, the residency could be longer. See the Majors Section of this catalog (http://catalog.ufl.edu/graduate/programs-az/) for Art, English, and Theatre.

Art: The M.F.A. degree with a major in art involves advanced visual research for those who wish to attain a professional level of proficiency in studio work. Specialization is offered in the studio areas of art + technology, ceramics, creative photography, drawing, graphic design, painting, printmaking, and sculpture. For studio work, the M.F.A. is generally the terminal degree and is often the required credential for teachers of art in colleges and universities.

In addition to the general requirements above, students must take at least 60 credits. Requirements include 42 credits in studio courses (24 in specialization, 12 in electives, and 6 in ART 6973C Individual Project (1-10 cr)), 6 credits in art history, 3 credits in teaching art in higher education (required if the student is to accept a teaching assistantship); 3 credits in aesthetics, criticism, or theory; and 6 credits of electives. The College requires the student to leave documentation of thesis project work for purposes of record, exhibition, or instruction.

Creative writing: The M.F.A. in creative writing develops writers of poetry and fiction through series of workshops and other courses, including seminars. Candidates are required to produce a thesis (a manuscript of publishable poetry or fiction) at the end of the 3-year program. The degree requires 11 courses (4 workshops, 3 seminars, 1 forms course, and 3 electives); a reading tutorial; and a thesis, along with 9-18 research/thesis hours: 54 credits in all. Students typically take at least 1 workshop each Fall/Spring term for the first two years. The electives may be seminars, approved independent studies, or additional workshops. No coursework is expected in summer.

Theatre: The M.F.A. degree with a major in theatre is for those interested in production-oriented theatrical careers and teaching. Two specializations are offered: acting and design. The craft skills encompassed in the program are later applied in public and studio productions. The program requires 60 credits, including 18 credits of core classes, 17 credits of specialty training, an internship, and a project in lieu of thesis.

Master of Fisheries and Aquatic Sciences
The non-thesis Master of Fisheries and Aquatic Sciences (M.F.A.S.) program trains students in the technical aspects of fisheries and aquatic sciences emphasizing written and oral communication of scientific information. Requirements are the same as for the Master of Science degree with the non-thesis option, except that the minimum credit requirement is 32 credits, of which at least 26 graduate credits of graded course work (at least 16 in the major), and a technical paper. The final draft of the technical paper must be submitted to all supervisory committee members for approval at least 3 weeks before the scheduled date of the oral and written final examination.

Master of Forest Resources and Conservation
The Master of Forest Resources and Conservation (M.F.R.C.) degree is for additional professional preparation rather than primary research. Requirements are the same as those listed for master's degrees, except that the M.F.R.C. requires GRE scores of at least 500 verbal and 500 quantitative.

Work required: At least 30 credits of letter-graded course work with at least 12 credits of graduate course work in the major are required. A thesis is not required, but the student must complete a technical project in an appropriate field. This project may take various forms, such as a literature review, extension publication, video, training manual, or curriculum. The M.F.R.C. requires a final examination covering the candidate's entire field of study. The student must present the work to the supervisory committee in an on-campus public forum before the final examination.

Master of Health Administration
The Master of Health Administration (M.H.A.), offered by the College of Public Health and Health Professions, trains qualified individuals to become managers and leaders of health care organizations. The
degree provides a core of business and analytical skills, concepts and knowledge specific to health administration, opportunities for application and synthesis, and exposure to the field of practice. The M.H.A. program admits students only in the fall term and requires full-time study for 2 years, plus a summer internship between the first and second years. The program requires a total of 57 credits.

Master of Health Science
The Master of Health Science (M.H.S.) degree, offered by the College of Public Health and Health Professions, provides exposure to health research and meets the need for leadership personnel in established and emerging health care programs. The College currently offers a program in occupational therapy and a concentration program leading to the M.H.S. degree.

The M.H.S. concentration program in One Health is part of the portfolio of training programs available through the Environmental and Global Health Department (https://egh.phhp.ufl.edu/) in the College of Public Health and Health Professions. The program requires 39 credits to complete.

There are three paths to enter occupational therapy and attain the Master of Health Science degree. The 4-term thesis option emphasizes research and is the appropriate route for (but not limited to) students interested in rehabilitation science. The 3-term non-thesis option emphasizes research and advanced theories related to the practice of occupational therapy. Both options prepare leaders in the profession and require 36 credits. The third option, the distance learning program, is for working professionals to increase knowledge in emerging practice areas and leadership. See the requirements for all master's degrees for additional requirements.

Master of Historic Preservation
The University of Florida College of Design, Construction and Planning offers a Master of Historic Preservation degree using an interdisciplinary variety of coursework in the basic and applied skills and arts of historic preservation, anthropology, archaeology, architecture, building construction, cultural tourism, history, interior design, landscape architecture, museum studies, and urban and regional planning. The coursework totals 42 hours. Students must take 12 hours of core courses, 6 hours of pre-approved history electives, and may choose from pre-approved and specially approved electives from across the campus. A true thesis to meet Graduate Requirements relating to historic preservation is required.

Master of Interior Design
The Master of Interior Design (M.I.D.) allows students to direct their attention to a variety of topics including design pedagogy and processes; sustainable, safe, and secure environments; creative performance and innovation; and built heritage conservation.

Work required includes at least 36 credits (no more than 6 thesis credits). Required preparatory courses are in addition to the minimum credits for graduate work.

Master of International Business
The Master of International Business (M.I.B) is a non-thesis interdisciplinary graduate business program designed to enhance a student's knowledge and understanding of global business trends and problems.

Admission: All admission requirements of the Graduate School must be met. Applicants must have a U.S. Bachelor’s degree (or equivalent) from an accredited institution, with a major or minor in Business. In addition, applicants must complete a statement of purpose and submit two letters of recommendation as well as a resume and all official transcripts and admissions scores.

Work required: Students must complete the 30-credit curriculum, which consists of 14 core credits and 16 elective credits, with a grade point average (major and overall) of 3.0 or higher. The curriculum includes a mandatory global immersion experience and a non-thesis capstone project.

Master of International Construction Management
The Master of International Construction Management (M.I.C.M.) is a non-thesis, distance education, advanced degree program with a research report/project requirement offered by the Rinker School of Construction Management. The M.I.C.M. allows students with computer and Internet access to attend classes at any time, any place and to interact with faculty and classmates via the Internet.

Admissions: Applicants for admission must have:
- An undergraduate degree,
- At least 5 years of meaningful, supervisory-level construction management experience,
- Acceptable GRE scores
- A grade point average of 3.00 on a 4.0 scale,
- If an international student, an acceptable score on one of the following: TOEFL (Test of English as a Foreign Language: paper=550, Internet=80), IELTS (International English Language Testing System: 6), MELAB (Michigan English Language Assessment Battery: 77), or successful completion of the UF English Language Institute program, and
- Sponsorship by the employer.

Work required: The M.I.C.M. prepares students to assume upper-level construction management responsibilities in a multinational construction company. Specializations include sustainable construction, information systems, construction safety, and human resource management. In addition to 6 research-oriented graduate credits, the student selects 1 or 2 specializations and then takes the rest of the required 33 credits from the remaining courses and special electives. Students must pass a comprehensive oral and/or written examination on completing course work and the master's research report/project.

Master of Landscape Architecture
The degree of Master of Landscape Architecture (M.L.A.) is the advanced professional degree for graduates with baccalaureate credentials in landscape architecture and is a first professional degree for the graduate from a non-landscape architectural background. Candidates are admitted from related and unrelated fields and backgrounds. An advanced professional life experience track is available for eligible candidates.

Work required: Candidates must complete at least 52 credits, including no more than 6 credits of thesis or project. For students without baccalaureate credentials in landscape architecture, required preparatory courses are in addition to the minimum credits for graduate work. For advanced professional life experience candidates, the minimum requirement is 30 credits, including thesis. At least 50% of all course work must be graduate courses in landscape architecture. Some areas allow a project (requiring 6 credits) in lieu of thesis, with permission of the academic unit's Graduate Faculty.

Master of Latin
The Classics Department offers the non-thesis Master of Latin (M.L.) degree, a 30-credit program mainly for currently employed and/or
certified teaching professionals who wish to widen their knowledge of Latin, broaden their education in the field of Classics, and enhance their professional qualifications. This degree can be attained by students in residence for fall/spring terms or by a program of summer course work at UF and by directed independent study and/or distance learning courses during the regular academic year.

Students registering during summer terms can complete the degree in 4 years by earning 6 graduate credits each summer (total = 24), plus two 3-credit independent study or distance learning courses during the intervening academic years. Those who already have some graduate credit in Latin, or who can take more credits during the year, can complete the degree more quickly.

Unlike the M.A. degree in Latin, the Master of Latin degree has no thesis requirement, does not prepare students for Ph.D. level studies, and is aimed specifically at currently employed and certified Latin teachers.

Admission: Contact the Department’s Graduate Coordinator or Distance Learning Coordinator before applying. Requirements for the admissions process are:

- Apply to UF’s Graduate School,
- Acceptable GRE scores,
- Three letters of recommendation, and
- Transcripts recording undergraduate courses (and graduate courses, if any; students must demonstrate the ability to take Latin courses at the graduate level).

Degree requirements include at least 30 credits as a UF graduate student. Of these, no more than 8 credits (grade of A, A-, B+, or B) may be transferred from institutions approved for this purpose by the Dean of the Graduate School. At least half of the 30 credits required should be from Latin language and literature courses (LAT or LNW courses at the 5000 level or above). UF graduate-level courses taken before admission to Graduate School (e.g., in the Latin Summer Institutes) may be applied to the 30 credits if approved by the Graduate School. The Department will work closely with individual students to determine how many previous graduate credits at UF or other institutions may be applied to this program.

The student may elect minor work in other academic units (e.g., history, philosophy, art history, religion) although there is no requirement to do so. If a minor is chosen, at least 6 credits are required in the minor field. Two 6-credit minors may be taken with departmental permission. A GPA of 3.0 is required for minor credit and for all work counted toward the degree. All work in a minor must be approved by the supervisory committee.

Examination: The supervisory committee administers a final oral and written comprehensive examination at completion of the course work. This examination includes:

1. an oral component on Roman literary tradition and
2. a written component covering
   a. Latin sight translation and grammar,
   b. Roman history and civilization, and if applicable
   c. the minor, or minors.

As preparation for this examination, the student should read the required reading list of secondary works in English.

Language requirement: The Department for this degree plan does not require, but strongly recommends, at least a reading knowledge of one (or more) of the following: German, French, Italian, or Spanish. Such study will facilitate reading important secondary works not translated into English, enhance travel, and perhaps lead to teaching opportunities in the chosen language at the secondary school level.

Master of Laws in Comparative Law
The Master of Laws in Comparative Law (LL.M.Comp.Law) degree is for graduates of foreign law schools who want to enhance their understanding of the American legal system and the English common law system. The program starts with Introduction to American Law, a 4-credit summer course that gives students a foundation in the American legal process. It also helps students acclimate to the College of Law and the University community before starting the academic year. During fall and spring terms, and with the director’s approval, students choose their remaining 22 credits from more than 100 Juris Doctor and LL.M. in Taxation courses and seminars. For admission information consult the College of Law Catalog or write to the:

Comparative Law Office
P.O. Box 117643
University of Florida
Gainesville FL 32611-7643.

Master of Laws in Environmental and Land Use Law
The Master of Laws in Environmental and Land Use Law degree is a one-year post-J.D. degree providing an opportunity for experienced attorneys, as well as recent law school graduates, to spend an academic year full-time on the UF campus developing in-depth expertise in environmental and land use law.

For more information about the Environmental and Land Use Law Program, contact:

University of Florida Levin College of Law
Environmental and Land Use Law Office
P.O. Box 117625
University of Florida
Gainesville, FL 32611-7625
Phone (352-273-0777) or E-mail to elulp@law.ufl.edu.

Master of Laws in International Taxation
The Master of Laws in International Taxation (LL.M.I.T.) degree program offers advanced instruction for law graduates who plan to specialize in international taxation, in the practice of law. Degree candidates must complete 26 credits. Of these 26 credits, 22 must be graduate-level tax courses, and 13 must be graduate-level international tax courses, including a research and writing course.

Master of Laws in Taxation
The Master of Laws in Taxation (LL.M.T.) degree program offers advanced instruction for law graduates who plan to specialize in federal taxation and particularly federal income taxation, in the practice of law. Degree candidates must complete 26 credits. Of these 26 credits, 22 must be graduate-level tax courses, including a research and writing course.

Master of Music
The Master of Music (M.M.) degree is offered in music or music education. The music program offers the following concentrations: choral conducting, composition, electronic music, ethnomusicology, instrumental conducting, music education, music history and literature, music theory, performance, and sacred music. The M.M. degree prepares students for careers as teachers in studios, schools, and universities;
performers; music historians; music critics; church musicians; composers; conductors; and accompanists. There is also an available online master's program (https://musiceducation.arts.ufl.edu/).

**Admission:** Applicants should have a baccalaureate degree in music or a closely related area from an accredited institution. Students whose undergraduate degree is in another discipline must demonstrate a level of achievement fully acceptable for master's level work in this discipline. Applicants normally complete at least 4 semesters of music theory, two semesters of music history, and 3-5 semester of performance study. A candidate deficient in certain undergraduate areas must remove the deficiencies by successfully completing appropriate courses. If remedial work is needed, the residency (usually 4 terms of full-time study) may be longer. An audition or portfolio review is required for all students.

**Work required** includes at least 32 credits of course work (not counting prerequisite or deficiency courses) incorporating a core of 9 credits. The core in all emphases includes MUS 6716 Methods of Musical Research and Bibliography (3 cr.) (MUE 6785 Research in Music Education (3 cr.) in the music education program), MUT 6629 Analytical Techniques (3 cr.), and one MUH or MUL graduate course. A thesis or creative project in lieu of thesis is required.

The College of the Arts reserves the right to retain student work for purposes of record, exhibition, or instruction. For more information, see the Majors Section of this catalog (http://catalog.ufl.edu/graduate/programs-az/).

**Master of Occupational Therapy**

The non-thesis Master of Occupational Therapy (M.O.T.) degree program is for students who do not have a degree in occupational therapy, and who want to enter the field of occupational therapy. The program gives students a holistic perspective including an understanding of the philosophical and theoretical bases for practice in the current health care environment. The M.O.T. program provides a strong background in theory, assessment, and therapeutic intervention.

This 5-term program of graduate study consists of 3 terms of classroom course work and 2 terms (24 weeks) of internship. Students enter the program after completing a bachelor's degree. The M.O.T. degree is awarded after completing 58 credits. Students must receive at least a B (3.00 truncated) on all course work and satisfactory evaluations on all clinical fieldwork.

**Master of Public Health**

The Master of Public Health (M.P.H.) is a non-thesis degree program that prepares students to become effective public health practitioners, scientists, and educators. Graduates can contribute to the health of the local, national, and international communities through advancing public health knowledge and by designing, implementing, and evaluating programs and policies that prevent disease and promote health.

Students have the opportunity to develop skills in 1 of 6 public health concentration areas:

- Biostatistics: Applying quantitative and analytical methods in public health research and evaluation
- Environmental health: Assessing risk levels and protecting the public from environmental threats to health
- Epidemiology: Studying the distribution and determinants of health in populations and communities
- Public health management and policy: Providing leadership in public health administration and developing policies to promote the public's health
- Public health practice: Developing breadth in the field of public health by studying 2 or more of the other concentration areas
- Social and behavioral sciences: Exploring the unique issues faced by diverse groups and populations and acquiring skills to achieve social and behavioral change.

The M.P.H. degree program is a 48-credit program for individuals with bachelor's degrees. Those with prior terminal degrees in health-related fields may take the M.P.H. in an accelerated 42-credit format. Several collaborative programs with professional and graduate degrees are available, including D.V.M./M.P.H., J.D./M.P.H., and Pharm.D./M.P.H. A combined degree program for seniors and a 15-credit certificate program also are offered. For additional information, visit http://www.mph.ufl.edu.

**Admission:** Applicants with any undergraduate major are considered for the program as long as they meet the Graduate School admission requirements and their interests match the program's philosophy and curriculum.

**Work required:** In the 48-credit program, students take 16 credits of core public health course work and 5-8 credits of internship. Internships are designed to promote competency in the concentration area and contribute to the student's career goals. The remaining 24-27 credits include required and elective course work in the concentration area chosen by the student. Specific course requirements vary by concentration area.

Students who have a relevant terminal degree in a health-related field may be eligible for the 42-credit accelerated program, pending M.P.H. admissions committee approval. This program requires completion of 16 credits of core public health course work, 21 credits of concentration course work, and a 5-credit internship.

**Master of Science in Architectural Studies**

**Admission:** The Master of Science in Architectural Studies (M.S.A.S.) is a nonprofessional, research degree for students with undergraduate degrees in any field of study who wish to undertake advanced studies and research in architectural specialties. Specialization is offered in environmental technology, architectural preservation, urban design, history, and theory.

**Work required** includes at least 32 credits of course work incorporating up to 6 credits of ARC 6971 Research for Master's Thesis (1-15 cr.) (Research for Master's Thesis). Most course work should be in the School of Architecture, but multidisciplinary electives in planning, history, law, engineering, art history, and real estate are encouraged. Students also may enroll in one of the School's off-campus programs in Nantucket, in the Caribbean, in Hong Kong, or in Vicenza. A thesis is required.

Requirements for level and distribution of credits, supervisory committee, and final examination are the same as for the Master of Arts and Master of Science with thesis.

**Master of Science in Entrepreneurship**

The Master of Science in Entrepreneurship (M.S.E.) program is a one-year, 36-credit, campus-based program designed for young and aspiring entrepreneurs and change-makers. Offered to both business and non-business majors alike, the program is a combination of classroom delivery and experiential learning activities with a focus on opportunity assessment, feasibility analysis, lean entrepreneurial concept testing, business plan development, entrepreneurial leadership, and the sourcing of capital. Students are exposed to cutting edge entrepreneurial theory, which they apply immediately by consulting for small business, commercializing UF technology, and creating their own businesses. The
M.S.E. program is a non-thesis degree requiring a final exam in lieu of thesis.

**Admission:** All admission requirements of the Graduate School must be met. In addition, applicants must complete a statement of purpose, submit two letters of recommendation as well as a resume and all official transcripts and admissions scores, and conduct a program interview. Either a GMAT or GRE score will be accepted.

**Work required:** In order to graduate from the program students must:

- Complete 36 credits with a grade of “C” or better;
- Maintain an overall Graduate GPA of 3.0 or higher;
- Maintain a Major GPA of 3.0 or higher;
- Complete the program final exam: a portfolio of entrepreneurial experiences completed throughout the program demonstrating mastery of entrepreneurial competencies;
- Fulfill all program requirements.

**Master of Science in Fire and Emergency Sciences**
The Master of Science in Fire and Emergency Sciences (M.S.F.E.S.) is a non-thesis, distance education, advanced degree program with a research report/project requirement offered by the Rinker School of Construction Management. The degree focuses on Emergency Services/Disaster Management (ES/DM) and is designed for individuals who are seeking knowledge in emergency planning, hazard mitigation and preparedness, disaster response and recovery, and homeland security. The goal is to create broad experience that includes the many elements of current cases in ES/DM and emphasizes both the critical thinking and leadership skills necessary to advance in the field. Major research topics include interdisciplinary studies in material sciences, suppression systems, advanced planning and geographic systems, pre- and post-disaster mitigation planning, computer applications, and technological innovations.

**Admission:** All admission requirements of the Graduate School must be met. Applicants must have a U.S. Bachelor’s degree (or equivalent) from an accredited institution. In addition, applicants must have:

- at least five years of meaningful supervisory and management related experience;
- a cumulative verbal and quantitative GRE score of 300 or higher;
- a grade point average of 3.0 on a 4.0 scale (preferred); and
- for international applicants a TOEFL score of 80 or higher on the Internet-Based exam (550 on the Paper-Based) or a 6 or higher on the IELTS.

**Work required:** At least 33 credits overall (at least 17 credits in the major) with a GPA of 3.0 or higher, a final comprehensive exam, and a research report.

**Master of Science in Information Systems and Operations Management**
The Master of Science in Information Systems and Operations Management (M.S.ISOM) program provides computing, analytical, and application skills to be used in a business setting. The primary areas of emphasis in the program are business intelligence and analytics, information technology, and supply chain management. Requirements span traditional academic disciplines to produce a multi-discipline focus. The M.S.ISOM program is a non-thesis degree program.

All admission requirements of the Graduate School must be met. There are no prerequisites for the program. However, students without a business background will need additional core business coursework.

Preparedness for graduation is based on:

- Completing a minimum of 36 credits (including 18 in the major) and all course requirements for the designated track. Letter grades of C, D+, D, D- or E are not considered passing at the graduate level and therefore any required course for which such grades have been assigned must be repeated.
- Being registered for at least two credits in the semester in which the student intends to graduate.
- Completing all degree requirements, including a minimum grade point average of B (3.00 truncated) in the major (i.e., only courses offered under the Department section of the graduate catalog) and in all work attempted in the graduate program, including a minor where appropriate
- Clearing all incompletes or other unresolved grades by the midpoint deadline published on the Graduate School’s Critical Dates (http://catalog.ufl.edu/graduate/academic-calendar/) web page.
- Filing a degree application with the Office of the University Registrar by the deadline published on the Graduate School’s Critical Dates (http://catalog.ufl.edu/graduate/academic-calendar/) web page. The degree application can be accessed on ONE.UF under “My Record.” Check the box “Master of Science” on the application.

**Master of Science in Nursing**
The master’s degree prepares nurses for advanced practice, clinical nurse specialist, or to be a clinical nurse leader. The graduate nursing core includes nursing theory, research, statistics, health policy, ethics, finance, and health promotion. The advanced practice core includes specific theory and clinical courses with relevant clinical experiences.

The College offers the master’s degree and post-master’s certification for nurse midwifery and the following nurse practitioner roles: adult acute care, adult, family, pediatric, and neonatal.

**Additional offerings include**

- Psychiatric/mental clinical nurse specialists/nurse practitioners
- Clinical Nurse Leader

Graduates are eligible for Florida licensure and national certification. To be considered for the M.S.N. program, students must meet the following minimum requirements:

- Bachelor of Science in Nursing degree with an upper-division grade point average of 3.0 or higher from a CCNE or NLN AC accredited program
- A score of 500 or higher on each of the verbal and quantitative sections in the prior version of the Graduate Record Examination (GRE) General Test. In the new version of the GRE a minimum score of 153 in the verbal section and 144 in the quantitative section. Analytical writing section is optional.
- Eligibility for licensure to practice as a registered nurse in the state of Florida

For application materials: http://www.nursing.ufl.edu/prospective/prospective_msn_application_process.shtml (http://www.nursing.ufl.edu/prospective/prospective_msn_application_process.shtml/)
The Master of Science in Pharmacy offers the Master of Science in Pharmacy in Pharmaceutical Sciences, as well as the following concentrations: Clinical Pharmacy, Clinical Toxicology, Forensic DNA and Serology, Forensic Drug Chemistry, Forensic Science, Medication Therapy Management, Medicinal Chemistry, Pharmaceutical Chemistry, Pharmaceutical Outcomes and Policy, Pharmacodynamics, and Pharmacy.

The Master of Statistics (M.Stat.) degree requires at least 36 credits including at least 30 graduate credits in the major. Courses are selected in consultation with the supervisory committee chair and approved by the supervisory committee. Students must pass two examinations:

1. a first-year examination, given by a committee designated for the purpose, on material covered in statistics courses for first-year graduate students and
2. a final oral examination consisting of a presentation by the student on a statistical topic not covered in depth in the regular course work.

The student should consult with his/her adviser to choose a topic, and present a written report on that topic to the supervisory committee at least 1 week before the examination date. A typical report is 8 to 10 pages. During and after the presentation, the student’s committee may ask questions related to the topic of the presentation and related to other material covered in the student’s program of study.

The Master of Sustainable Development Practice (M.D.P.) at the University of Florida prepares development practitioners to address development challenges in creative and dynamic ways. The UF M.D.P. integrates the academic and development pillars of natural sciences, social sciences, health sciences and integrated management skills into a vigorous and innovative program curriculum.

The M.D.P. Degree requires 45 credits of course work, including 24 core credits and 21 elective credits, the latter through which a student focuses on a specialization (for example, entrepreneurship, agriculture, ecotourism, gender, community forest management, nonprofits, or M&E). The M.D.P. Program is a non-thesis degree. Each student must successfully complete a set of requirements, including a summer field practicum, the development of a poster presented in a public poster session, a final practicum report approved by their committee, and a public presentation and private defense with committee members of the final report. All students will be expected to meet defined learning outcome objectives, integrating knowledge, skills and desired professional behavior.

All admission and graduation requirements of the Graduate School must be met. Students are required to develop a study plan approved by the M.D.P. program Graduate Coordinator and by their supervisory committee. Please visit the M.D.P. Program website for additional information on the M.D.P. degree and curriculum http://mdp.africa.ufl.edu/.

The Doctor of Philosophy (Ph.D.) is a research degree and is granted on evidence of general proficiency, distinctive attainment in a special field, and particularly on ability for independent investigation as demonstrated in a dissertation presenting original research with a high degree of literary skill. Consequently, doctoral programs are more flexible and varied than those leading to other graduate degrees. The Graduate Council does not specify what courses are required for the Doctor of Philosophy degree.

General requirements: the program should be unified in relation to a clear objective, the program should have the considered approval of the student’s entire supervisory committee, and the program should include an appropriate number of credits of doctoral research.

Course Requirements

Course requirements for doctoral degrees vary from field to field and from student to student. In all fields, the Ph.D. degree requires at least 90 credits beyond the bachelor’s degree. All master’s degrees counted in the minimum must be earned in the last 7 years.

Transfer of credit: No more than 30 credits of a master’s degree from another institution will be transferred to a doctoral program. If a student holds a master’s degree in a discipline different from the doctoral program, the master’s work will not be counted in the program unless the academic unit petitions the Dean of the Graduate School. All courses beyond the master’s degree taken at another university to be applied to the Ph.D. degree must be taken at an institution offering the doctoral degree and must be approved for graduate credit by the Graduate School of the University of Florida. All courses to be transferred must be graduate-level, letter-graded with a grade of B or better and must be demonstrated to relate directly to the degree being sought. All such transfer requests must be made by petition of the supervisory committee no later than the third term of Ph.D. study. The total number of credits (including 30 for a prior master’s degree) that may be transferred cannot exceed 45, and in all cases the student must complete the qualifying examination at the University of Florida. In addition, any prior graduate credits earned at UF (e.g., a master’s degree in the same or a different discipline) may be transferred into the doctoral program at the discretion of the supervisory committee and by petition to the Graduate School. The petition must show how the prior course work is relevant to the current degree.

Major: A Ph.D. student does the major work in an academic unit specifically approved for offering doctoral courses and supervising dissertations. See Graduate Programs. At least a B (3.00 truncated) is needed for courses included in the major.

Minor: Minor work must be in an academic unit other than the major. If an academic unit contributes more than one course (as specified in the curriculum inventory and/or the Graduate Catalog) to the major, the
student is not eligible to earn a minor from the contributing academic unit. A 3.00 (truncated) GPA is required for minor credit.

With the supervisory committee's approval, the student may choose one or more minor fields. If one minor is chosen, the supervisory committee member representing the minor suggests 12 to 24 credits of courses numbered 5000 or higher as preparation for a qualifying examination. If two minors are chosen, each must include at least 8 credits. Competency in the minor is demonstrated by written examination by the minor academic unit, or by the oral qualifying examination.

Leave of Absence
A doctoral student who ceases to be registered at UF for more than 1 term needs prior written approval from the supervisory committee chair for a leave of absence for a stated period of time. This approved leave is kept on file in the student’s departmental record. It does not need Graduate School approval. The student must reapply for admission on returning. See Readmission and Catalog Year.

Supervisory Committee
Supervisory committees are nominated by the academic unit chair, approved by the dean of the college concerned, and appointed by the Dean of the Graduate School. The committee should be appointed as soon as possible after the student starts doctoral work and no later than the end of the second term of equivalent full-time study. The Dean of the Graduate School is an ex-officio member of all supervisory committees.

Duties and responsibilities of the supervisory committee:

• Inform the student of all regulations governing the degree sought. This does not absolve the student from responsibility for being informed about these regulations. See General Regulations.
• Meet immediately after appointment to review the student’s qualifications and discuss and approve a program of study.
• Meet to discuss and approve the proposed dissertation project and the plans for carrying it out.
• Give the student a yearly evaluation letter in addition to S/U grades earned for research courses 7979 and 7980. The chair writes this letter after consulting with the supervisory committee.
• Conduct the qualifying examination (or participate in it, if administered by the academic unit).
• Meet when at least half the work on the dissertation is complete, to review procedure, progress, and expected results; and to make suggestions for completion.
• Meet with the student when the dissertation is completed and conduct the final oral examination to assure that the dissertation is a piece of original research and a contribution to knowledge. The supervisory committee chair or co-chair must be present with the candidate for the examination. All other committee members may attend remotely. Only the actual supervisory committee may sign the ETD Signature Page, and they must approve the dissertation unanimously. See Examinations in General Regulations.

Membership: The supervisory committee for a doctoral candidate comprises at least four members selected from the Graduate Faculty. At least two members, including the chair, must be from the academic unit recommending the degree. At least one member serves as external member and should be from a different educational discipline, with no ties to the home academic unit. One regular member may be from the home academic unit or another unit.

If a minor is chosen, the supervisory committee includes at least one Graduate Faculty member representing the student’s minor. If the student elects more than one minor, each minor area must be represented on the supervisory committee. Therefore, committees for students with two minors must have a minimum of five members.

Special appointments: People without Graduate Faculty status may be made official members of a student’s supervisory committee through the special appointment process. Appropriate candidates for special appointments include

• Individuals from outside UF with specific expertise who contribute to a graduate student’s program of study
• Tenure-track faculty not yet qualified for Graduate Faculty status
• Non-tenure-track faculty or staff at UF who do not qualify for Graduate Faculty status

Limitations for special appointments:

• They do not hold Graduate Faculty appointments
• They have a special appointment that is specific only to an individual student’s committee
• They may not serve as a supervisory committee chair, co-chair, external member, or minor representative.

The student’s supervisory committee chair requests the special appointment, briefly explaining what the special appointment contributes to the supervisory committee. A special appointment is made for a specific supervisory committee. If a student changes to a new degree or major and the committee chair wishes to include the special member on the new supervisory committee, another request must be submitted to the Graduate School for the new committee.

External member:

• Represents the interests of the Graduate School and UF
• Knows Graduate Council policies
• Serves as an advocate for the student at doctoral committee activities.

If the academic unit’s committee activity conflicts with broader University policies or practices, the external member is responsible for bringing such conflicts to the attention of the appropriate governing body. Therefore, the external member is prohibited from holding any official interest in the doctoral candidate’s major academic unit. Faculty holding joint, affiliate, courtesy, or adjunct appointments in the degree-granting academic unit cannot be external members on a student’s committee.

Minor member: The Graduate Faculty member who represents a minor on a student’s committee may be appointed as the external member if he/she does not have a courtesy graduate appointment in the student’s major academic unit.

Co chair: To substitute for the chair of the committee at any examinations, the co chair must be in the same academic unit as the candidate.

Retired faculty: Graduate Faculty members who retire may continue their service on supervisory committees for 1 year. With approval of the academic unit, retired faculty may continue serving on existing or new committees beyond this period.

Substituting members at qualifying and final examination: If a supervisory committee member cannot be present at the student’s final
defense, a Graduate Faculty member in the same academic area may substitute for the absent committee member. The substitute should sign the Final Examination form on the left side, in the space provided for committee members, noting the name of the absent member.

The chair of the student’s major academic unit also must indicate the reason for the absence and state that the absent member agreed to this substitution at the final examination.

The substitute should not sign the ETD signature page. The original committee member must sign.

The student and chair or co-chair should be present for the oral defense; however, other committee members may elect to attend remotely, with approval by the other committee members, using modern communication technology to be present rather than being physically present at the defense.

No substitutes are allowed for the chair or external member of the committee. Changes to the supervisory committee may be entered online in GIMS before the qualifying examination.

The Graduate Council wants each supervisory committee to function as a University committee (not a departmental committee), applying University-wide standards to the various doctoral degrees.

Language Requirement
Any foreign language requirement for the Ph.D. is established by the major academic unit with approval of the college. The student should check with the graduate coordinator of the appropriate academic unit for specific information. The foreign language departments offer classes for graduate students starting to study a language. See the current Schedule of Courses for available languages. All candidates must be able to use the English language correctly and effectively, as judged by the supervisory committee.

Campus Residence Requirement
Beyond the first 30 credits counted toward the doctoral degree, students must complete 30 credits enrolled at the University of Florida campus or at an approved branch station of the University of Florida Agricultural Experiment Stations or the Graduate Engineering and Research Center. An academic unit or college may establish and monitor its own more-stringent requirement as desired.

Qualifying Examination
All Ph.D. candidates must take the qualifying examination. It may be taken during the third term of graduate study beyond the bachelor's degree.

The student must be registered in the term the qualifying examination is given.

The examination, prepared and evaluated by the full supervisory committee or the major and minor academic units, is both written and oral and covers the major and minor subjects. Except for allowed substitutions, all members of the supervisory committee must attend the oral part. The student and chair or co-chair must be in the same physical location. With approval of the entire committee, other committee members may attend remotely using modern technology. At this time the supervisory committee is responsible for deciding whether the student is qualified to continue work toward a Ph.D. degree.

If a student fails the qualifying examination, the Graduate School should be notified. A re-examination may be requested, but it must be recommended by the supervisory committee. At least one term of additional preparation is needed before re-examination.

Time lapse: Between the oral part of the qualifying examination and the date of the degree there must be at least 2 terms. The term the qualifying examination is passed is counted, if the examination occurs before the midpoint of the term.

Registration in Research Courses
Advanced Research (7979) is open to doctoral students not yet admitted to candidacy (classified as 7 and 8). Students enrolled in 7979 during the term they qualify for candidacy will stay in this registration unless the academic unit elects to change their enrollment to Research for Doctoral Dissertation (7980), which is reserved for doctoral students admitted to candidacy (classified as 9).

Admission to Candidacy
A graduate student becomes a candidate for the Ph.D. degree when the student is granted formal admission to candidacy. Such admission requires the approval of the student’s supervisory committee, the academic unit chair, the college dean, and the Dean of the Graduate School. The approval must be based on:

- The academic record of the student
- The supervisory committee’s opinion on overall fitness for candidacy
- An approved dissertation topic
- A qualifying examination as described above

The student should apply for admission to candidacy as soon as the qualifying examination is passed and a dissertation topic is approved by the student’s supervisory committee.

Dissertation
Each doctoral candidate must prepare and present a dissertation that shows independent investigation and that is acceptable in form and content to the supervisory committee and to the Graduate School. The work must be of publishable quality and must be in a form suitable for publication, using the Graduate School’s format requirements. The student and supervisory committee are responsible for level of quality and scholarship. Graduate Council requires the Graduate School Editorial Office, as agents of the Dean of the Graduate School, to review theses and dissertations for acceptable format, and to make recommendations as needed.

Doctoral dissertation requirements: Before presentation to the Editorial Office, the dissertation should be virtually complete and completely formatted (not in a draft format). Students must be completely familiar with the format requirements of the Graduate School and should work with one of the consultants in the Application Support Center, to troubleshoot the dissertation, before attempting to make a first submission to the editors in the Graduate School Editorial Office. Students who fail to first meet with one of the ASC Lab Consultants often find their document rejected upon First Submission to the Editorial Office, for not meeting the minimum submission standards, required for an editorial review.


Checklist:
graduate

5:00 p.m. on this deadline. This deadline only applies, if all other posted above), the final thesis must be confirmed as accepted, by email, by the Graduate School's Editorial Office by the Final Clearance deadline. This deadline is firm, and no further changes to the document can be accepted. The Graduate School Representative then emails the Committee Chair and the student regarding the status of the ETD. If accepted, no further changes are allowed. Should the document pass the submission requirements and appear acceptable for review, the Editorial Office will email the student, using their Gatorlink email address, confirming the submission, and responding with an acceptance email. Should the document not pass first submission requirements, a denial email will instead be sent, advising the student of their options at that time. This notice must be addressed immediately. Once a successful first submission has been achieved and the document has been reviewed by one of the Graduate School's editors, another email is sent, providing editorial feedback to the student and committee chair. The student is responsible for retrieving the dissertation, reviewing comments, and resolving any deficits related to the format requirements. Students should promptly make all required changes.

Uploading and submitting the final pdf for Editorial Final Submission: After changes have been made to the satisfaction of the supervisory committee, the Electronic Thesis or Dissertation (ETD) Signature Page is submitted electronically to the Graduate School Editorial Office, via the Graduate Information Management System (GIMS) (https://gradschool.ufl.edu/gimsportal/gatorlink/portal.asp). This must be completed by the Editorial Office's Final Submission Deadline. Once submitted, the student should upload and submit the final pdf of the electronic thesis, using the Editorial Package portal found within the Graduate Information Management System (GIMS) (https://gradschool.ufl.edu/gimsportal/gatorlink/portal.asp). The document will undergo a final review by one of the Graduate School Representatives. The Editorial Office ensures that the format is acceptable, that all indicated changes were made, and that all of the hyperlinks work within the document. The Graduate School Representative then emails the student regarding the status of the ETD. If accepted, no further changes are allowed. From changes are still required, the student should resubmit the corrected document as soon as possible. All documents must be confirmed with final approval emails from the Graduate School Editorial Office by the Final Clearance deadline. This deadline is firm, and no exceptions can be granted. When all changes have been made and approved, the Editorial Office will email the Committee Chair and the student with a message, indicating the student has achieved Editorial Final Clearance with the Graduate School's Editorial Office.

Editorial Final Clearance: Among other requirements (see Checklist above), the final thesis must be confirmed as accepted, by email, by 5:00 p.m. on this deadline. This deadline only applies, if all other posted deadlines for the term have been appropriately met. Because there are hundreds of students in this process, most students complete all requirements well in advance.

It is the responsibility of the student to ensure they have achieved Final Clearance status by the Final Clearance Deadline for the term in which they intend to graduate. This can be confirmed via GIMS.

Publication of dissertation: All dissertation students must pay a $25 microfilm fee for traditional publication and microfilming fees through ProQuest, even if they elect not to send the full dissertation to ProQuest for publication. This charge will appear as a hold on the student's record in ONE.UF after making their first submission to the Graduate School's Editorial Office. All dissertation students must also submit a microfilm publishing agreement form, indicating whether the entire dissertation or simply the abstract will be archived with ProQuest. This form is signed by the student and is delivered to the Graduate School Editorial Office by the Final Submission Deadline for the intended term of degree award. Students who began their graduate program in Fall 2001 or later must submit their final dissertations electronically (not on paper).

Copyright: The student is automatically the copyright holder, by virtue of having written the dissertation. A copyright page should be included immediately after the title page to indicate this. The Editorial Office does not accept copyright registration requests. Registering copyright is not required and does not benefit most students. Any students who wish to register a copyright can do so themselves (http://www.copyright.gov).

Dissertation language: Dissertations must be written in English, except for students pursuing degrees in Romance or Germanic languages and literatures. Students in these disciplines, with the approval of their supervisory committees, may write in the topic language. A foreign language dissertation should have the Acknowledgments, Abstract, and Biographical Sketch written in English. All page titles before Chapter 1 should also be in English.

Journal articles: Dissertations may include journal articles as chapters, if all copyright considerations are addressed appropriately. In such cases, Chapter 1 should be a general introduction, tying everything together as a unified whole. The last chapter should be general conclusions, again tying everything together into a unified whole. Any chapter representing a journal article needs a footnote at the bottom of the first page of the chapter: “Reprinted with permission from ...” giving the source, just as it appears in the list of references. The dissertation should have only 1 abstract and 1 reference list.

Guidelines for Restriction on Release of Dissertations Research performed at the University can effectively contribute to the education of our students and to the body of knowledge that is our heritage only if the results of the research are published freely and openly. Conflicts can develop when it is in the interests of sponsors of university research to restrict such publication. When such conflicts arise, the University must decide what compromises it is willing to accept, taking into account the relevant circumstances.

Final Examination While submitting the dissertation and completing all other work prescribed for the degree, the candidate is given a final examination, oral or written or both, by the supervisory committee, on campus. The candidate and the supervisory committee chair or co chair must be physically present together at the same location. With approval of the entire committee, other members may attend the defense remotely, using modern communication technology. The defense should be no more
than 6 months before degree award. All forms should be signed at the defense: the candidate and the supervisory committee chair sign the UF Publishing Agreement Form, while the entire supervisory committee signs the ETD Signature Page and the Final Examination Report. If dissertation changes are requested, the supervisory committee chair or his or her designee may hold the ETD Signature Page until all are satisfied with the dissertation. However, this form must be submitted electronically, via GIMS, by the Final Submission Deadline for the Graduate School Editorial Office, during the term of intended degree award.

Satisfactory performance on this examination and adherence to all Graduate School regulations outlined above complete the requirements for the degree.

**Time limitation:** All work for the doctorate must be completed within 5 calendar years after the qualifying examination, or this examination must be repeated.

### Doctor of Audiology

The College of Public Health and Health Professions offers a program leading to the degree of Doctor of Audiology. The Au.D. degree is awarded after a 4-year program of graduate study. Foreign languages are not required. The program leading to the Au.D. degree is administered by the Department of Speech, Language and Hearing Sciences, the college, and the Graduate School.

**Admission:** To be considered for the Au.D. program, students must meet the following minimum requirements:

- A 3.00 junior-senior undergraduate grade point average and a program specific acceptable score on the GRE General Test,
- Evidence of good potential for academic success in at least three letters of recommendation, and
- Evidence of acceptable skills in written expression through a personal statement describing the motivation and skills applicable to graduate study and the profession of audiology.

Course requirements include 110 credits for students entering the program with a bachelor's degree awarded by an accredited institution consisting of at least 70 credits of didactic instruction, 30 credits of applied practicum, and 3 credits of audiology research.

A 70-credit program leading to the Au.D. is offered for applicants holding an earned master's degree in audiology from an accredited institution.

A 45-credit program leading to the Au.D. is offered for applicants holding an earned master's from an accredited institution, certification and/or licensure in audiology, and at least 3 years of full-time experience in audiology.

Comprehensive examination, required for all Au.D. candidates, may be taken during the eighth term of study beyond the bachelor's degree. Both written and oral, this examination is prepared and evaluated by the supervisory committee, which is responsible for determining whether the student is qualified to continue work toward the degree by completing the clinical residency.

### Doctor of Education

The Doctor of Education (Ed.D.) degree offers advanced professional training and academic preparation for the highest levels of educational practice. Programs are available in the School of Teaching and Learning, the School of Special Education, School Psychology, and Early Childhood Studies, and the School of Human Development and Organizational Studies in Education.

A minimum of 90 credits beyond the bachelor's degree (master's degrees included must be in the last 7 years) is required. Course requirements vary with the academic unit and with the student's plan for research and/or professional pursuit. With the approval of the supervisory committee, the student may choose one or more minor fields of study. The Ed.D. requires a qualifying examination and a dissertation.

See Requirements for the Ph.D. for information on transfer of credit, minors, leave of absence, supervisory committee, language requirement, campus residence requirement, qualifying and final examinations, admission to candidacy, dissertation, and certification. These statements apply to both the Ph.D. and Ed.D. degrees.

### Doctor of Plant Medicine

**Campus Program**

The College of Agricultural and Life Sciences offers an interdisciplinary program leading to the degree of Doctor of Plant Medicine (D.P.M.). The D.P.M. degree is awarded after a 3- to 4-year program of graduate study. Foreign languages are not required. The program leading to the D.P.M. degree is administered by the Entomology and Nematology Department, College of Agricultural and Life Sciences, and the Graduate School.

**Admission:** Students must meet the following minimum requirements:

- B.S. or B.A. degree, preferably in biological, agricultural, or health science.
- A 3.00 grade point average in upper-division courses.
- A minimum score of 153 in the verbal section and 144 in the quantitative section of the Graduate Record Examination (GRE).
- A program specific acceptable score on the GRE General Test.
- Applicants from countries where English is not the native language must also achieve a satisfactory score on one of the following: TOEFL (Test of English as a Foreign Language: paper=550, web= 80), IELTS (International English Language Testing System: 6), MELAB (Michigan English Language Assessment Battery: 77) or successful completion of the University of Florida English Language Institute program.
- Evidence of good potential for academic success in at least three letters of recommendation.
- Evidence of acceptable skills in written expression through personal statements briefly describing their backgrounds, reasons, and career goals for studying plant medicine.

**Course requirements:** Students entering the program with a bachelor's degree must earn 100 credits. This includes at least 85-86 credits of course work and 15-16 credits of internship. Students entering the program with a master's degree in a related area may be allowed to transfer up to 30 credits in graduate courses corresponding to those required by the D.P.M. degree program. All D.P.M. students must complete two substantial 3-credit internships. Signed approval by a student's Committee and the D.P.M. Director is required prior to registering for substantial internship credits.

**Comprehensive examination:** Both written and oral comprehensive examinations are required of all D.P.M. students. The written examination has three sections: entomology/nematology, plant pathology, and plant/soil science. Faculty from the appropriate disciplines are appointed by the D.P.M. Program Director and D.P.M. Competency Exam Coordinators.
to develop and grade the final written examination. The three sections of the written exam may be taken independently throughout the program at the discretion of the supervisory committee and the D.P.M. Director. Students are encouraged to complete the exam prior to the last full year of the D.P.M. program and his/her anticipated semester of graduation. Students should also complete the D.P.M. Competency Area Exams before the completion of a substantial internship. After a student passes all three sections of the final written examination (80% or higher is considered a passing grade), the supervisory committee administers an oral examination that tests the student's ability to diagnose and manage plant health problems. A student who fails to pass a comprehensive examination may retake an exam once with the recommendation of his/her supervisory committee.

Distance Program

The College of Agricultural and Life Sciences offers a distance education program leading to the D.P.M. degree for highly qualified students. The D.P.M. degree is awarded after a 3- to 4-year program of graduate student. Foreign languages are not required. The distance education program leading to a D.P.M. degree is administered by the Entomology and Nematology Department, College of Agricultural and Life Sciences, and the Graduate School.

Admission: Students must meet the following minimum requirements:

Entrance requirements:

- A graduate degree (Master's or Doctoral) with a concentration in plant health science, plant pathology, agronomy, horticulture, environmental horticulture, forestry, entomology, nematology, soil science or a similar field.
- A passing score for the Certified Crop Advisor (CCA) exam administered by the Agronomy Society of America (ASA).
- Completion of at least two years of full-time work in a professional job associated with the Plant Doctor (DPM/H) profession. Examples of professional jobs associated with the Plant Doctor profession include: crop consultant, industry scientist, extension specialist, diagnostician, identifier, survey specialist, plant pest risk analyst, plant health technician, or instructor.
- A minimum score of a 300 on the Graduate Record Examination (GRE). Verbal and quantitative portions of the GRE should be approximately 150 each. Exceptions to the minimum may be considered by the DPM admissions committee.
- International applicants must also have a TOEFL score above 80.
- A graduate (Master's or Doctoral) grade point average of 3.0 or higher.
- A passing score (80% or higher) on the Plant Pathology Written Comprehensive Exam. The exam must be completed in Gainesville, Florida.

Course requirements: Students enter the program with a Master's or Doctoral degree and must earn 60 credits. Transfer of graduate credits from another graduate degree are not allowed for the distance education program. All D.P.M. students complete two substantial 3-credit internships. Signed approval by a student's Committee and the D.P.M. Director is required prior to registering for substantial internship credits.

Comprehensive examination: Both written and oral comprehensive examinations are required of all D.P.M. students. The written examination has three sections: entomology/nematology, plant pathology, and plant/soil science. Faculty from the appropriate disciplines are appointed by the D.P.M. Program Director and D.P.M. Competency Exam Coordinators to develop and grade the final written examination. Students enrolled in the distance education program must pass the plant pathology written competency area exam prior to admission. The two remaining sections of the written exam may be taken independently throughout the program at the discretion of the supervisory committee and the D.P.M. Director. Students are encouraged to complete the exam prior to the last full year of the D.P.M. program and his/her anticipated semester of graduation. Students should also complete the D.P.M. Competency Area Exams before the completion of a substantial internship. After a student passes all three sections of the final written examination (80% or higher is considered a passing grade), the supervisory committee administers an oral examination that tests the student’s ability to diagnose and manage plant health problems. A student who fails to pass a comprehensive examination may retake an exam once with the recommendation of his/her supervisory committee.

Specialized Degrees

Specialist in Education

An Ed.S. program develops competencies needed for a professional specialization. Specializations are offered in the School of Teaching and Learning, the School of Special Education, School Psychology, and Early Childhood Studies, and the School of Human Development and Organizational Studies in Education. Ed.S. applicants must apply and be admitted to UF's Graduate School. All work for the degree, including transferred credit, must be completed within 7 years before the degree is awarded.

The Ed.S. degree is awarded on completing a planned program with at least 72 credits beyond the bachelor's degree or at least 36 credits beyond the master's degree. All credits accepted for the program must contribute to the unity and the stated objective of the total program.

Students are tested (no more than 6 months before graduation) by written and oral examination. A thesis is not required; however, each program includes a research component relevant to the intended profession. With the academic unit’s approval, course work taken as part of the specialist program may count toward a doctoral degree.

Students who enter the program with an appropriate master’s degree from another accredited institution must complete at least 36 credits of post-master’s study to meet the following requirements:

- At least 36 credits in graduate-level courses
- At least 12 credits in graduate-level professional education courses

Students who enter the program with a bachelor's degree only must (during the 72-credit program) meet these requirements in addition to the requirements of the Master of Education degree or its equivalent.

Only graduate-level (5000-7999) work, earned with a grade of B or better, is eligible for transfer of credit. A maximum of 15 transfer credits are allowed. These can include no more than 9 credits from institution/s approved by UF; with the balance obtained from post-baccalaureate work at UF. Credits transferred from other universities are applied toward meeting the degree requirements, but the grades earned are not computed in the student’s grade point average. Acceptance of transfer of credit requires approval of the student's supervisory committee and the Dean of the Graduate School.

Petitions for transfer of credit for the Ed.S. degree must be made during the student's first term of enrollment in the Graduate School. The supervisory committee is responsible for basing acceptance of graduate
transfer credits on established criteria for ensuring the academic integrity of course work.

Students are tested (no more than 6 months before graduation) by written and oral examination. A thesis is not required; however, each program includes a research component relevant to the intended profession. With the academic unit's approval, course work taken as part of the specialist program may count toward a doctoral degree.

**Other Degree Combinations**

All other degree combinations that involve a graduate degree as at least one component (not addressed in the above definitions) require a formal approval process through the academic units offering the degree programs and the Graduate School.

Taking multiple courses within a discipline does not constitute admission to that discipline's graduate programs.

The primary/home academic unit must contact the Graduate School's Student Records Unit for procedural details and deadlines. In all cases, each academic unit must submit appropriate programs of study to the Graduate School for review. Graduate School approval for participation must be obtained prior to the published Midpoint deadline of the term in which the first degree is to be awarded. Retroactive requests will not be considered.

Ultimately, it is the student's responsibility to follow up with the academic units to verify that all Graduate School approvals and deadlines have been met.

**Nontraditional Programs**

**Concurrent Graduate Programs**

Any student interested in pursuing two master's degrees in two different programs or two master's degrees in the same program concurrently should discuss the proposed study with Graduate Student Records (392-4643, 116 Grinter) before applying. Written approval is needed from each academic unit and the Graduate School Dean. The student must be officially admitted to both programs through regular procedures. No more than 9 credits from the first program may be applied toward the second. Contact the academic unit(s) for details.

**Joint Degree Programs**

A joint degree program leads to a graduate degree and a professional degree. Normally 12 credits of professional courses count toward the graduate degree and 12 credits of graduate courses count toward the professional degree. Individual academic units determine whether a joint degree program is appropriate. Joint programs established before January 1, 2003, may have other requirements.

To participate in a joint program, a student must be admitted to both programs. Enrollment in one program may precede enrollment in the other according to timelines set by the program. During the term the student is graduating, registration is required (at least 3 credits fall or spring, or 2 credits summer). This course work must be credit that applies toward the graduate degree requirements. See graduate coordinator for details.

**Combined Bachelor's/Master's Degree Programs**

UF offers a number of bachelor's/master's programs for superior students. In these programs, 12 credits of graduate-level courses are counted for both degrees. See Transfer of Credit for requirements. For admission requirements and available programs, contact the academic unit.

**State University System Programs**

**Traveling Scholar program:** By mutual agreement of the appropriate academic authorities in both the home and host institutions, traveling scholars' admission requirements are waived and their earned credits are guaranteed acceptance. Traveling scholars are normally limited to 1 term on the host campus, and it cannot be their final term. The program offers special resources on another campus that are not available on the student's home campus. To participate, graduate students need prior approval from their graduate coordinator, their supervisory committee chair, and the Dean of the Graduate School. Interested students should contact Graduate Student Records, 116 Grinter Hall.

**Cooperative degree programs:** In certain degree programs, faculty from other universities in the State University System hold Graduate Faculty status at UF. In those approved areas, the intellectual resources of these Graduate Faculty members are available to students at UF.
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College of Veterinary Medicine
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College of Agricultural and Life Sciences

Dean: Elaine Turner

The College of Agricultural and Life Sciences offers academic programs and grants advanced degrees in 14 departments and the Schools of Forest Resources and Conservation, and Natural Resources and Environment. These academic units are all a part of the Institute of Food and Agricultural Sciences (IFAS). Additional components of IFAS include 12 research and education centers located throughout the state and cooperative extension offices in each of the 67 counties of the state.

For more information, please see our website: http://cals.ufl.edu.

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### Faculty

#### Professor
- Peterson, John Carl

#### Assistant Professor
- Adams, Alison Eve
- Koeser, Andrew K.
- Marble, Stephen Christopher
- Pearson, Brian J.
- Shaddox, Travis Wayne

#### Other
- Barry, Debra Marie-Hope
- Rampold, Shelli Danjean
- Toledo, Izabella Maria Michelon

#### Research Assistant Professor
- Chagaris, David D.
- Martin, Charles

### Agricultural and Biological Engineering Department

Chair: Dorota Z. Haman
Graduate Coordinator: Greg Kiker

The degrees of Master of Science and Doctor of Philosophy are offered with graduate programs in agricultural and biological engineering in the areas of agricultural operations management and applied sciences through the College of Agricultural and Life Sciences. Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

The Master of Science and Doctor of Philosophy in the agricultural operations management area of specialization provide for scientific training and research in technical agricultural management. Typical plans of study focus on advanced training in environmental systems management, production systems management, construction and process management and technical sales management.

For students with basic science degrees, the Master of Science and Doctor of Philosophy programs with a specialization in applied sciences through the College of Agricultural and Life Sciences provides advanced training in problem-solving capabilities, interdisciplinary research, and methods for applying science to real-world problems and issues. Typical emphasis is on:

1. the use of engineering methods and approaches, such as mathematical modeling, optimization, and information technologies, in application of science to problems of various spatial and temporal scales; and
2. an interdisciplinary experience in research at the doctoral level.
The requirements for a master's degree normally take 2 years to complete. The length of time required for the Doctor of Philosophy degree depends partly on the research topic, but normally takes 3 to 4 years.

For more information about the program, please visit the program link below and the graduate studies pages on the departmental website at http://www.abe.ufl.edu.

**Majors**
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**Faculty**

**Professor**
- Asseng, Senthold
- Burks, Thomas Francis
- Dukes, Michael D.
- Fraisse, Clyde William
- Gao, Bin
- Graham, Wendy Dimbrero
- Hoogenboom, Gerrit
- Huffaker, Ray G.
- Jones, Pierce H.
- Judge, Jasmeet
- Kiker, Gregory A.
- Lee, Won Suk
- Migliaccio, Kati White
- Mukhtar, Saqib
- Munoz-Carpena, Rafael
- Shukla, Sanjay
- Welt, Bruce Ari

**Associate Professor**
- Bliznyuk, Nikolay A.
- Correll, Melanie J.
- Martinez, Christopher J.
- McLamore, Eric
- Muneepeerakul, Rachata
- Pullammanappallil, P C.
- Tong, Zhaohui

**Assistant Professor**
- Ampatzidis, Ioannis
- Bayabil, Haimanote Kebede
- Bean, Eban Zachary
- Gorucu, Serap
- Guzman Gutierrez, Sandra Milena
- Her, Young Gu
- Martin-Ryals, Ana D.
- Sharma, Vivek
- Singh, Aditya
- Watson, Jonathan A.
- Yu, Ziwen
- Zhang, Ying

**Research Professor**
- Palm, Cheryl A.

**Senior Lecturer**
- Leary, James Daniel
- Porter, Wendell A.

**Affiliated Faculty**
- Schueller, John Kenneth

**Agricultural and Biological Engineering (CALS)**

**Program Information**

The degrees of Master of Science, Master of Engineering, and Doctor of Philosophy are offered with graduate programs in agricultural and biological engineering through the College of Engineering. Students must have an undergraduate or graduate degree in Engineering or meet specific articulation requirements in order to pursue an advanced degree in engineering.

For students without an engineering degree, The Master of Science and Doctor of Philosophy degrees in agricultural and biological engineering are offered in the areas of agricultural operations management and applied science through the College of Agricultural and Life Sciences. Students must have a degree in a related field or meet specific articulation requirements.

A combined B.S./M.S. or B.S./M.E. for Engineering students program allows up to 12 graduate credits to be double-counted toward fulfillment of both degrees. Contact the graduate coordinator for qualifications and details. A 30-credit, non-thesis master's degree program is also available to students interested in completing the requirements in 1 year.

The Master of Science, Master of Engineering, and Doctor of Philosophy (Engineering) degrees are offered in the following areas of research:

Agricultural production engineering includes development and application of precision agriculture concepts and tools, weather and climate risk in agriculture, decision support systems, food security, pesticide application, post-harvest operations robotics and other machine systems and environmental control systems. Applications to space biology are included in cooperation with NASA at Kennedy Space Center.

Biological engineering includes includes biocomplexity analysis, ecological modeling, risk and decision analysis, bioprocess design, plant biotechnology, process microbiology, food process engineering, environmental biotechnology, bioreactors, and packaging science.

Information systems includes development and application of GIS and remote sensing, communications, mathematical modeling, data solutions, and expert systems techniques to biological and agricultural systems.

Land and water resources includes soil-water-plant relations, irrigation, water quality, watershed hydrology, BMP and TMDL studies, hydrologic modeling, ecological restoration, environmental fate and transport of nanoparticles, waste management, and water reuse.
Students also may choose to participate in interdisciplinary concentrations in hydrologic sciences, geographic information sciences, particle science and technology, and interdisciplinary ecology.

The Master of Science and Doctor of Philosophy (CALS) in the agricultural operations management area of specialization provide for scientific training and research in technical agricultural management. Typical plans of study focus on advanced training in environmental systems management, production systems management, construction and process management and technical sales management.

In addition, for students with basic science degrees, the Master of Science and Doctor of Philosophy programs with a specialization in applied sciences through the College of Agricultural and Life Sciences provides advanced training in problem-solving capabilities, interdisciplinary research, and methods for applying science to real-world problems and issues. Typical emphasis is on:

1. the use of engineering methods and approaches, such as mathematical modeling, optimization, and information technologies, in application of science to problems of various spatial and temporal scales; and
2. an interdisciplinary experience in research at the doctoral level.

The requirements for a master’s degree normally take 2 years to complete. The length of time required for the Doctor of Philosophy degree depends partly on the research topic, but normally takes 3 to 4 years.

Additional information can also be found on the graduate studies pages on the department website at www.abe.ufl.edu (http://www.abe.ufl.edu).

Degrees Offered with a Major in Agricultural and Biological Engineering

- Doctor of Philosophy
  - without a concentration
  - concentration in Geographic Information Systems
  - concentration in Global Systems Agroecology
  - concentration in Hydrologic Sciences
  - concentration in Wetland Sciences
- Master of Science
  - without a concentration
  - concentration in Agroecology
  - concentration in Geographic Information Systems
  - concentration in Hydrologic Sciences
  - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

**Agricultural and Biological Engineering Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ABE 5015</td>
<td>Empirical Models of Crop Growth and Yield Response</td>
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<tr>
<td>ABE 5038</td>
<td>Recent Developments and Applications in Biosensors</td>
<td>3</td>
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<tr>
<td>ABE 5152</td>
<td>Fluid Power Circuits and Control</td>
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<td>ABE 5332</td>
<td>Advanced Agricultural Structures</td>
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<td>ABE 5442</td>
<td>Advanced Agricultural Process Engineering</td>
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<tr>
<td>ABE 5643C</td>
<td>Biological Systems Modeling</td>
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<td>ABE 5646</td>
<td>Biological and Agricultural Systems Simulation</td>
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<td>ABE 5653</td>
<td>Rheology and Mechanics of Agricultural and Biological Materials</td>
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<td>ABE 5663</td>
<td>Advanced Applied Microbial Biotechnology</td>
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<tr>
<td>ABE 5707C</td>
<td>Agricultural Waste Management</td>
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<td>ABE 5815C</td>
<td>Food and Bioprocess Engineering Design</td>
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<td>ABE 5936</td>
<td>Writing Grant Proposals for Scholarships and Fellowships</td>
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<td>ABE 6005</td>
<td>Applied Control for Automation and Robots</td>
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<td>ABE 6031</td>
<td>Instrumentation in Agricultural Engineering Research</td>
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<td>ABE 6035</td>
<td>Advanced Remote Sensing: Science and Sensors</td>
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<td>ABE 6037C</td>
<td>Remote Sensing in Hydrology</td>
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<td>ABE 6252</td>
<td>Advanced Soil and Water Management Engineering</td>
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<td>ABE 6254</td>
<td>Simulation of Agricultural Watershed Systems</td>
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<td>ABE 6255</td>
<td>Vadose Zone Modeling</td>
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<td>ABE 6266</td>
<td>Nanotechnology in Water Research</td>
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<td>ABE 6615</td>
<td>Advanced Heat and Mass Transfer in Biological Systems</td>
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<td>ABE 6644</td>
<td>Agricultural Decision Systems</td>
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<td>ABE 6645C</td>
<td>Computer Simulation of Crop Growth and Management Responses</td>
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<td>ABE 6654C</td>
<td>Advanced Bio-Based Products from Renewable Resources</td>
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<td>ABE 6816</td>
<td>Food and Bioprocess Sterilization</td>
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<td>ABE 6905</td>
<td>Individual Work in Agricultural and Biological Engineering</td>
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<td>ABE 6910</td>
<td>Supervised Research</td>
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<td>Special Topics in Agricultural and Biological Engineering</td>
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<td>ABE 6940</td>
<td>Supervised Teaching</td>
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<td>ABE 6971</td>
<td>Research for Master’s Thesis</td>
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<tr>
<td>ABE 6972</td>
<td>Research for Engineer’s Thesis</td>
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<td>ABE 6974</td>
<td>Nonthesis Project</td>
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<td>ABE 6986</td>
<td>Applied Mathematics in Engineering and Agriculture</td>
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<td>ABE 7979</td>
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<tr>
<td>ABE 7980</td>
<td>Research for Doctoral Dissertation</td>
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<td>AGG 5607</td>
<td>Communicating in Academia</td>
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<td>AOM 5334C</td>
<td>Agricultural Chemical Application Technology</td>
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<td>AOM 5431</td>
<td>GIS and Remote Sensing in Agriculture and Natural Resources</td>
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<td>AOM 5435</td>
<td>Advanced Precision Agriculture</td>
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<td>AOM 6735</td>
<td>Irrigation Principles and Management</td>
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<tr>
<td>AOM 6736</td>
<td>Principles and Issues in Environmental Hydrology</td>
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<tr>
<td>AOM 6905</td>
<td>Individual Work in Agricultural Operations Management</td>
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<td>AOM 6932</td>
<td>Special Topics in Agricultural Operations</td>
<td>1-6</td>
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<tr>
<td>AOM 6933</td>
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<tr>
<td>CWR 6536</td>
<td>Stochastic Subsurface Hydrology</td>
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<tr>
<td>PKG 5003</td>
<td>Advanced Distribution and Transport Packaging</td>
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Agricultural and Biological Engineering

Departmental Courses

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<td>PKG 5006</td>
<td>Advanced Packaging Principles</td>
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<td>PKG 5105</td>
<td>Advanced Consumer Products Packaging</td>
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<tr>
<td>PKG 6256C</td>
<td>Advanced Analytical Packaging Methods</td>
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<td>PKG 6100</td>
<td>Advanced Computer Tools for Packaging</td>
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<tr>
<td>PKG 6905</td>
<td>Individual Work in Packaging</td>
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<tr>
<td>PKG 6932</td>
<td>Special Topics in Packaging Sciences</td>
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College of Agricultural and Life Sciences Courses

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<td>ALS 5156</td>
<td>Agricultural Ecology Principles and Applications</td>
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<tr>
<td>ALS 5905</td>
<td>Individual Study</td>
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<tr>
<td>ALS 5932</td>
<td>Special Topics</td>
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<tr>
<td>ALS 6046</td>
<td>Grant Writing</td>
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<td>ALS 6166</td>
<td>Exotic Species and Biosecurity Issues</td>
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<td>ALS 6921</td>
<td>Colloquium on Plant Pests of Regulatory Significance</td>
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<td>ALS 6925</td>
<td>Integrated Plant Medicine</td>
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<td>ALS 6931</td>
<td>Plant Medicine Program Seminar</td>
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<td>ALS 6935</td>
<td>Topics in Biological Invasions</td>
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<tr>
<td>ALS 6942</td>
<td>Principles of Pest Risk Assessment and Management</td>
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<td>ALS 6943</td>
<td>Internship in Pest Risk Assessment and Management</td>
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<td>ANSI 6936</td>
<td>Graduate Seminar in Animal Molecular and Cell Biology</td>
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<td>BCH 5045</td>
<td>Graduate Survey of Biochemistry</td>
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<td>FYC 6422</td>
<td>Policy Issues and Case Studies in Nonprofit Organizations</td>
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<tr>
<td>STA 6093</td>
<td>Introduction to Applied Statistics for Agricultural and Life Sciences</td>
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<tr>
<td>STA 6329</td>
<td>Matrix Algebra and Statistical Computing</td>
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</table>

Student Learning Outcomes

Agricultural & Biological Engineering (PHD)

SLO 1 Knowledge
Employ mathematics, science and engineering principles to solve problems in the discipline of Agricultural and Biological Engineering.

SLO 2 Skills
Apply, analyze, and synthesize content knowledge to plan and conduct scholarly activities that make original contributions to the knowledge base in the field of study by identifying components or processes of agricultural and/or biological systems to meet desired needs within realistic economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability constraints.

SLO 3 Professional Behavior
Display ethical behavior, cultural sensitivity, teamwork, professional conduct and effective communication.
Agricultural & biological engineering (MS)

SLO 1 Knowledge
Identifies, describes, explains, and applies the mathematics, science and engineering principles of the discipline of Agricultural and Biological Engineering.

SLO 2 Skills
Apply, analyze, and synthesize content knowledge to solve problems by identifying components or processes of agricultural and/or biological systems to meet desired needs within realistic economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability constraints.

SLO 3 Professional Behavior
Display ethical behavior, cultural sensitivity, teamwork, professional conduct and effective communication

Agricultural Education and Communication Department
Chair: B. E. Myers
Graduate Coordinator: G.D. Israel

The Department of Agricultural Education and Communication offers the degrees of Master of Science and Doctor of Philosophy. Graduate students who obtain a degree in Agricultural Education and Communication will focus their study in one of four areas of specialization. The areas of specialization are agricultural communication, agricultural education, extension education, and leadership development. These degree programs are individually tailored to meet the student’s unique needs for professional development. The requirements for each degree are described in the Graduate Degrees (p. 48) section of the University of Florida Graduate Catalog. More information about our program can be found by following the link below.

Majors
- Agricultural Education and Communication (p. 81)

Faculty
Professor
- Harder, Amy Marie
- Israel, Glenn D.
- Myers, Brian E.
- Osborne, Edward Wayne
- Place, Nick T.
- Roberts, Thomas G.
- Stedman, Nicole Lamee
- Telg, Ricky W.
- Vergot, Pete

Associate Professor
- Baker, Lauri May
- Lamm, Alexa J.
- Lundy, Lisa Katherine
- Monaghan, Paul F.
- Thoron, Andrew C.
- Warner, Laura Anne

Assistant Professor
- Benge, Matthew Paul
- Bunch, James Charles
- Diaz, John M.
- Easterly, Ralph G.
- Greenhaw, Laura Lee
- Jagger, Carla
- Loizzo, Jamie Lynn
- Sowcik, Matthew J.
- Suarez, Cecilia E.

Other
- Coers, Natalie

Research Assistant Professor
- Galindo, Sebastian
- Stofer, Kathryn Anne

Affiliated Faculty
- Barry, Debra Marie-Hope
- Rampold, Shelli Danjean

Program Information
The Master of Science program is designed to prepare graduates for domestic and international teaching, research, extension, administrative and leadership positions in both the public and private sectors. Courses are taught in an agricultural and natural resources context and are broadly applicable in educational, business, government, and agency settings. The Master of Science program is delivered on-campus and online via the AEC e-Learning Institute (eLI). The Doctor of Philosophy degree program is primarily designed to prepare graduates for academic positions in teaching, research, and extension within the realm of Agricultural Education and Communication. In addition, graduates may obtain positions in administration, human resource management, or training and development.

The Agricultural Communication specialization prepares students for professional communication careers in or dealing with agriculture and agribusiness. It is intended primarily for students who enter with a bachelor’s degree in journalism, agricultural communication/journalism, advertising, broadcasting, public relations, or related fields. Graduates of this option are employed in:

1. communication or management positions with the numerous commodity or special-interest associations in agriculture and related fields;
2. communication support positions in agricultural extension and research information departments of land-grant universities,
agencies of USDA, state Departments of Agriculture, and agricultural development projects overseas;
3. advertising and public relations positions with agribusiness firms or commodity associations; and
4. media positions involved in reporting on agriculture, agribusiness, and natural resource issues.

Students in Agricultural Communication also develop strong skills/application in media writing, production, campaign strategies and/or Web design/desktop publishing. Graduates become prepared for positions in both public and private sectors in both industry and educational settings.

The **Agricultural Education** specialization is designed to enhance the careers of those employed in the educational professions in agriculture and natural resources. Regardless if one is employed in public school teaching, community college instruction, or training and development in agribusiness, students gain valuable knowledge and experience in designing, implementing, and evaluating educational programs. In addition, graduates of the program command added depth in the understanding of the teaching and learning process. This specialization may be designed to allow students to complete the requirements of teacher certification while completing their master’s degree program. The PhD is a research-oriented degree that has a primary focus of preparing candidates to assume faculty positions in colleges or university teacher education programs. Candidates develop an individual program of study that provides a comprehensive knowledge of teaching and learning processes. The degree also seeks to extend the candidate’s development by providing instruction, research opportunities, and experiences that enhance the depth and breadth of the candidate’s prior learning opportunities.

The **Extension Education** specialization is designed to prepare students for careers in the Cooperative Extension service, outreach education, and/or other international agencies. Through coursework and research, students will gain valuable knowledge and experience in designing, implementing, and evaluating educational programs. Extension graduate students choose between a domestic or international focus in regards to coursework and/or research. In addition, graduates of the program command tremendous depth of the teaching and learning process. Candidates who select the **Extension Education** specialization develop an individual program of study that focuses on such topics as program development, experiential education, the change process, educational technologies and extension, program evaluation and organizational accountability, administration and leadership, and international extension. Graduates become prepared for a variety of positions including extension specialists, county and district extension directors, outreach education coordinators for private and public agencies, 4-H Extension agents and specialists, and educator specialists with international agencies.

The **Leadership Development** specialization is designed to prepare students for educational leadership, training, and outreach positions in agricultural, extension, community and governmental agencies. Course work in the major will focus on a core of agricultural courses along with emphasis in designing educational/training programs, professional presentation enhancement, leadership development, teaching/training methods, and interpersonal communication. Candidates who select the **Leadership Development** specialization develop an individual program that focuses on leadership theory and measurement, critical and creative thinking, and leadership in cross-cultural settings. Students will encompass a strong research and theory-based program with a strong knowledge of training and development, and human resource management. Graduates become prepared for positions in both public and private sectors in both industry and educational settings.

### Degrees Offered

#### Degrees Offered with a Major in Agricultural Education and Communication

- Doctor of Philosophy
  - without a concentration
  - concentration in Tropical Conservation and Development
- Master of Science
  - without a concentration
  - concentration in Tropical Conservation and Development

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

#### Agricultural Education and Communication Courses

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<td>Agricultural Media Writing</td>
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<td>AEC 5037</td>
<td>Agricultural Media Production</td>
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<td>AEC 5060</td>
<td>Public Opinion and Agricultural and Natural Resource Issues</td>
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<td>AEC 5074</td>
<td>Agriculture, Resources, People, and the Environment: A Global Perspective</td>
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<td>AEC 5201</td>
<td>Teaching in Colleges of Agricultural and Life Sciences</td>
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<td>AEC 5203</td>
<td>Advanced Teaching in Colleges of Agricultural and Life Sciences</td>
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<td>AEC 5206</td>
<td>Teaching Methods in Agricultural Education</td>
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<td>AEC 5227</td>
<td>Teaching in Agricultural Education Laboratory Facilities</td>
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<td>AEC 5302</td>
<td>Professional Skill Development in Agriscience Education I</td>
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<td>AEC 5324</td>
<td>Philosophy and Development of Agricultural Education</td>
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<td>AEC 5440</td>
<td>Interpersonal Leadership in Agricultural and Life Sciences</td>
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<td>AEC 5454</td>
<td>Leadership Development for Extension and Community Nonprofit Organizations</td>
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<td>AEC 5501</td>
<td>Professional Skill Development in Agriscience Education II</td>
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<td>AEC 5541</td>
<td>Communication and Instructional Technologies in Agricultural and Life Sciences</td>
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<td>AEC 5544</td>
<td>Curriculum Development and Assessment Techniques in Emerging Agricultural Technologies</td>
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<td>AEC 5545</td>
<td>Special Methods in Teaching Agriculture</td>
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<td>AEC 5546</td>
<td>Program Planning in Agricultural Education</td>
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<td>AEC 6205</td>
<td>Advanced Curriculum and Teaching Methods</td>
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<td>AEC 6210</td>
<td>Designing Educational Programs in Agricultural Settings</td>
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<td>Delivering Educational Programs in Agricultural Settings</td>
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<td>Methodology of Planned Change</td>
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<td>AEC 631</td>
<td>From America to Zimbabwe: An Overview of International Extension Systems</td>
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<td>The Land Grant University and University Governance</td>
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<td>History and Philosophy of Agricultural Education</td>
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<td>Organizational Leadership in Agriculture and Life Sciences</td>
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<td>Agricultural and Natural Resources Communications Theory and Strategies</td>
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<td>Agricultural and Extension Adult Education</td>
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<td>Extension Administration and Supervision</td>
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<td>Nonthesis Research in Agricultural and Extension Education</td>
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<td>Practicum in Agricultural Education and Communication</td>
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<td>AEC 541</td>
<td>Critical and Creative Thinking in Problem Solving and Decision Making</td>
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### Agricultural Education and Communication Departmental Courses

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<td>AEC 541</td>
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<td>AEC 544</td>
<td>Interpersonal Leadership in Agricultural and Life Sciences</td>
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<td>Leadership Development for Extension and Community Nonprofit Organizations</td>
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<td>Professional Skill Development in Agriscience Education II</td>
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<td>AEC 554</td>
<td>Communication and Instructional Technologies in Agricultural and Life Sciences</td>
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<td>AEC 555</td>
<td>Curriculum Development and Assessment Techniques in Emerging Agricultural Technologies</td>
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<td>Special Methods in Teaching Agriculture</td>
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<td>AEC 605</td>
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<td>AEC 610</td>
<td>Advanced Curriculum and Teaching Methods</td>
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<td>AEC 611</td>
<td>Designing Educational Programs in Agricultural Settings</td>
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<td>AEC 612</td>
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<td>AEC 622</td>
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<td>AEC 630</td>
<td>Laboratory Instruction: Theory and Practice</td>
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<td>AEC 636</td>
<td>From America to Zimbabwe: An Overview of International Extension Systems</td>
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<td>AEC 631</td>
<td>The Land Grant University and University Governance</td>
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<td>AEC 635</td>
<td>History and Philosophy of Agricultural Education</td>
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<td>AEC 641</td>
<td>Organizational Leadership in Agriculture and Life Sciences</td>
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<td>Communication and Competencies for Global Leadership</td>
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<td>AEC 654</td>
<td>Program Development in Extension Education</td>
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<td>AEC 659</td>
<td>Agricultural and Natural Resources Communications Theory and Strategies</td>
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<td>AEC 662</td>
<td>Teaching and Learning Theory: Applications in Agricultural Education</td>
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<td>AEC 666</td>
<td>Agricultural and Extension Adult Education</td>
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<td>AEC 670</td>
<td>Extension Administration and Supervision</td>
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<td>AEC 676</td>
<td>Research Strategies in Agricultural Education and Communication</td>
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AEC 6945 | Practicum in Agricultural Education and Communication | 1-9
AEC 6947 | Experiential Learning in Agricultural Education | 3
AEC 6971 | Research for Master's Thesis | 1-15
AEC 6980 | Thesis/Dissertation Proposal Development | 3
AEC 7979 | Advanced Research | 1-12
AEC 7980 | Research for Doctoral Dissertation | 1-15

**College of Agricultural and Life Sciences Courses**

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<td>ALS 6925</td>
<td>Integrated Plant Medicine</td>
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<td>Principles of Plant Pest Risk Assessment and Management</td>
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<td>Graduate Seminar in Animal Molecular and Cell Biology</td>
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<td>BCH 5045</td>
<td>Graduate Survey of Biochemistry</td>
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<td>FYC 6422</td>
<td>Policy Issues and Case Studies in Nonprofit Organizations</td>
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<td>STA 6093</td>
<td>Introduction to Applied Statistics for Agricultural and Life Sciences</td>
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<td>STA 6329</td>
<td>Matrix Algebra and Statistical Computing</td>
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**Student Learning Outcomes**

**Agricultural Education & Communications (PHD)**

SLO 1   Knowledge
Summarize contemporary and foundational theory and research in the selected specialization.

SLO 2   Knowledge
Apply, analyze and synthesize content knowledge, evolving concepts and philosophies in the selected specialization to solve problems by identifying component parts, relationships and ideas.

SLO 3   Skills
Apply visual and nonvisual techniques in the use of instructional materials and methods.

SLO 4   Skills
Apply concepts and principles related to design, implementation and evaluation of formal and non-formal education and/or training and development programs.

SLO 5   Skills
Apply principles, practices and strategies for conducting behavioral research in agricultural and natural resource professions.

**Agricultural Education & Communications (MS)**

SLO 1   Knowledge
Display competency in contemporary and foundational theory and research in their selected specialization.

SLO 2   Knowledge
Apply, analyze and synthesize content knowledge and evolving concepts and philosophies in the selected specialization to solve problems by identifying component parts, relationships and ideas.

SLO 3   Skills
Apply visual and nonvisual techniques in the use of instructional materials and methods.

SLO 4   Skills
Apply concepts and principles related to design, implementation and evaluation of formal and non-formal education and/or training and development programs.

SLO 5   Skills
Apply principles, practices and strategies for conducting behavioral research in agricultural and natural resource professions.

SLO 6   Professional Behavior
Display ethical behaviors, cultural sensitivity, teamwork, professional conduct and communication.

**Agronomy Department**

*Interim Chair: D. L. Rowland  
Graduate Coordinator: L. E. Sollenberger*

The Agronomy Department offers the degrees of Doctor of Philosophy and Master of Science (thesis and non-thesis options) in agronomy with specializations in plant physiology, ecology, management and nutrition, weed science (terrestrial and aquatic), and plant breeding and genetics. Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Graduate programs emphasize the development and subsequent application of basic principles in each specialization to the management of agricultural and natural ecosystems in Florida and throughout the world. The continuing need for increased plant production for food, fiber and energy to meet the demands of a rapidly escalating population is reflected in departmental research programs. When compatible with a student’s program and permitted by prevailing circumstances, some thesis and dissertation research may be conducted wholly or in part in other countries.

Students seeking a graduate program in the Agronomy Department should hold a Bachelor of Science degree from an accredited college or university with a major in an area of plant science, or closely related discipline. A science background with basic courses in biology, botany,
mathematics, chemistry, and physics is required of new graduate students.

For more information, please see https://agronomy.ifas.ufl.edu/.

Majors
• Agronomy (p. 85)

Faculty

Professor
• Altpeter, Fredy
• Blount, Ann Rachel
• Ferrell, Jason Arden
• Fishel, Frederick M.
• Gilbert, Robert A.
• Kenworthy, Kevin E.
• Macdonald, Gregory E.
• Rowland, Diane L.
• Sellers, Brent Alan
• Tillman, Barry
• Vansanten, Edzard
• Wright, David L.

Associate Professor
• Dubeux, Jose Carlos
• Enloe, Stephen Frederick
• Flory, Stephen
• Leon-Gonzalez, Ramon G.
• Odero, Dennis C.
• Vendramini, Joao Mauricio
• Wang, Jianping

Assistant Professor
• Babar, Md Ali
• Brym, Zachary Thomas
• Devkota, Pratap
• Gettys, Lyn A.
• Laughinghouse, Haywood D.
• Leary, James J K
• Mulvaney, Michael J.
• Osorio Wallau, Marcelo
• Prince, Candice M.
• Rios, Esteban Fernando
• Sandhu, Hardev S.
• Wilson, Chris H.

Other
• Celis Azofeifa, Gerardo
• Estrada, James Anthony

Assistant Scientist
• Lieurance, Deah Marie

Scientist
• McCray, James M.

Distinguished Professor
• Sollenberger, Lynn E.

Research Assistant Scientist
• Sperry, Benjamin P.

Affiliated Faculty
• Warner, Laura Anne
  Associate Professor

Agronomy

Program Information
The Agronomy Department offers the degrees of Doctor of Philosophy and Master of Science (thesis and non-thesis option) in agronomy with specializations in plant physiology, ecology, management and nutrition, weed science (terrestrial and aquatic), and plant breeding and genetics.

Graduate programs emphasize the development and subsequent application of basic principles in each specialization to the management of plants in Florida and throughout the world. The continuing need for increased plant production for food, fiber and energy to meet the demands of a rapidly escalating population is reflected in departmental research programs. When compatible with a student’s program and permitted by prevailing circumstances, some thesis and dissertation research may be conducted wholly or in part in other countries.

Students seeking a graduate program in the Agronomy Department should hold a Bachelor of Science degree from an accredited college or university with a major in an area of plant science, or closely related discipline. A science background with basic courses in biology, botany, mathematics, chemistry, and physics is required of new graduate students.

Degrees Offered with a Major in Agronomy

• Doctor of Philosophy
  • without a concentration
  • concentration in Global Systems Agroecology
  • concentration in Toxicology
  • concentration in Tropical Conservation and Development

• Master of Science
  • without a concentration
  • concentration in Agroecology
  • concentration in Geographic Information Systems
  • concentration in Tropical Conservation and Development

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.
## Agronomy Departmental Courses

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<td>AGR 5266C</td>
<td>Field Plot Techniques</td>
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<td>AGR 5277C</td>
<td>Tropical Crop Production</td>
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<td>AGR 5307</td>
<td>Molecular Genetics for Crop Improvement</td>
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<td>AGR 5321C</td>
<td>Genetic Improvement of Plants</td>
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<td>AGR 5444</td>
<td>Ecophysiology of Crop Production</td>
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<td>AGR 5511</td>
<td>Crop Ecology</td>
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<td>AGR 6233</td>
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<td>Research Techniques in Forage Evaluation</td>
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<td>AGR 6322</td>
<td>Advanced Plant Breeding</td>
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<td>Agronomic Problems</td>
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<td>Global Agroecosystems</td>
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<td>PLS 5305</td>
<td>Principles of Pesticides</td>
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<td>Upland Invasive Plant Management</td>
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<td>PLS 6626</td>
<td>Invasive Plant Ecology</td>
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<td>PLS 6655</td>
<td>Plant/Herbicide Interaction</td>
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## College of Agricultural and Life Sciences Courses

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<td>FYC 6422</td>
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## Student Learning Outcomes

### Agronomy (PhD)

**SLO 1 Knowledge**
- Describe and explain theories and concepts in the basic plant sciences and in a chosen specialization (Crop Genetics and Breeding; Crop Physiology and Ecology; Crop Nutrition and Management; Weed Science).

**SLO 2 Knowledge**
- Design and execute an innovative research plan and analyze, synthesize and interpret research results using appropriate experimental designs and statistical analyses.

**SLO 3 Knowledge**
- Address and solve issues related to crop production and resource management in preparation for leadership roles in the discipline (in academia, government or the private sector).

**SLO 4 Skills**
- Communicate effectively and professionally in oral and written form and in interpersonal relationships.

**SLO 5 Professional Behavior**
- Conduct all scholarly activities, including teaching, research and outreach with collegiality, cultural sensitivity, and ethical practices.

### Agronomy (MS)

**SLO 1 Knowledge**
- Describe and explain theories and concepts in the basic plant sciences and in a chosen specialization (Crop Genetics and Breeding; Crop Physiology and Ecology; Crop Nutrition and Management; Weed Science).

**SLO 2 Knowledge**
- Design and execute an innovative research plan and analyze, synthesize and interpret research results using appropriate experimental designs and statistical analyses.

**SLO 3 Knowledge**
- Address and solve issues related to crop production and resource management in preparation for leadership roles in the discipline (in academia, government or the private sector).

**SLO 4 Skills**
- Communicate effectively and professionally in oral and written form and in interpersonal relationships.

**SLO 5 Professional Behavior**
- Conduct all scholarly activities, including teaching, research and outreach with collegiality, cultural sensitivity, and ethical practices.

### Animal Molecular and Cellular Biology Department

**Director**: John Driver

For more information about the program, contact P.J. Hansen at pjhansen@ufl.edu, follow the link below to our catalog page, or visit the program's website at http://www.animal.ufl.edu/amcb/.
Animal Molecular and Cellular Biology

Program Information
The animal molecular and cell biology (AMCB) graduate program offers Master of Science and Doctor of Philosophy degrees. Faculty are drawn from these disciplines:

- Animal Sciences
- Biochemistry and Molecular Biology
- Large Animal Clinical Sciences
- Obstetrics and Gynecology
- Zoology

Early in the program, students choose a faculty supervisor who will ensure the quality of their research experience. Students may also do optional rotations through the laboratories of one or more other faculty. The Annual Research Symposium features guest speakers and student research presentations. A weekly journal club and monthly seminars draw on the knowledge and diversity the campus offers in molecular and cell biology.

Core course requirements for the M.S. degree are BCH 5045 Graduate Survey of Biochemistry (4 cr.), registration in a 1-credit graduate seminar course and successful completion of a course on responsible and ethical conduct of research. Core course requirements for the Ph.D. include BCH 5413 Mammalian Molecular Biology and Genetics (3 cr.) and GMS 6421 Cell Biology (4 cr.), registration in two graduate seminar courses and successful completion of a course on responsible and ethical conduct of research.

Contact P.J. Hansen at pjhansen@ufl.edu or visit the program's website at http://www.animal.ufl.edu/amcb/.

Degrees Offered
Degrees Offered with a Major in Animal Molecular and Cellular Biology

- Doctor of Philosophy
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses
Animal Molecular and Cellular Biology Courses

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<td>ABE 6933</td>
<td>Special Topics in Agricultural and Biological Engineering</td>
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<td>Special Topics</td>
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<td>ANS 5446</td>
<td>Reproductive Biology Seminar and Research Studies</td>
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<td>ANS 5935</td>
<td>Experimental Techniques and Analytical Procedures in Meat Research</td>
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Animal Sciences Department

Chair: John Arthington
Graduate Coordinator: Raluca Mateescu

Animal Sciences is an academic department of the College of Agriculture and Life Sciences (CALS) (https://cals.ufl.edu/), a unit of the Institute of Agriculture and Life Sciences (CALS).
Food and Agricultural Sciences (IFAS) (https://ifas.ufl.edu/). Creating new solutions to tomorrow's problems underlies everything we do in the Animal Sciences Program. In the areas of teaching, research, and extension, our faculty integrate the most modern technologies available with personal expertise and attention to the needs of students and our industry. For more information about the Animal Sciences program, contact Raluca Mateescu at raluca@ufl.edu, follow the link below to our program page, or visit the program's website at http://animal.ifas.ufl.edu/students/graduate/index.shtml (http://animal.ifas.ufl.edu/students/graduate/index.shtml/).

Majors
- Animal Sciences (p. 89)

Faculty

Professor
- Adesogan, Adegbola Tolulope
- Arthington, John David
- Brendemuhl, Joel H.
- Capua, Ilaria
- Dahl, Geoffrey E.
- De Vries, Albert
- Elzo, Mauricio Aguirre
- Havelaar, Arie Hendrik
- Santos, Jose Eduardo
- Staples, Charles R.

Associate Professor
- Brooks, Samantha Ann
- Carr, Charles C.
- DiLorenzo, Nicolas
- Mateescu, Raluca
- Tenbroeck, Saundra Hodge
- Thrift, Todd A.
- Warren, Lori Kay
- Williams, Sally Kathryn

Assistant Professor
- Binelli, Mario
- Daigneault, Bradford William
- Driver, John P.
- Faciola, Antonio
- Ferrarotto, Luiz Felipe
- Gonella Diaz, Angela Maria
- Harsh, Bailey Nicole
- McCoey, Sean Conrad
- Miller Cushon, Emily Kathryn
- Moriel, Philipe
- Penagaricano, Francisco
- Scheffler, Jason M.
- Scheffler, Tracy Leigh
- Wickens, Carissa Lee
- Wohlgemuth, Stephanie

Distinguished Professor
- Hansen, Peter J.

Research Assistant Professor
- Vyas, Diwakar

Affiliated Faculty
- Bromfield, John James
  Assistant Professor
- Jeong, Kwang Cheol
  Associate Professor
- Laporta, Jimena
  Assistant Professor
- Nelson, Corwin D.
  Assistant Professor
- Toledo, Izabella Maria Michelon
  Other

Animal Sciences

Program Information
The Department of Animal Sciences offers the degrees of Master of Science (thesis and non-thesis) and Doctor of Philosophy in Animal Sciences with emphasis in beef or dairy cattle, swine, or equine. Minimum requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

The following specializations are available:
- Breeding, genetics and genomics
- Behavior
- Management
- Immunology
- Nutrition (nutritional physiology, nutrient metabolism, and feedstuff utilization)
- Physiology (environmental, lactational, muscle and reproductive)
- Molecular biology (embryology, endocrinology, and genetics)
- Meat science (meat processing, meat quality, muscle biology, and food safety)

A student may work on a problem covering more than one area of study. Animal resources (beef cattle, dairy cattle, horses, swine, sheep, and laboratory animals) are available for use in various research programs. Nutrition, physiology, immunology and meats laboratories are available for detailed chemical and carcass quality evaluations, and excellent computer facilities are available. Special arrangements may be made to conduct research at the various branch agricultural experiment stations throughout Florida.

Departmental and program prerequisites for admission to graduate study include a sound science background, with basic courses in microbiology, biology, mathematics, and chemistry. All courses in the animal sciences program area are acceptable for graduate credit as part of the candidate's major.

The Graduate School restricts graduate students from pursuing minors in academic units that contribute major credit toward their degree program. Therefore, graduate students majoring in Animal Sciences cannot pursue a minor in Food and Resource Economics, Food Science and Human
Nutrition, Medicine-Biochemistry, and Veterinary Medical Sciences. In addition, undergraduate credits at the 3000–4000 level in the major of any of these listed academic units are not eligible to count toward degree requirements.

Combined programs: Qualified students are encouraged to apply to the combined degree program. Acceptance into the program will allow both a bachelor’s degree and master’s degree with a savings of 1 semester.

**Degrees Offered**

**Degrees Offered with a Major in Animal Sciences**

- Doctor of Philosophy
  - without a concentration
  - concentration in Animal Molecular and Cellular Biology
- Master of Science
  - without a concentration

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

**Animal Sciences Departmental Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ANS 5446</td>
<td>Animal Nutrition</td>
<td>3</td>
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<tr>
<td>ANS 5935</td>
<td>Reproductive Biology Seminar and Research Studies</td>
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<tr>
<td>ANS 6040</td>
<td>Concepts in Applied Ethology</td>
<td>3</td>
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<tr>
<td>ANS 6288</td>
<td>Experimental Techniques and Analytical Procedures in Meat Research</td>
<td>3</td>
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<tr>
<td>ANS 6312C</td>
<td>Applied Ruminant Reproductive Management</td>
<td>4</td>
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<tr>
<td>ANS 6313</td>
<td>Current Concepts in Reproductive Biology</td>
<td>2</td>
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<tr>
<td>ANS 6379L</td>
<td>Techniques Genetics</td>
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<tr>
<td>ANS 6387</td>
<td>Genetic Analysis of Complex Traits in Livestock</td>
<td>3</td>
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<tr>
<td>ANS 6447</td>
<td>Ruminant Nutrition</td>
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<tr>
<td>ANS 6449</td>
<td>Vitamins</td>
<td>3</td>
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<tr>
<td>ANS 6452</td>
<td>Principles of Forage Quality Evaluation</td>
<td>3</td>
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<tr>
<td>ANS 6458</td>
<td>Advanced Methods in Nutrition Technology</td>
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<tr>
<td>ANS 6636</td>
<td>Meat Technology</td>
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<tr>
<td>ANS 6637</td>
<td>Quantitative Microbial Risk Assessment of Pathogens in Food Systems</td>
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<tr>
<td>ANS 6702</td>
<td>Physiology of the Mammary Gland and Lactation</td>
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<tr>
<td>ANS 6704</td>
<td>Mammalian Endocrinology</td>
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<td>ANS 6705</td>
<td>Muscle Physiology</td>
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<td>ANS 6707</td>
<td>Growth Physiology in Farm Animals</td>
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<tr>
<td>ANS 6711</td>
<td>Current Topics in Equine Nutrition and Exercise Physiology</td>
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<td>ANS 6714</td>
<td>Current Topics in Microbial Physiology in Animals</td>
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<td>ANS 6715</td>
<td>Gastrointestinal and Feed Microbiology</td>
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<td>ANS 6716</td>
<td>Physiology in Farm Animals</td>
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<td>ANS 6718</td>
<td>Nutritional Physiology of Domestic Animals</td>
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<td>ANS 6723</td>
<td>Mineral Nutrition and Metabolism</td>
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<td>ANS 6750</td>
<td>Reproductive Physiology in Farm Animals</td>
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<td>ANS 6751</td>
<td>Physiology of Reproduction</td>
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<td>ANS 6767</td>
<td>Advanced Endocrinology</td>
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<td>ANS 6775</td>
<td>Essentials of Livestock Immunology</td>
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<td>ANS 6905</td>
<td>Problems in Animal Science</td>
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<td>ANS 6933</td>
<td>Graduate Seminar in Animal Science</td>
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<td>ANS 6936</td>
<td>Graduate Seminar in Animal Molecular and Cell Biology</td>
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<td>ANS 6940</td>
<td>Supervised Teaching</td>
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<td>ANS 6971</td>
<td>Research for Master’s Thesis</td>
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<td>Advanced Research</td>
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<td>ANS 7980</td>
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<td>PCB 6816</td>
<td>Thermal Physiology</td>
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**Additional Courses for Major Credit in Animal Sciences**

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<td>Agribusiness Financial Management</td>
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<td>AEB 6385</td>
<td>Management Strategies for Agribusiness Firms</td>
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<td>AEB 7182</td>
<td>Agricultural Risk Analysis and Decision Making</td>
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<tr>
<td>FOS 5205</td>
<td>Current Issues in Food Safety and Sanitation</td>
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<td>FOS 5225C</td>
<td>Principles in Food Microbiology</td>
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<td>FOS 5437C</td>
<td>Food Product Development</td>
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<td>FOS 5732</td>
<td>Current Issues in Food Regulations</td>
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<tr>
<td>FOS 5126C</td>
<td>Psychophysical Aspects of Foods</td>
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<tr>
<td>FOS 6226C</td>
<td>Advanced Food Microbiology</td>
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<tr>
<td>FOS 6315C</td>
<td>Advanced Food Chemistry</td>
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<tr>
<td>FOS 6317C</td>
<td>Flavor Chemistry and Technology</td>
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<td>FOS 6355C</td>
<td>Instrumental Analysis and Separations</td>
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<td>FOS 6428C</td>
<td>Advanced Food Processing</td>
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<td>Industrial Food Fermentations</td>
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<td>HUN 5447</td>
<td>Nutrition and Immunity</td>
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<td>HUN 6245</td>
<td>Advanced Human Nutrition</td>
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<td>HUN 6301</td>
<td>Nutritional Aspects of Lipid Metabolism</td>
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<td>HUN 6305</td>
<td>Nutritional Aspects of Carbohydrates</td>
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<td>HUN 6321</td>
<td>Proteins and Amino Acids in Nutrition</td>
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<td>VME 5244</td>
<td>Physiology: Organ Systems</td>
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**College of Agricultural and Life Sciences Courses**

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<td>Agricultural Ecology Principles and Applications</td>
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<tr>
<td>ALS 5905</td>
<td>Individual Study</td>
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<td>ALS 5932</td>
<td>Special Topics</td>
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<td>ALS 6046</td>
<td>Grant Writing</td>
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<tr>
<td>ALS 6166</td>
<td>Exotic Species and Biosecurity Issues</td>
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<td>ALS 6921</td>
<td>Colloquium on Plant Pests of Regulatory Significance</td>
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<td>ALS 6925</td>
<td>Integrated Plant Medicine</td>
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<td>ALS 6931</td>
<td>Plant Medicine Program Seminar</td>
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<td>ALS 6935</td>
<td>Topics in Biological Invasions</td>
<td>3</td>
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<tr>
<td>ALS 6942</td>
<td>Principles of Plant Pest Risk Assessment and Management</td>
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<tr>
<td>ALS 6943</td>
<td>Internship in Plant Pest Risk Assessment and Management</td>
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</table>

**Degrees Offered with a Major in Animal Sciences**

- Doctor of Philosophy
  - without a concentration
  - concentration in Animal Molecular and Cellular Biology
- Master of Science
  - without a concentration

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ANS 6936</td>
<td>Graduate Seminar in Animal Molecular and Cell Biology</td>
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<tr>
<td>BCH 5045</td>
<td>Graduate Survey of Biochemistry</td>
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<td>FYC 6422</td>
<td>Policy Issues and Case Studies in Nonprofit Organizations</td>
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</tr>
<tr>
<td>STA 6093</td>
<td>Introduction to Applied Statistics for Agricultural and Life Sciences</td>
<td>3</td>
</tr>
<tr>
<td>STA 6329</td>
<td>Matrix Algebra and Statistical Computing</td>
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</tbody>
</table>

**Student Learning Outcomes**

**Animal Sciences (PHD)**

SLO 1  Principles of Animal Sciences  
Identify, interpret, and discuss the principles of the animal sciences with a deeper mastery of a chosen specialization.

SLO 2  Employ Scientific Methods  
Employ scientific methods to critically appraise and devise solutions to problems in the animal sciences.

SLO 3  Solve Problems and Generate New Information  
Propose and deploy scientific methods to solve problems and generate new information.

SLO 4  Prepare Grants for Funding  
Prepare grants for extramural funding during their PhD program.

SLO 5  Professional Behavior  
Display ethical conduct and interact with others with honesty, cultural sensitivity, and respect.

SLO 6  Effective Communication  
Communicate effectively in professional situations.

**Animal sciences (MS)**

SLO 1  Principles of Animal Sciences  
Identify, interpret, and discuss the principles of the animal sciences with a deeper mastery of a chosen specialization.

SLO 2  Apply Scientific Methods  
Apply scientific methods to problems in the animal sciences and develop new solutions to such problems.

SLO 3  Problem Solving Skills  
Propose and deploy scientific methods to solve problems and generate new information.

SLO 4  Professional Behavior  
Display ethical conduct and interact with others with honesty, cultural sensitivity, and respect.

SLO 5  Communicate Effectively  
Communicate effectively in professional situations.

**Entomology and Nematology Department**

*Chair: Blair Siegfried  
Graduate Coordinator: Heather J. McAuslane*

The Entomology and Nematology Department offers the Master of Science (thesis and nonthesis options) and Doctor of Philosophy degrees in entomology and nematology. Minimum requirements for the M.S. and Ph.D. degrees are described in the Graduate Degrees (p. 48) section of this catalog.

The Department also offers a cooperative Doctor of Philosophy degree with Florida A&M University and distance education courses leading to the Master of Science degree with specializations in basic entomology, medical entomology, urban pest management, and landscape pest management. Members of the Graduate Faculty include the department resident faculty, faculty located on University of Florida campuses away from Gainesville, scientists with other State of Florida agencies such as the Division of Plant Industry and Florida Department of Agriculture and Consumer Services, and scientists of the U.S. Department of Agriculture. The Graduate Faculty is qualified to direct graduate students in all specialties of entomology and nematology.

New graduate students should have backgrounds in biology, chemistry, physics, and mathematics. Minor deficiencies may be made up after entering graduate school.

The Department offers a combined bachelor’s/master’s degree program. Contact the graduate coordinator for information.

For more information, please see the program page below, and visit our website: [http://entnemdept.ifas.ufl.edu/academics-directory/](http://entnemdept.ifas.ufl.edu/academics-directory/).

**Majors**

- Entomology and Nematology (p. 93)  
- Plant Medicine (p. 95)

**Faculty**

**Professor**

- Bloomquist, Jeffrey R.  
- Cave, Ronald David  
- Cherry, Ronald H.  
- Cilek, James  
- Crow, William T.  
- Cuda, James Paul  
- Day, Jonathan F.  
- Dickson, Donald W.  
- Duncan, Larry Wayne  
- Eger, Joseph E.  
- Ellis, James  
- Flowers, Ralph W.  
- Funderburk, Joseph E.  
- Giblin-Davis, Robin Michael  
- Hahn, Daniel Allen  
- Hall, David G.  
- Kaufman, Phillip Edward  
- Koehler, Philip G.  
- Leplla, Norman C.  
- Liburd, Oscar Emanuel  
- Mannion, Catharine Mary  
- McAuslane, Heather J.  
- Noling, Joseph W.  
- Nuessly, Gregg Stephen  
- Osborne, Lance S.
• Patterson, Richard S.
• Pescador, Manuel Lopez
• Rey, Jorge
• Rogers, Michael E.
• Scheffrahn, Rudolf H.
• Siegfried, Blair D.

**Associate Professor**

• Alborn, Hans T.
• Alto, Barry Wilmer
• Baldwin, Rebecca W.
• Branham, Marc A.
• Kanga, Lambert H.
• Killiny, Nabil
• Lord, Cynthia C.
• Mankin, Richard W.
• Miller, Christine Whitney
• Smartt, Chelsea T.
• Smith, Hugh A.
• Stelinski, Kirsten Suzanne
• Stelinski, Lukasz Lech

**Assistant Professor**

• Bahder, Brian W.
• Becnel, James J.
• Beuzelin, Julien M.
• Buckner, Eva Ann
• Burkett-Cadena, Nathan Daniel
• Campbell, Lindsay P.
• Carrillo, Daniel
• Chouvenc, Thomas
• Dale, Adam G.
• Desaeger, Johan
• Diepenbrock, Lauren Marie
• DiGennaro, Peter
• Grabau, Zane
• Hahn, Philip G.
• Halbert, Susan Elizabeth
• Handler, Alfred Marc
• Hix, Raymond Lee
• Hodges, Greg
• Kline, Daniel L.
• Lahiri, Sriyanka
• Lucky, Andrea
• Mallinger, Rachel
• Martin, Estelle
• Martini, Xavier Philippe
• Mathias, Derrick
• Minteer-Killian, Carey R.
• Oi, David Hedeji
• Porazinska, Dorota Lidia
• Qureshi, Jawwad A.
• Smith, Trevor R.
• Vieira De Paula Moraes, Silvana
• Wong, Chun Nin

**Other**

• Riegel, Claudia

**Eminent Scholar**

• Bonning, Bryony

**Associate Curator**

• Daniels, Jaret C.

**Assistant Scientist**

• Sourakov, Andrei

**Distinguished Professor**

• Su, Nan-Yao

**Courtesy Assistant Professor**

• Bernier, Ulrich R.
• Bloem, Stephanie
• Brito, Janete A.
• Heppner, John B.
• Meagher, Robert Leo
• Petitt, Frederick L.
• Pratt, Paul David
• Shirk, Paul David
• Skelley, Paul E.
• Steck, Gary John
• Vandermeer, Robert K.

**Associate Extension Scientist**

• Gillett-Kaufman, Jennifer Lynn
• Hodges, Amanda C.
• Oi, Faith M.

**Research Assistant Scientist**

• Taylor, Lisa Anne
• Weeks, Emma N I

**Courtesy Professor**

• Geden, Christopher J.
• Hogsette, Jerome A.
• Tumlinson, James H.
• Woodruff, Robert E.

**Curator**

• Willmott, Keith Richard
Entomology and Nematology Program Information

The Entomology and Nematology department offers research-based M.S. (thesis) and PhD degrees in entomology and in nematology. Our large faculty in Gainesville and at Research and Education Centers around the state allow for study in many important areas. Insect and nematode pests cause significant losses to agricultural and horticultural crops and livestock, and are important vectors of pathogens that cause diseases in plants, livestock and humans. Urban pests can affect quality of life and cause significant loss to property. However, these organisms also provide important services through decomposition, pollination of fruits and vegetables, and as natural enemies of other pest species. Our department is uniquely positioned to address these fundamental and applied biological questions because of our strong interdisciplinary research and education programs, from molecular to whole organism and population ecology studies.

In addition to our research based degree programs, the M.S. degree can be taken in a non-thesis format, in Gainesville or entirely online, with a specialization in either entomology or pest management (with foci on pests of medical, urban or landscape importance). Online M.S. degrees are designed to accommodate place-bound students interested in biological science with emphasis on insects and other arthropods, including extension faculty and other educators; state and federal employees in agricultural, environmental and regulatory positions; consultants; pest control industry personnel; and others who want to further their education.

Certificates, comprising 15 credit hours of specific coursework, are available online or to residential students with concentrations in urban pest management, landscape pest management or medical entomology. These certificates document specialization and proficiency in sub-disciplines within entomology for enrolled graduate students and provide evidence of expertise for non-degree seeking students.

Students entering graduate programs in entomology and nematology should have a strong science background, including biology, chemistry, and algebra. Physics and statistics are recommended. Admissions criteria can be found on the Graduate School's Admission (p. 12) page.

Degrees Offered

Degrees Offered with a Major in Entomology and Nematology

- Doctor of Philosophy
  - without a concentration
  - concentration in Global Systems Agroecology
- Master of Science
  - without a concentration
  - concentration in Agroecology

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Entomology and Nematology Departmental Courses

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>ALS 5156</td>
<td>Agricultural Ecology Principles and Applications</td>
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<td>ALS 6046</td>
<td>Grant Writing</td>
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<td>ALS 6166</td>
<td>Exotic Species and Biosecurity Issues</td>
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<td>ALS 6935</td>
<td>Topics in Biological Invasions</td>
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<tr>
<td>ENY 5006L</td>
<td>Graduate Survey of Entomology Laboratory</td>
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<td>ENY 5006</td>
<td>Graduate Survey of Entomology</td>
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<td>ENY 5031C</td>
<td>Insect Field Biology</td>
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<td>ENY 5160C</td>
<td>Survey of Science with Insects</td>
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<td>ENY 5164</td>
<td>Graduate Survey of Invertebrate Field Biology</td>
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<td>Insects and Wildlife</td>
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<td>ENY 5223C</td>
<td>Biology and Identification of Urban Pests</td>
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<tr>
<td>ENY 5226C</td>
<td>Principles of Urban Pest Management</td>
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<td>ENY 5231</td>
<td>Pests Structures</td>
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<td>ENY 5236</td>
<td>Insect Pest and Vector Management</td>
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<td>ENY 5241</td>
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<td>ENY 5245</td>
<td>Agricultural Acarology</td>
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<td>ENY 5405</td>
<td>Insects as Vectors of Plant Pathogens</td>
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<td>ENY 5516</td>
<td>Turf and Ornamental Entomology</td>
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<td>ENY 5566</td>
<td>Tropical Entomology</td>
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Entomology and Nematology

Student Learning Outcomes

**Entomology & Nematology (PHD)**

**SLO 1**  Knowledge
Identify insects, other arthropods and/or nematodes, and describe their relationship with the environment and humans

**SLO 2**  Knowledge
Discuss appropriate research methodology, including aspects of statistical design and analysis, in the execution of arthropod research

**SLO 3**  Skills
Effectively communicate science orally and in written form to an audience of scientific peers

**SLO 4**  Skills
Effectively communicate science orally and in written form to a non-specialized audience through educational activities

**SLO 5**  Skills
Apply critical thinking and inquiry/analysis methodologies to solve problems and generate new knowledge

**SLO 6**  Professional Behavior
Interact with professional peers with honesty, ethical behavior, cultural sensitivity, and teamwork.

**entomology & Nematology (MS)**

**SLO 1**  Knowledge

College of Agricultural and Life Sciences Courses

<table>
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<th>Code</th>
<th>Title</th>
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<td>ALS 5156</td>
<td>Agricultural Ecology Principles and Applications</td>
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</tr>
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<td>ALS 5905</td>
<td>Individual Study</td>
<td>1-4</td>
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<td>Policy Issues and Case Studies in Nonprofit Organizations</td>
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<td>STA 6299</td>
<td>Matrix Algebra and Statistical Computing</td>
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**Courses**

**Tropical Entomology Field Laboratory**

**Advanced Apiculture I**

**Advanced Apiculture II**

**Advanced Mosquito Identification**

**Advanced Mosquito Biology**

**Insect Toxicology**

**Advanced Medical and Veterinary Entomology I**

**Advanced Medical and Veterinary Entomology Laboratory**

**Forensic Entomology**

**Insect Microbiology**

**Molecular Biology Techniques with Invertebrates and Their Pathogens**

**Problems in Entomology**

**Supervised Research**

**Entomology Seminar**

**Special Topics in Entomology**

**Selected Studies in Entomology**

**Supervised Teaching**

**Insect Diagnostics**

**Insect Physiology Laboratory**

**Insect Physiology**

**Effective communication of science orally and in written form to scientific peers**

**Effective communication of science orally and in written form to non-specialized audience through educational activities**

**Application of critical thinking and inquiry/analysis methodologies to solve problems and generate new knowledge**

**Interact with professional peers with honesty, ethical behavior, cultural sensitivity, and teamwork**
Identify insects, other arthropods and/or nematodes, and describe their relationship with the environment and humans

SLO 2  Knowledge
Identify insects, other arthropods and/or nematodes, and describe their relationship with the environment and humans

SLO 3  Knowledge
Discuss appropriate research methodology, including statistical aspects of experimental design and analysis, in the execution of arthropod research

SLO 4  Knowledge
Discuss appropriate research methodology, including statistical aspects of experimental design and analysis, in the execution of arthropod research

SLO 5  Skills
Effectively communicate science orally and in written form

SLO 6  Skills
Effectively communicate science orally and in written form

SLO 7  Skills
Apply critical thinking and inquiry/analysis methodologies to solve problems and generate new knowledge

SLO 8  Professional Behavior
Interact with professional peers with honesty, ethical behavior, cultural sensitivity, teamwork and effective communication

SLO 9  Professional Behavior
Interact with professional peers with honesty, ethical behavior, cultural sensitivity, teamwork and effective communication

Plant Medicine
Program Information
Coordinator: Amanda C. Hodges

Campus Program
The Doctor of Plant Medicine (DPM) program is an intensive doctorate-level graduate level training program for students interested in plant health diagnosis and management. Requirements for the degree can be found in the Graduate Degrees (p. 48) section of this catalog.

DPM students complete rigorous coursework and intensive internships. Only DPM students jointly enrolled in one of our discipline department M.S. programs complete a thesis. DPM students often participate in applied research within laboratory programs, and may participate in the publication of peer-reviewed scientific and extension papers. More information regarding the latest policies for the DPM program is available in the DPM graduate handbook (http://dpm.ifas.ufl.edu/wp-content/uploads/2017/11/DPM_Handbook_2017.pdf).

The DPM program is a partnership among faculty mentors and teaching faculty within the following primary departments:

- Entomology and Nematology Department
- Department of Plant Pathology
- Agronomy Department
- Horticulture Sciences Department
- Environmental Horticulture Department
- Soil and Water Sciences Department
- Food Science and Human Nutrition Department

Distance Program
The College of Agricultural and Life Sciences offers a distance education program leading to the D.P.M. degree for highly qualified students. The D.P.M. degree is awarded after a 3- to 4-year program of graduate study. Foreign languages are not required. The distance education program leading to a D.P.M. degree is administered by the Entomology and Nematology Department, College of Agricultural and Life Sciences, and the Graduate School.

Admission: Students must meet the following minimum requirements:

Entrance requirements:

- A graduate degree (Master’s or Doctoral) with a concentration in plant health science, plant pathology, agronomy, horticulture, environmental horticulture, forestry, entomology, nematology, soil science or a similar field.
- A passing score for the Certified Crop Advisor (CCA) exam administered by the Agronomy Society of America (ASA).
- Completion of at least two years of full-time work in a professional job associated with the Plant Doctor (DPM/H) profession. Examples of professional jobs associated with the Plant Doctor profession include: crop consultant, industry scientist, extension specialist, diagnostician, identifier, survey specialist, plant pest risk analyst, plant health technician, or instructor.
- A minimum score of a 300 on the Graduate Record Examination (GRE). Verbal and quantitative portions of the GRE should be approximately 150 each. Exceptions to the minimum may be considered by the DPM admissions committee.
- International applicants must also have a TOEFL score above 80.
- A graduate (Master’s or Doctoral) grade point average of 3.0 or higher.
- A passing score (80% or higher) on the Plant Pathology Written Comprehensive Exam. The exam must be completed in Gainesville, Florida.

Course requirements: Students enter the program with a Master’s or Doctoral degree and must earn 60 credits. Transfer of graduate credits from another graduate degree are not allowed for the distance education program. All D.P.M. students must complete two substantial 3-credit internships. Signed approval by a student’s Committee and the D.P.M. Director is required prior to registering for substantial internship credits.

Comprehensive examination: Both written and oral comprehensive examinations are required of all D.P.M. students. The written examination has three sections:

- entomology/nematology
- plant pathology, and
- plant/soil science.

Faculty from the appropriate disciplines are appointed by the D.P.M. Program Director and D.P.M. Competency Exam Coordinators to develop and grade the final written examination. Students enrolled in the distance education program must pass the plant pathology written competency area exam prior to admission. The two remaining sections of the written exam may be taken independently throughout the program at the discretion of the supervisory committee and the D.P.M. Director. Students are encouraged to complete the exam prior to the last full year of the D.P.M. program and his/her anticipated semester of graduation.
Students should also complete the D.P.M. Competency Area Exams before the completion of a substantial internship. After a student passes all three sections of the final written examination (80% or higher is considered a passing grade), the supervisory committee administers an oral examination that tests the student’s ability to diagnose and manage plant health problems. A student who fails to pass a comprehensive examination may retake an exam once with the recommendation of his/her supervisory committee.

For more information, please see the DPM website: http://dpm.ifas.ufl.edu.

Degrees Offered

Degrees Offered with a Major in Plant Medicine

- Doctor of Plant Medicine
  - without a concentration
  - concentration in Tropical Conservation and Development

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Agronomy Departmental Courses

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<td>Research Techniques in Forage Evaluation</td>
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<td>AGR 6322</td>
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<td>Project Team Research: Building Skills in</td>
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Entomology and Nematology Departmental Courses

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### School of Forest Resources and Conservation Courses

#### Geomatics Concentration Courses

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<td>Diseases of Warmwater Fish</td>
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<td>Applied Fisheries Statistics</td>
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<td>FAS 5407</td>
<td>Biology of Fishery and Aquaculture Invertebrates</td>
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<td>FAS 5901</td>
<td>Scientific Thinking in Ecology</td>
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<td>FAS 6176</td>
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<td>FAS 6256</td>
<td>Fish and Aquatic Invertebrate Histology</td>
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<td>FAS 6101C</td>
<td>Nematode Morphology and Anatomy</td>
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<td>Nematode Systematics and Molecular Phylogeny</td>
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Horticultural Sciences Departmental Courses

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<td>Genetics &amp; Breeding of Vegetable Crops</td>
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<td>Molecular Biology of Plant Hormones</td>
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<td>Postharvest Technologies for Horticultural Crops</td>
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<td>HOS 5555</td>
<td>Tropical Fruit Production and Research in Florida</td>
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<td>Phytochemicals in Food &amp; Health</td>
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<td>Breeding Perennial Cultivars</td>
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<td>WDS 6005</td>
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Plant Pathology Departmental Courses

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<td>Bacterial Plant Pathogens</td>
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## Soil and Water Sciences Departmental Courses

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<td>AGG 6503</td>
<td>Nanotechnology in Food, Agriculture, and Environment</td>
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<td>ALS 5027</td>
<td>Reusable Learning Objects</td>
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<td>ALS 5155</td>
<td>Global Agroecosystems</td>
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<td>CWR 6537</td>
<td>Contaminant Subsurface Hydrology</td>
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<td>Tropical Soil Management</td>
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<td>Earth System Analysis</td>
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<td>Sustainable Agricultural and Urban Land Management</td>
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<td>Environmental Soil, Water, and Land Use</td>
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<td>South Florida Ecosystems</td>
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<td>SWS 5246</td>
<td>Water Resource Sustainability</td>
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<td>Wetlands and Water Quality</td>
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<td>Soil Microbial Ecology</td>
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<td>Ecology of Waterborne Pathogens</td>
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<td>SWS 5406</td>
<td>Soil and Water Chemistry</td>
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<td>SWS 5424C</td>
<td>Soil Chemical Analysis</td>
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<td>Advanced Microbial Ecology</td>
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<td>Biodegradation and Bioremediation</td>
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<td>Biogeochemistry of Wetlands and Aquatic Systems</td>
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<td>SWS 6992</td>
<td>Aquatic Toxicology Science and Applications</td>
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## College of Agricultural and Life Sciences Courses

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<td>ALS 6166</td>
<td>Exotic Species and Biosecurity Issues</td>
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<td>Colloquium on Plant Pests of Regulatory Significance</td>
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<td>Topics in Biological Invasions</td>
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<td>ALS 6942</td>
<td>Principles of Plant Pest Risk Assessment and Management</td>
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<td>Internship in Plant Pest Risk Assessment and Management</td>
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<td>Graduate Survey of Biochemistry</td>
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<td>Policy Issues and Case Studies in Nonprofit Organizations</td>
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<td>STA 6093</td>
<td>Introduction to Applied Statistics for Agricultural and Life Sciences</td>
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<td>STA 6329</td>
<td>Matrix Algebra and Statistical Computing</td>
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## Family, Youth, and Community Sciences Department

Interim Chair: Tracy Irani
Graduate Coordinator: David C. Diehl

The FYCS graduate program is an interdisciplinary applied social science program that prepares students for advanced degrees (e.g., Ph.D.) and careers in such areas as family and youth services, Extension and community-based education, community development and nonprofit management, program planning and evaluation, and social policy.

Graduates find careers in both the public and private sectors including:

- Child and Youth Development in areas such as juvenile justice, dropout prevention programs, recreational and camp programs, and youth ministry;
- Community Development Practice in local and regional government, private nonprofit organizations (such as chambers of commerce, local development corporations, and local, national and international foundations) and citizen’s groups;
- Nonprofit Organizational Management, such as management of community based, nonprofit organizations;
- Family and Social Services, such as family preservation programs, assistance for abused and neglected children and other public assistance programs; and
- Cooperative Extension Service in such areas as youth development, family and consumer sciences and community development.

Contact the graduate coordinator for more information or visit http://fycs.ifas.ufl.edu/.
Family, Youth, and Community Sciences

Majors
- Family, Youth, and Community Sciences (p. 100)
- Youth Development and Family Science (p. 102)

Faculty
Professor
- Barnett, Rosemary V.
- Bobroff, Linda Benjamin
- Diem, Keith
- Irani, Tracy Anne
- Simonne, Amarat
- Spranger, Michael S.
- Swisher, Marilyn E.

Associate Professor
- Culen, Gerald Robert
- Diehl, David Christopher
- Fogarty, Kate
- Forthun, Larry F.
- Gillen, Martie L.
- Gutter, Michael S.
- Harris, Victor
- Kumaran, Muthusami
- Pracht, Dale
- Radunovich, Heidi Liss
- Smith, Suzanna D.

Assistant Professor
- Campbell, Catherine G.
- Cantrell, Randall Alan
- Doty, Jennifer Lynn
- Jones, Jennifer Amanda
- Lindsey, Angela B.
- Lynne, Sarah Delphia
- O’Neal, LaToya J.
- Ruiz Menjivar, Jorge H.
- Wiley, Kimberly Kay

Other
- Duffy, Nicole Owens
- Johnson, Emily Rose

Lecturer
- Moore, Kelly N.

Clinical Professor
- Stefanou, Candice R.

Affiliated Faculty
- Shelnutt, Karla Pagan
  Associate Professor

Family, Youth, and Community Sciences

Master of Science in Family, Youth and Community Sciences

The Master of Science in FYCS seeks to prepare students for careers in human services, youth professions, and community development in public, private, and nonprofit organizations. There are two degree options: thesis and non-thesis project. The thesis option prepares students to conduct independent research needed to develop science-based solutions to problems, issues, and policies that affect families, youth, and communities. Students develop expertise in a subject matter area directly relevant to the problem or need they want to address with the thesis research. The non-thesis project option provides the student with a broad base of knowledge and skills in the discipline. Projects vary in nature and may include program development and evaluation, improving aspects of organizational/community development, grant writing, or other empirically-based projects.

Students in the Master of Science program have the option to complete one of three concentrations: Concentration in Nonprofit Organizational Development. The concentration helps students build a foundation of skills to develop and sustain an effective nonprofit organization, including coursework that examines essential topics like governance, strategic planning, fundraising, risk management, and financial planning. The Concentration in Family and Youth Development helps students build the leadership skills needed to effectively develop, implement, and evaluate services and programs affecting youth and families within their communities. The Concentration in Community Studies prepares students to serve as leaders and managers for community-based organizations and programs.

Students both inside and outside the major may complete a Graduate Certificate in Nonprofit Leadership. This 12-credit certificate covers the core competencies of: governance, strategic planning, fundraising, human resources management, and risk management, as well as other emerging strategies.

An online professional development program in Personal and Family Financial Planning is available. The program is registered with the Certified Financial Planner™ Board of Standards to offer courses that cover education requirements for sitting for the CFP examination.

The Family, Youth and Community Sciences Department offers two minors for non-majors. The Minor in Organizational Leadership for Nonprofits introduces students to the core management and leadership competencies necessary to work in the nonprofit sector. The Minor in Family, Youth and Community Sciences provides students with knowledge about the theories and body of research that explain how families, youth, and communities develop and interact.

Combined program: The Department offers a combined bachelor’s/master’s degree program, which allows qualified students to earn both a bachelor’s degree and a master’s degree with a savings of up to 12 credits.
Degrees Offered

Degrees Offered with a Major in Family, Youth, and Community Sciences

- Master of Science
  - without a concentration
  - concentration in Community Studies
  - concentration in Family and Youth Development
  - concentration in Nonprofit Organizational Development

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Family, Youth and Community Sciences

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<td>Personal and Family Retirement and Estate Planning</td>
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<td>FYC 6111</td>
<td>Families and Violence</td>
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<td>Military Families in Community Context</td>
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<td>Ethics for FYCS Practitioners</td>
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<td>Parenting and Child Relationships</td>
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<td>Promoting Positive Youth Development</td>
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<td>Resilience and Positive Youth Development</td>
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<td>Theories of Family Development, Systems and Change</td>
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<td>Theoretical Approaches to Youth Development</td>
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<td>Nonprofit Organizations</td>
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<td>Non-Governmental Organizations</td>
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<td>Fund Raising for Community Nonprofit Organizations</td>
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<td>Risk Management in Nonprofit Organizations</td>
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<td>Program Planning and Evaluation for Human Service Delivery</td>
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<td>Scientific Reasoning and Research Design</td>
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<td>Advanced Research Methods for Family, Youth, and Community Sciences</td>
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College of Agricultural and Life Sciences

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<td>Colloquium on Plant Pests of Regulatory Significance</td>
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<td>ALS 6925</td>
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Student Learning Outcomes

Family, youth & community sciences (MS)

SLO 1  Analyze Problems, Issues and Needs
Use science-based research to analyze complex family, youth, or social problems, issues and needs.

SLO 2  Apply Theory and Research
Apply family, economic, or social theory and research to the analysis of policies and programs that affect families, youth and communities.

SLO 3  Analyze and Assess Needs, Issues and Problems
Analyze and assess the needs, issues and problems of families, youth and communities

SLO 4  Impacts of Policies, Programs and Organizations
Develop, implement and analyze the impacts of policies, programs and organizations for families, youth and communities.

SLO 5  Professional Behavior
Interact with professional peers with honesty, ethical behavior, cultural sensitivity, and teamwork


Youth Development and Family Science

Program Information

The Doctor of Philosophy in Youth Development and Family Sciences will prepare students to conduct high-impact research on youth, their families, and the communities in which they live. Graduates will be trained to become faculty members in academic departments such as human development and family studies, child and family sciences, community resource development, and family and consumer sciences, as well as for research positions in the public and private sector. Research in this field considers the influence of human growth and development, interpersonal and family processes and systems, and community contexts on the behavioral, psychosocial, and socio-emotional well-being of children, adolescents, and emerging adults. Students will be able to apply this knowledge to the development and rigorous evaluation of prevention and promotion programs and activities.

Degrees Offered

Degrees Offered with a Major in Youth Development and Family Science

- Doctor of Philosophy
- without a concentration

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Youth Development and Family Science Program Courses

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<td>Theoretical Approaches to Youth Development</td>
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<td>FYC 6330</td>
<td>Theories of Community Development</td>
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<td>FYC 6800</td>
<td>Scientific Reasoning and Research Design</td>
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<td>FYC 6802</td>
<td>Advanced Research Methods for Family, Youth, and Community Sciences</td>
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Electives

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<td>Survey Design and Analysis in Educational Research</td>
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<td>EDF 7412</td>
<td>Structural Equation Models</td>
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<td>Multilevel Models</td>
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<td>EDF 7479</td>
<td>Qualitative Data Analysis: Approaches and Techniques</td>
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<td>Multivariate Analysis in Educational Research</td>
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Family, Youth, and Community Sciences Departmental Courses

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<td>Personal and Family Insurance Planning</td>
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<td>FYC 5106</td>
<td>Personal and Family Retirement and Estate Planning</td>
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<td>FYC 6111</td>
<td>Families and Violence</td>
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<td>FYC 6117</td>
<td>Military Families in Community Context</td>
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<td>FYC 6131</td>
<td>Ethics for FYCS Practitioners</td>
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<td>FYC 6207</td>
<td>Adolescent Problematic Behavior</td>
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<td>FYC 6221</td>
<td>Grant Proposals for Community-Based Organizations</td>
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<td>FYC 6222</td>
<td>Parenting and Child Relationships</td>
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<td>Promoting Positive Youth Development</td>
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<td>Resilience and Positive Youth Development</td>
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<td>Theories of Family Development, Systems and Change</td>
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FYC 6423  Non-Governmental Organizations  3
FYC 6424  Fund Raising for Community Nonprofit Organizations  3
FYC 6425  Risk Management in Nonprofit Organizations  3
FYC 6620  Program Planning and Evaluation for Human Service Delivery  3
FYC 6662  Public Policy and Human Resource Development  3
FYC 6800  Scientific Reasoning and Research Design  3
FYC 6802  Advanced Research Methods for Family, Youth, and Community Sciences  3
FYC 6901  Problems in Family, Youth, and Community Sciences  1-3
FYC 6912  Nonthesis Project in Family, Youth, and Community Sciences  1-3
FYC 6932  Topics, in Family, Youth, and Community Sciences  1-3
FYC 6933  Seminar in Human Resource Development  1
FYC 6934  Professional Internship/Practicum in Family, Youth, and Community Sciences  1-3
FYC 6971  Research for Master’s Thesis  1-6
FYC 7979  Advanced Research  1-12
FYC 7980  Research for Doctoral Dissertation  1-15

College of Agricultural and Life Sciences Courses

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Food and Resource Economics Department

Interim Chair: Lisa House
Associate Chair: Rodney Clouser
Graduate Coordinator: Kelly Grogan

The Food and Resource Economics Department offers the Master of Agribusiness (M.AB.) (non-thesis), Master of Science (thesis), and Doctor of Philosophy. Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

The Department participates in programs with the Center for Latin American Studies, the Center for African Studies, the Center for Tropical Agriculture, the School of Natural Resources and Environment, the College of Law, and the Florida Sea Grant College Program.

The Department programs reflect the diversity of Florida's agriculture which has more than fifty major commodities. With over thirty faculty involved in a full range of research, extension, and teaching programs in areas including Agricultural Marketing, International Trade, Policy, Production/Farm Management, International Development, Marine Economics, Natural Resource and Environmental Economics, Community/Regional Development and Labor Economics. In addition to the main campus location, the department has faculty at research centers throughout the state.

Several members of the faculty have garnered international reputations in diverse fields such as trade policy, generic advertising, citrus economics, sugar policy, business retention and expansion, leadership development, consumer attitudes towards genetically modified food, and dairy marketing.

The Department offers a combined bachelor's/master's degree program for the Master of Science and Master of Science with Concentration in Agribusiness. Contact the Graduate Program Office in 1179 McCarty Hall for information.

For more information, please see the program pages below, and see our website: http://www.fred.ifas.ufl.edu.

Majors
- Food and Resource Economics (p. 104)

Faculty

Professor
- Adams, Charles M.
- Anderson, James L.
- Burkhardt, Robert Jeffrey
- Clouser, Rodney L.
- Evans, Edward Anthony
- House, Lisa Ann
- Larkin, Sherry L.
- Moss, Charles Britt
- Olexa, Michael T.
- Seale, James L.
- Stefanou, Spiro E.
- Vansickle, John J.
- Weldon, Richard N.
- Wysocki, Allen F.

Associate Professor
- Borisova, Tatiana
- Gao, Zhifeng
- Grogan, Kelly A.
- Khachatryan, Hayk
The Food and Resource Economics Department offers the Master of Agribusiness (M.AB.) (non-thesis), Master of Science with Concentration in Agribusiness (M.S.AB.) (non-thesis), Master of Science (thesis), and Doctor of Philosophy.

The Master of Agribusiness is designed for students with no academic background in economics. Students who come from diverse academic backgrounds including Accounting, Agricultural Education and Communication, Agricultural Operations Management, Agronomy, Animal Science, Business Administration, Finance, English, Food Science, History, Horticulture, Management, Marketing, Soil and Water Science, Turfgrass, and Wildlife Ecology and Conservation. The graduate coursework prepares students for careers in banking, investing, financial analysis, sales, management, marketing, human resources, policy, production, and entrepreneurial pursuits working in private industry, international firms, non-profit organizations and government.

The Master of Science in the Food and Resource Economics Department provides broad training in applied economics as it relates to food production, policy, marketing and trade, regional economics, and natural resource issues. Students are taught to use economic principles and quantitative methods to address empirical problems. The core consists of courses in microeconomics, policy, econometrics, statistics and survey research methods. Many students continue their education with a Ph.D. while others opt for employment with government agencies, nongovernmental organizations, foreign agencies, private consulting firms, or corporations.

The Master of Science with Concentration in Agribusiness is designed for students with an academic background in economics. The quantitative courses include microeconomics, policy, econometrics and survey research methods and provide solid economic theory and prepares students for careers in banking, investing, financial analysis, sales, management, marketing, human resources, policy, production, and entrepreneurial pursuits working in private industry, international firms, non-profit organizations and government.

For more information, please see our website: http://www.fred.ifas.ufl.edu.
Courses

Food and Resource Economics

Departmental Courses

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<td>AEB 5188</td>
<td>Economics of Agribusiness Decisions</td>
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<td>AEB 5326</td>
<td>Agribusiness Financial Management</td>
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<td>Strategic Agribusiness Human Resource Management</td>
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<td>AEB 6106</td>
<td>Microeconomic Principles and Analysis</td>
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<td>AEB 6145</td>
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<td>Food Wholesale and Retail Marketing</td>
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<td>Management Strategies for Agribusiness Firms</td>
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<td>Elements of Econometrics</td>
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<td>Production Economics</td>
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<td>Macroeconomic Theory in Open Economies II</td>
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Student Learning Outcomes

Food and resources economics (PHD)

SLO 1 Knowledge
Explain relevant economic principles and apply economic theory to address problems relevant to agriculture and natural resources

SLO 2 Skills
Identify relevant economic problem, propose and complete an original research project, and effectively communicate results to appropriate audiences (including off campus)

SLO 3 Professional Behavior
Display honesty and integrity in research, the classroom and professional activities

Food and resources economics (MAB)

SLO 1 Principles Relating to Food and Agribusiness Firms
Explain principles of economics, management, marketing, finance, quantitative analysis and policy as they apply to food and agribusiness firms

SLO 2 Solve Management Problems
Apply, analyze and synthesize content knowledge to solve management problems faced by food and agribusiness firms

SLO 3 Display Honesty and Integrity
Display honesty and integrity in research, the classroom, and professional activities

Food and resources economics (MS)

SLO 1 Explain Relevant Economic Principles
Explain relevant economic principles and apply economic theory and tools to address problems relevant to agriculture and natural resources

SLO 2 Develop, Complete and Present Research Project
Identify relevant economic problem, complete research project, and effectively communicate results to an appropriate audience

SLO 3 Professional Behavior
Display honesty and integrity in the classroom, research and professional activities
Food Science and Human Nutrition Department

Chair: Susan S. Percival
Graduate Coordinators: Renee Goodrich-Schneider (M.S. in Food Science and Human Nutrition / Ph.D. in Food Science), James F. Collins (Ph.D. in Nutritional Sciences)

The Food Science and Human Nutrition Department (FSHN) is one of the world’s largest combined academic programs where food science, nutritional sciences, and dietetics are all studied within one department. FSHN has nearly 30 full-time faculty members, 80 graduate assistants, and close to 1,000 undergraduate students. Our programs are accredited by the Institute of Food Technologists (http://www.ift.org/) (IFT) and the Accreditation Counsel for Education in Nutrition and Dietetics (ACEND) (http://www.eatrightacend.org/ACEND/). After completing undergraduate degrees, our students typically move on to professional employment, further education or training in food or nutrition graduate programs, or on to professional school programs. We have a strong record of excellent placement of our graduate students in industry and professional organization employment positions, as faculty members at colleges and universities, or in postdoctoral training experiences.

Our faculty has trained at institutions from around the world; they have been widely successful in their teaching, research, and extension efforts. Throughout our programs in food science, nutrition, and dietetics, our faculty is recognized nationally and internationally as experts in their respective fields.

The Food Science and Human Nutrition Department offers programs leading to the degrees of Master of Science in Food Science and Human Nutrition, Doctor of Philosophy in Food Science, and Doctor of Philosophy in Nutritional Sciences (offered under the auspices of the Center for Nutritional Sciences (http://nutritionalsciences.centers.ufl.edu/)). Minimum requirements for these degrees are located in the Graduate Degrees section of this catalog.

For more information please click the links to the program pages below, or see our website: http://fshn.ifas.ufl.edu.

Majors
- Food Science (p. 107)
- Food Science and Human Nutrition (p. 108)
- Nutritional Sciences (p. 109)

Faculty

Professor
- Archer, Douglas L.
- Baldwin, Elizabeth A.
- Borum, Peggy L.
- Collins, James Forrest
- Goodrich, Renee M.
- Gregory, Jesse F.
- Henken, Robin J.
- Knutson, Mitchell D.
- Percival, Susan S.
- Schneider, Keith R.
- Sims, Charles A.
- Turner, R Elaine

Associate Professor
- Dahl, Wendy Joanne
- Danyluk, Michelle D.
- Gu, Liwei
- Mathews, Anne
- Shelnutt, Karla Pagan
- Wright, Anita Christine

Assistant Professor
- Ahn, Soohyoun
- Andrade, Jeanette Mary
- Cheng, Zhiyong
- Da Silva, Robin Paul
- Farzad, Razieh
- MacIntosh, Andrew John
- Montazeri-Djouybari, Naim
- Sarnoski, Paul J.
- Wang, Yu

Eminent Scholar
- Cousins, Robert J.

Assistant Scientist
- Von Castel Dunwoody, Kristina M.

Affiliated Faculty
- Bobroff, Linda Benjamin
- Mathews, Clayton Elwood
- Simonne, Amarat
- Sommerfield, Linda May
- Williams, Sally Kathryn

Associate Professor

Courses

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<tr>
<td>FDS 5225C</td>
<td>Principles in Food Microbiology</td>
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Food Science

Program Information

The Ph.D. program in Food Science is a multidisciplinary program consisting of Food Chemistry, Food Processing and Engineering, and Food Microbiology and Safety. Students are expected to obtain a breadth of food science knowledge by taking courses in all program areas with the majority of courses stressing one of the three areas of emphasis.

For further information, please see our website at: http://fshn.ifas.ufl.edu.
Food Science and Human Nutrition

Program Information

The M.S. program offers tracks in food science and in nutritional sciences. The Institute of Food Technologists and the American Society for Nutrition recognize these concentrations. The department also offers a combined Master of Science-Dietetics Internship (MS-DI) program accredited by the Accreditation for Education in Nutrition and Dietetics (ACEND) (https://www.eatrightpro.org/acend/). Students who complete this program are eligible to take the national registration examination to become a registered dietitian. Only graduates from an ACEND accredited/approved Didactic Program in Dietetics are eligible for the MS-DI program.

Specific areas of study include nutritional biochemistry/molecular biology, nutrient function/metabolism, medical nutrition therapy/dietetics, nutritional immunology, food processing/engineering, food chemistry/biochemistry, and food safety/microbiology/quality.

Applicants must have an adequate background in physical and biological sciences and food science or nutritional sciences. Students with specific deficiencies will be required to take prerequisite courses.

For additional information, e-mail Dr. James F. Collins, Director at jfcollins@ufl.edu or Dr. Mitchell D. Knutson, Graduate Coordinator at mknutson@ufl.edu.

Degrees Offered with a Major in Food Science and Human Nutrition

- Master of Science
  - without a concentration
  - concentration in Nutritional Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

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<td>Citrus Processing Technology</td>
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<td>Functional Foods and Nutraceuticals</td>
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<td>Current Issues in Food Regulations</td>
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Courses

College of Agricultural and Life Sciences

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<td>ALS 5156</td>
<td>Agricultural Ecology Principles and Applications</td>
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<td>ALS 5905</td>
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<td>ALS 6921</td>
<td>Colloquium on Plant Pests of Regulatory Significance</td>
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<td>ALS 6935</td>
<td>Topics in Biological Invasions</td>
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<td>Principles of Plant Pest Risk Assessment and Management</td>
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<td>BCH 5045</td>
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<tr>
<td>FYC 6422</td>
<td>Policy Issues and Case Studies in Nonprofit Organizations</td>
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Student Learning Outcomes

Food Science and human nutrition (MS)

SLO 1  Knowledge
Explain and apply components and interactions of food and health.

SLO 2  Skills
Use critical thinking to evaluate research design and experiments and the scientific literature.

SLO 3  Skills
Identify appropriate research methodologies, execute a research plan and interpret results for the discovery of new information.

SLO 4  Professional Behavior
Interact with professional peers, faculty, and staff with honesty, ethical behavior, respect, fellowship, and cooperation.

Nutritional Sciences

Program Information

The field of nutritional science has unprecedented public interest. This is fostered by evolving links between diet and health, and the impact of one's individual genetic makeup on nutrient utilization. The Ph.D. degree program in Nutritional Sciences is interdisciplinary, with participating CALS, COM, CLAS, and CVM faculty directing research of doctoral students, where the full spectrum of Nutritional Sciences is available. Emphasis areas include basic nutritional sciences, biochemistry and molecular biology, genetics, immunology, physiology, clinical nutrition, microbiology, and biostatistics.

Students are admitted to the program after the bachelor's degree or a master's degree in nutritional sciences or a related field. Applicants should have a strong undergraduate background in biological sciences and chemistry. Deficiencies may be made up during the first year of graduate study.

Additional information can be found at http://nutritionalsciences.centers.ufl.edu.

For additional information, e-mail Dr. Mitch Knutson, Director at mknutson@ufl.edu or Dr. Bobbi Langkamp-Henken, Graduate Coordinator at henken@ufl.edu

Degrees Offered

Degrees Offered with a Major in Nutritional Sciences

- Doctor of Philosophy
  - without a concentration
  - concentration in Clinical and Translational Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.
Nutritional Sciences Program Core Courses

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<td>STA 616</td>
<td>Statistical Methods in Research I</td>
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<td>HUN 6301</td>
<td>Nutritional Aspects of Lipid Metabolism</td>
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<td>HUN 6305</td>
<td>Nutritional Aspects of Carbohydrates</td>
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<td>HUN 6321</td>
<td>Proteins and Amino Acids in Nutrition</td>
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<td>HUN 6331</td>
<td>Vitamins in Human Nutrition</td>
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<tr>
<td>HUN 6356</td>
<td>Minerals in Nutrition</td>
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Additional Course Offerings

The following courses may be taken to contribute to the overall degree award requirements.

Food Science and Human Nutrition

Departmental Courses

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College of Agricultural and Life Sciences Courses

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<tr>
<td>STA 6093</td>
<td>Introduction to Applied Statistics for Agricultural and Life Sciences</td>
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Student Learning Outcomes

Nutritional sciences

SLO 1  Articulate Fundamental Knowledge
Articulate (in oral and written form) fundamental knowledge in nutrition, physiology, biochemistry, molecular biology, genetics and genomics.

SLO 2  Research in Nutritional Sciences
Analyze, interpret and evaluate research in nutritional sciences.

SLO 3  Discovery of New Information
Plan, organize and conduct research for the discovery of new information.

SLO 4  Professional Behavior
Display ethical behavior in all areas of conduct; interact with peers, faculty and staff with respect, fellowship and cooperation.
Horticultural Sciences Department

Chairs: K.M. Folta (Chair, Horticultural Sciences) and Dean Kospell (Interim Chair, Environmental Horticulture)
Graduate Coordinator: Carlos Vallejos (Horticultural Sciences) and Hector Perez (Environmental Horticulture)

The Horticultural Sciences Department Graduate Program at the University of Florida has a wide array of opportunities for graduate study.

The Horticultural Sciences (HOS) graduate program is administered jointly by the Environmental Horticulture (HSE) and Horticultural Sciences (HS) departments and offers graduate programs leading to the Master of Science (thesis or nonthesis options) and the Doctor of Philosophy degrees. Members of the program's Graduate Faculty include department resident faculty and faculty at University of Florida Research and Education Centers located throughout Florida.

The Horticultural Sciences Department offers a combined bachelor's/master's degree program. Please contact the graduate coordinator for information.

For admission to the HOS graduate program, apply to either the HS or HSE departments, depending on your career/research interest. Details about the program and how to apply are listed on their website:

HOS http://hos.ufl.edu
HSE https://hort.ifas.ufl.edu/graduate-program/

Majors

• Horticultural Sciences (p. 112)

Faculty

Professor

• Andersen, Peter C.
• Barrett, James E.
• Brecht, Jeffrey K.
• Burns, Jacqueline K.
• Chase, Christine D.
• Chen, Jianjun
• Clark, David G.
• Crane, Jonathan H.
• Darnell, Rebecca L.
• Etxeberria, Edgardo Juan
• Folta, Kevin M.
• Gmitter, Frederick G.
• Grosser, Jude William
• Kazuz, Elhadi M.
• Knox, Gary W.
• Koch, Karen E.
• Mccarty, Donald R.
• Moore, Kimberly
• Plotto, Anne
• Ritenour, Mark A.
• Sargent, Steven Alonzo
• Schaffer, Bruce A.
• Settles, Andrew M.

• Simonne, Eric H.
• Trenholm, Laurie E.
• Vendrame, Wagner Aparecido
• Wheeler, Raymond M.
• Williamson, Jeffrey G.
• Yeager, Thomas H.

Associate Professor

• Basset, Gilles J.
• Block, Anna K.
• Boyd, Nathan S.
• Chaparro, Jose Xavier
• Chase, Carlene Ann
• Dittmar, Peter J.
• Freeman, Joshua H.
• Hutton, Samuel F.
• Liu, Guodong
• Stutte, Gary W.
• Treadwell, Danielle D.
• Vallejos, Carlos E.
• Whitaker, Vance M.
• Zhao, Xin
• Zotarelli, Lincoln

Assistant Professor

• Agehara, Shinsuke
• Albrecht, Ute
• Alferez, Fernando Miguel
• Bai, Jinhe
• Barrett, Charles Edward
• Bassil, Elias
• Chambers, Alan H.
• Kanissery, Ramdas Gopinath
• Kim, Jeongim J.
• Lee, Seonghee
• Lee, Tong Geon
• Liu, Tie
• Meru, Geoffrey Mugambi
• Munoz, Patricio Ricardo
• Ribeiro De Resende, Marcio Fernando
• Rossi, Lorenzo
• Sandoya Miranda, German V.
• Sarkhosh, Ali
• Soranz Ferrarezi, Rhuanito
• Vashisth, Tripti
• Vincent, Christopher I.
• Williams, Phillip B.

Eminent Scholar

• Hanson, Andrew D.
• Klee, Harry John
Scientist
• Gutierrez, Osman Ariel

Lecturer
• Nunez Villegas, Gerardo

Distinguished Professor
• Ferl, Robert J.

Research Professor
• Paul, Annalisa

Research Assistant Scientist
• Dutt, Manjul
• Elhanafi, Ahmad Al Sayed Omar
• Febres, Vicente J.

Research Assistant Professor
• Tieman, Denise M.

Courtesy Professor
• Brovelli, Ernesto A.

Extension Agent
• Rice, Ronald W.

Affiliated Faculty
• Rathinasabapathi, Balasubramani

Horticultural Sciences

Program Information
The Horticultural Sciences (HOS) graduate program is administered jointly by the Environmental Horticulture (HSE) and Horticultural Sciences (HS) departments and offers graduate programs leading to the Master of Science (thesis or nonthesis options) and the Doctor of Philosophy degrees. The Department offers a combined bachelor's/master's degree program. Contact the graduate coordinator for information. Members of the program's Graduate Faculty include department resident faculty and faculty at University of Florida Research and Education Centers located throughout Florida.

For admission to the HOS graduate program, apply to either the HS or HSE departments, depending on your career/research interest.

Requirements
A strong undergraduate or graduate background in horticultural, biological, agronomic, or other disciplines in the life sciences and undergraduate coursework in chemistry, physics, and mathematics. A prospective graduate student need not have majored in horticulture as an undergraduate or master’s student; however, students with curriculum deficiencies are required to take prerequisite subjects during the first year of graduate study. Undergraduate courses taken to correct curriculum deficiencies do not count for graduate program credit.

Specializations in the HS department focus on vegetable and fruit crops and include
• Plant Breeding and Genetics
• Crop Production and Nutrient Management
• Postharvest Biology
• Organic Sustainable Agriculture
• Weed Science
• Physiology and Biochemistry
• Plant Molecular Biology
• Protected Agriculture

Numerous HS and HSE faculty participate in the interdisciplinary Plant Molecular and Cellular Biology Program. Students interested in molecular biology/biotechnology may pursue molecular-oriented studies in any listed specialization. Students interested in full specialization in molecular and related disciplines should contact the Plant Molecular and Cellular Biology interdisciplinary program for specific requirements.

Specializations in the HSE department:
• Breeding and Genetics
• Restoration Ecology
• Floriculture
• Foliage Production
• Plant anatomy and development
• Plant Biotechnology
• Plant Restoration Conservation Biotechnology
• Stress Physiology
• Taxonomy
• Tissue Culture
• Turfgrass Science
• Woody Plants

Graduate School Degree Program Requirements Master of Science (Thesis Option)

Students must earn at least 30 credits as a graduate student at UF. No more than 9 of the 30 credits (earned with a grade of A, B+, or B) may be transferred from institutions approved for this purpose by the Dean of the Graduate School. A minimum of 12 credits is required in the Horticultural Sciences major; additionally, a maximum of 6 credits in HOS 6971 Research for Master’s Thesis (1-15 cr.)—Master’s Research—may be counted toward the total credits. See here for information on M.S. graduate degrees (p. 48).

A minor may be chosen in an academic unit other than the major. If a minor is chosen, at least 6 credits of course work are required in the minor field. Two 6-credit minors may be taken with the major academic unit’s permission. A 3.00 (truncated) GPA is required for minor credit. In addition, a representative from the department in which the minor is being received must be on the supervisory committee.

Master of Science Non-Thesis Option

This option offers additional training beyond the bachelor's degree in a horticultural specialization. Essential elements of this program include a program of courses and a comprehensive written and/or final oral qualifying examination. There is no thesis requirement. A minimum of 30 credit hours of course work is required. Courses taken for program credit must be numbered 5000 or higher with at least 15 of these credits in the
Horticultural Science major. With supervisory committee and college dean approval, 6 hours of 3000- or 4000-level undergraduate courses, taught outside the major department, may count toward the minimum requirements for the degree. Click for information on all graduate degrees (p. 48).

A minor may be chosen in an academic unit other than the major. If a minor is chosen, at least 6 credits of work are required in the minor field. Two 6-credit minors may be taken with the major academic unit’s permission. A 3.00 (truncated) GPA is required for minor credit. In addition, a representative from the department in which the minor is being received must be on the supervisory committee.

**Doctor of Philosophy**

The Doctor of Philosophy is a research degree and is granted on evidence of general proficiency, distinctive attainment in a special field, and ability to conduct independent investigation as demonstrated in a dissertation presenting original research with a high degree of literary skill. Consequently, doctoral programs are more flexible and varied than those leading to M.S. degree programs. The Ph.D. degree requires at least 90 credits beyond the bachelor’s degree, although specific course requirements vary from field to field and from student to student. Up to 30 credits of master’s degree may be transferred to a doctoral program. Any credits counted from an M.S. degree program must have been earned within the previous seven years (or by petition). The Graduate Council does not specify the courses required for the Ph.D. degree.

**Minor**

With the supervisory committee’s approval, the student may choose one or more minor fields. Minor work may be completed in any academic unit outside the major, if approved for M.S. or doctoral programs listed in this catalog. The collective grade for courses included in a minor must be “B” (3.00) or higher. If one minor is chosen, the supervisory committee member representing the minor suggests 12 to 24 credits of courses numbered 5000 or higher for preparation for a qualifying examination. Part of this credit may have been earned in the M.S. degree program. If two minors are chosen, each must include at least 8 credits. Competence in the minor area is demonstrated by written examination by the minor academic unit, or by the oral qualifying examination. Minor course work at the doctoral level may include courses in more than one academic unit; if the objective of the minor is clearly stated and the combination of courses is approved by the Graduate School (this approval is not required for a minor in one academic unit). Further requirements for the Master of Science and the Doctor of Philosophy degrees are listed under those headings in the General Information section of this catalog.

**Degrees Offered**

**Degrees Offered with a Major in Horticultural Sciences**
- Doctor of Philosophy
  - without a concentration
  - concentration in Environmental Horticulture
- concentration in Horticultural Sciences
- concentration in Toxicology
- Master of Science
  - without a concentration
  - concentration in Environmental Horticulture
  - concentration in Horticultural Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

**Horticultural Sciences Program Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>ALS 6935</td>
<td>Topics in Biological Invasions</td>
<td>3</td>
</tr>
<tr>
<td>BCH 5045</td>
<td>Graduate Survey of Biochemistry</td>
<td>4</td>
</tr>
<tr>
<td>BOT 6935</td>
<td>Special Topics</td>
<td>1-4</td>
</tr>
<tr>
<td>HOS 6934</td>
<td>Professional Seminar Preparation</td>
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<tr>
<td>PLS 5222C</td>
<td>Propagation of Horticultural Crops</td>
<td>3</td>
</tr>
<tr>
<td>PLS 5241C</td>
<td>Advanced Plant Micropropagation</td>
<td>4</td>
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<tr>
<td>PLS 5405</td>
<td>Advanced Composting Technology</td>
<td>3</td>
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**Additional Course Offerings**

The following courses may be taken to contribute to the overall degree award requirements.

**Botany Courses**

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<tr>
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<td>BOT 5305</td>
<td>Paleobotany</td>
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<td>BOT 5505C</td>
<td>Intermediate Plant Physiology</td>
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<td>BOT 5625</td>
<td>Plant Geography</td>
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<td>BOT 5655C</td>
<td>Physiological Plant Ecology</td>
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<td>BOT 5685C</td>
<td>Tropical Botany</td>
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<td>BOT 5695C</td>
<td>Ecosystems of Florida</td>
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<td>BOT 5725C</td>
<td>Taxonomy of Vascular Plants</td>
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<td>BOT 6508C</td>
<td>Proteomics Theory and Practice</td>
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<td>BOT 6516</td>
<td>Plant Metabolism</td>
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<td>BOT 6556</td>
<td>Plant Growth and Development</td>
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<td>BOT 6716C</td>
<td>Advanced Taxonomy</td>
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<td>BOT 6726C</td>
<td>Principles of Systematic Biology</td>
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<td>BOT 6905</td>
<td>Individual Studies in Botany</td>
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<td>BOT 6910</td>
<td>Supervised Research</td>
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<td>BOT 6927</td>
<td>Advances in Botany</td>
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<td>BOT 6935</td>
<td>Special Topics</td>
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<td>BOT 6936</td>
<td>Graduate Student Seminar</td>
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<td>BOT 6971</td>
<td>Research for Master’s Thesis</td>
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<td>BOT 7979</td>
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<td>PCB 5046C</td>
<td>Advanced Ecology</td>
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<td>PCB 5338</td>
<td>Principles of Ecosystem Ecology</td>
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<td>PCB 5356</td>
<td>Tropical Ecology</td>
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<tr>
<td>PLP 6656C</td>
<td>Fungal Biology</td>
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**Environmental Horticulture Courses**

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<td>Graduate Survey of Biochemistry</td>
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<td>HOS 5117C</td>
<td>Horticultural Plant Morphology and</td>
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Identification
HOS 5432  Advanced Nutritional Management of Ornamental Crops  3
HOS 5515C  Greenhouse and Nursery Operations  3
HOS 6070  Plant Materials for Conservation and Restoration  3
HOS 6523  Research and Development in Turfgrass Science  3
HOS 6905  Problems in Horticultural Science  1-4
HOS 6910  Supervised Research  1-5
HOS 6931  Horticultural Science Seminar  1
HOS 6932  Special Topics  1-4
HOS 6940  Supervised Teaching  1-5
HOS 6941  Practicum in Horticultural Science  2-4
HOS 6971  Research for Master’s Thesis  1-15
HOS 6991  Evolution, Eco-physiology and Global Importance of Seeds  4
HOS 7979  Advanced Research  1-12
HOS 7980  Research for Doctoral Dissertation  1-15
ORH 5026C  Advanced Annual and Perennial Gardening  3
ORH 5086  Advanced Golf and Sports Turf Management  2
ORH 5282  Orchid Biology and Culture  3
ORH 5817C  Advanced Florida Native Landscaping  3
PLS 5222C  Propagation of Horticultural Crops  3
PLS 5241C  Advanced Plant Micropropagation  4
PLS 5405  Advanced Composting Technology  3
PCB 6937  Special Topics in Plant Molecular and Cellular Biology  1-4
PCB 6971  Research for Master’s Thesis  1-15
PCB 7922  Journal Colloquy in Plant Molecular and Cellular Biology  1
PCB 7979  Advanced Research  1-12
PCB 7980  Research for Doctoral Dissertation  1-15
WDS 6005  Weed Management for Organic and Sustainable Cropping Systems  3

College of Agricultural and Life Sciences Courses

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<td>Agricultural Ecology Principles and Applications</td>
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<td>ALS 5905</td>
<td>Individual Study</td>
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<td>ALS 5932</td>
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<tr>
<td>ALS 6046</td>
<td>Grant Writing</td>
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<td>ALS 6166</td>
<td>Exotic Species and Biosecurity Issues</td>
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<td>ALS 6921</td>
<td>Colloquium on Plant Pests of Regulatory Significance</td>
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<tr>
<td>ALS 6925</td>
<td>Integrated Plant Medicine</td>
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<td>ALS 6931</td>
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<td>ALS 6935</td>
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<tr>
<td>ALS 6942</td>
<td>Principles of Pest Risk Assessment and Management</td>
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<td>ALS 6943</td>
<td>Internship in Plant Pest Risk Assessment and Management</td>
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<td>Graduate Seminar in Animal Molecular and Cell Biology</td>
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<td>FYC 6422</td>
<td>Policy Issues and Case Studies in Nonprofit Organizations</td>
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<tr>
<td>STA 6093</td>
<td>Introduction to Applied Statistics for Agricultural and Life Sciences</td>
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<tr>
<td>STA 6329</td>
<td>Matrix Algebra and Statistical Computing</td>
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Horticultural Sciences Departmental Courses

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<tr>
<td>HOS 5085C</td>
<td>Principles of Postharvest Horticulture</td>
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<td>HOS 5242</td>
<td>Genetics &amp; Breeding of Vegetable Crops</td>
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<td>HOS 5306</td>
<td>Molecular Biology of Plant Hormones</td>
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<td>HOS 5330</td>
<td>Postharvest Technologies for Horticultural Crops</td>
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<td>HOS 5555</td>
<td>Tropical Fruit Production and Research in Florida</td>
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<td>HOS 5711</td>
<td>Phytochemicals in Food &amp; Health</td>
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<td>HOS 6021</td>
<td>Breeding Perennial Cultivars</td>
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<td>HOS 6236</td>
<td>Molecular Marker Assisted Plant Breeding</td>
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<td>HOS 6331</td>
<td>Postharvest Biology</td>
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<td>HOS 6345</td>
<td>Environmental Physiology</td>
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<td>HOS 6355</td>
<td>Root and Rhizosphere Ecology</td>
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<td>HOS 6373C</td>
<td>Plant Cell Culture</td>
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<td>HOS 6412</td>
<td>Nutrition of Horticultural Crops</td>
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<td>HOS 6545</td>
<td>Advanced Citriculture I</td>
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<td>Advanced Citriculture II</td>
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<td>PCB 5065</td>
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<td>PCB 5530</td>
<td>Plant Molecular Biology and Genomics</td>
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<td>PCB 6528</td>
<td>Plant Cell and Developmental Biology</td>
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<td>PCB 6910</td>
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Student Learning Outcomes

Horticultural sciences (PHD)

SLO 1  Knowledge
Describe and explain theories and concepts of the various disciplines of Horticultural Sciences including plant physiology and plant genetics as related to horticultural plant growth and development, and the integration of structure and function of the whole plant

SLO 2  Knowledge
Describe new techniques and technologies from associated disciplines

SLO 3  Knowledge
Evaluate horticultural systems, components and/or processes to meet industry and societal needs within realistic economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability constraints

SLO 4  Skills
Design and conduct experiments required for successful production of fruit and vegetable crops and analyze results

SLO 5  Skills
Communicate horticultural ideas, technical data and design information clearly and professionally to other students, scientists and the public.

SLO 6   Professional Behavior
Display ethical behaviors, cultural sensitivity, teamwork skills and professional conduct

Horticultural sciences (MS)-Environmental Horticulture

SLO 1   Knowledge
Describe and explain theories and concepts the various disciplines of Horticultural Sciences including plant physiology and plant genetics as related to horticultural plant growth and development, and the integration of structure and function of the whole plant.

SLO 2   Knowledge
Evaluate and advance horticultural systems, components and/or processes to meet industry and societal needs within realistic economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.

SLO 3   Knowledge
Describe techniques and technologies from associated disciplines as applied to Environmental Horticulture.

SLO 4   Skills
Design, conduct, and evaluate experiments or study required to advance or improve production and/or management of horticultural crops and analyze results.

SLO 5   Skills
Communicate in written and oral form horticultural ideas, technical data and design information clearly and professionally to other students, scientists and the public.

SLO 6   Professional Behavior
Display ethical behaviors, cultural sensitivity, teamwork skills and professional conduct.

Horticultural sciences (MS)-Horticultural Sciences

SLO 1   Knowledge
Describe and explain theories and concepts the various disciplines of Horticultural Sciences including plant physiology and plant genetics as related to horticultural plant growth and development, and the integration of structure and function of the whole plant.

SLO 2   Knowledge
Describe new techniques and technologies from associated disciplines.

SLO 3   Knowledge
Evaluate horticultural systems, components and/or processes to meet industry and societal needs within realistic economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability constraints.

SLO 4 HS   Skills
Design and conduct experiments required for successful production of fruits and vegetables and analyze results.

SLO 5 HS   Skills
Communicate horticultural ideas, technical data and design information clearly and professionally to other students, scientists and the public.

SLO 6 HS   Professional Behavior
Display ethical behaviors, cultural sensitivity, teamwork skills and professional conduct.

Microbiology and Cell Science Department

Chair: E. Triplett
Graduate Coordinator: Tony Romeo

Graduate study is offered leading to the Master of Science and Doctor of Philosophy degrees in microbiology and cell science, with emphasis in one or more of the disciplines of biochemistry, cell biology, and microbiology.

Requirements for these degrees are provided in the Graduate Degrees (p. 48) section of this catalog and also at the Department webpage: http://microcell.ufl.edu/.

Instruction and guidance are collaborative among faculty in the Colleges of Agricultural and Life Sciences, Liberal Arts and Sciences, and Medicine.

Research spans broad areas in the cellular and molecular aspects of bacterial, plant, and animal life functions: Areas of research include microbial biochemistry, biotechnology, biomass conversion; genetic and metabolic regulation; environmental microbiology; cell biology; molecular biology; molecular genetics; genomics and bioinformatics; immunology; virology; parasitology, host-pathogen interactions; cellular ultrastructure.

Prerequisites for admission to graduate study, in addition to those of the Graduate School, are a broad educational background including mathematics, physics, and chemistry through organic, analytical, and physical chemistry; basic courses in biology, botany, and/or zoology; and at least one course in microbiology and biochemistry. An undergraduate major in biochemistry, physical or chemical science, engineering, or general biology may be an acceptable alternative to a degree in microbiology or cell science. Receipt of an advanced degree requires detailed knowledge in microbiology, biochemistry, and chemistry; undergraduate deficiencies may necessitate additional course work prior to entry into the graduate program.

In addition, the Microbiology and Cell Science Department also offers a combined B.S./M.S. program that allows qualified students to earn both the Bachelor’s and Master’s degrees with 12 credit hours of jointly counted course work. This program is considered a "4/1" because students may be awarded both degrees within a five-year period. For further information on this program, follow this link: http://microcell.ufl.edu/.

Majors

- Microbiology and Cell Science (p. 116)

Faculty

Professor

- Conesa Cegarra, Ana
- De Crecy, Valerie Anne
- Gurley, William B.
Microbiology and Cell Science

The Department of Microbiology and Cell Science offers a top-10 education for students who wish to earn their M.S. or Ph.D. in Microbiology and Cell Science. Graduates are well prepared to pursue careers in government, industry, research and teaching in microbiology, cell biology, cellular biochemistry, and molecular genetics. For more information on how to apply for these programs, please visit our Microbiology and Cell Science Graduate Program Website – http://microcell.ufl.edu/graduate-program/.

Currently there are 25 tenure eligible faculty positions staffed, 2 emeritus faculty, 5 non-tenure eligible faculty, 16 post-doctoral fellows, over 56 graduate students, and 2 full time academic advisors. Most faculty are involved in both teaching and research programs that complement one another. The faculty’s research programs span areas of broad interest in the cellular and molecular aspects bacterial, plant and animal life functions. Areas of research include:

- Microbial Biochemistry, Physiology, Metabolism and Regulation
- Molecular Biology
- Molecular Genetics
- Immunology
- Virology
- Host-pathogen Interactions
- Environmental Microbiology
- Bioinformatics
- Functional and Comparative Genomics
- Astrobiology
- Human Parasitology
- Cellular Ultrastructure and Function
- Microbial Communities
- Microbial Processing of Plant Biomass

For more information, please see our website: http://microcell.ufl.edu.

For Microbiology and Cell Science Academic Advising, contact Jacqueline Lee at 352-846-1330 or jlee9@ufl.edu.

Degrees Offered

Degrees Offered with a Major in Microbiology and Cell Science

- Doctor of Philosophy
  - without a concentration
  - concentration in Toxicology
- Master of Science
  - without a concentration
  - concentration in Medical Microbiology and Biochemistry

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Microbiology and Cell Science Courses

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<td>BSC 6459</td>
<td>Fundamentals of Bioinformatics</td>
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<td>MCB 5205</td>
<td>Microbiology of Human Pathogens</td>
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<td>MCB 5505</td>
<td>General Virology</td>
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<td>MCB 6151</td>
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### College of Agricultural and Life Sciences Courses

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<td>Individual Study</td>
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<td>Microbiology, Immunology, and Immunotherapeutics</td>
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<td>Astrobiology</td>
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<td>Prokaryotic Diversity</td>
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### Microbiology Learning Outcomes

#### Microbiology & Cell science (PHD)

**SLO 1**  Knowledge
- Describe orally and in writing, the molecular genetic, biochemical and cellular basis of life

**SLO 2**  Skills
- Discuss orally and in writing, research methodologies for applying the scientific method to the generation of new knowledge

**SLO 3**  Professional Behavior
- Interact with professional peers with honesty, ethical behavior, cultural sensitivity, teamwork, and effective communication

#### Microbiology & Cell science (MS)

**SLO 1**  Knowledge
- Describe in writing and orally, the molecular genetic, biochemical and cellular basis of life

**SLO 2**  Skills
- Discuss orally and in writing, research methodologies for applying the scientific method to the generation of new knowledge

**SLO 3**  Professional Behavior
- Interact with professional peers with honesty, ethical behavior, cultural sensitivity, teamwork, and effective communication

### Plant Molecular and Cellular Biology Department

Plant Molecular and Cellular Biology (PMCB) currently has 45 faculty members in the program. They are based in the departments...

**Majors**

- Plant Molecular and Cellular Biology (CALS) (p. 119)

**Faculty**

**Affiliated Faculty**

- Ali, Gul Shad
  Assistant Professor
- Altpeter, Fredy
  Professor
- Barbazuk, William Bradley
  Professor
- Basset, Gilles J.
  Associate Professor
- Bassil, Elias
  Assistant Professor
- Burleigh, John Gordon
  Associate Professor
- Chambers, Alan H.
  Assistant Professor
- Chase, Christine D.
  Professor
- Chen, Sixue
  Professor
- Choure, Prem S.
  Professor
- Clark, David G.
  Professor
- Colquhoun, Thomas A.
  Assistant Professor
- Davis, John Mark
  Professor
- Ferl, Robert J.
  Distinguished Professor
- Folimonova, Svetlana Yuryevna
  Associate Professor
- Folt, Kevin M.
  Professor
- Gabriel, Dean W.
  Professor
- Gmitter, Frederick G.
  Professor
- Gurley, William B.
  Professor
- Hanson, Andrew D.
  Eminent Scholar
- Harmon, Alice Claire
  Professor
- Hauser, Bernard A.
  Associate Professor
- Jones, Jeffrey B.
  Distinguished Professor
- Kim, Jeongim J.
  Assistant Professor
- Klee, Harry John
  Eminent Scholar
- Koch, Karen E.
  Professor
- Lee, Seongheee
  Assistant Professor
- Lee, Tong Geon
  Assistant Professor
- Levy, Amit
  Assistant Professor
- Liu, Tie
  Assistant Professor
- Mccarty, Donald R.
  Professor
- McDaniel, Stuart
  Associate Professor
- McIntyre, Lauren M.
  Professor
- Meru, Geoffrey Mugambi
  Assistant Professor
- Mou, Zhonglin
  Associate Professor
- Munoz, Patricio Ricardo
  Assistant Professor
- Oppenheimer, David G.
  Associate Professor
- Padilla, Kevin Begcy
  Assistant Professor
- Paul, Annalisa
  Research Professor
- Peter, Gary Frank
  Professor
- Rathinasabapathi, Balasubramani
  Professor
- Ribeiro De Resende, Marcio Fernando
  Assistant Professor
- Rollins, Jeffrey A.
  Professor
- Settles, Andrew M.
  Professor
- Soltis, Douglas Edward
  Distinguished Professor
- Soltis, Pamela S.
  Distinguished Professor
- Song, Wen-Yuan
  Associate Professor
- Tieman, Denise M.
Plant Molecular and Cellular Biology (CALS)

Program Information

Director: Dr. Svetlana Folimonova
Graduate Coordinator: Dr. Gilles Basset
Program Coordinator: Eliana Kampf

Plant Molecular and Cellular Biology (PCMB) is an interdisciplinary and interdepartmental graduate degree program that emphasizes understanding the molecular and cellular mechanisms that mediate plant development, adaptation, and evolution. Students can pursue an M.S. or a Ph.D. degree through the PMCB program. All students complete core courses in Advanced Genetics, Plant Molecular Biology and Genomics, Plant Cellular and Developmental Biology, and Plant Biochemistry. In addition to the core classes, students can select from a variety of courses in biochemistry, molecular biology, physiology, breeding, genetics, evolution, microbiology, and plant pathology.

New students are exposed to a variety of faculty and experimental systems while they rotate through several laboratories during their first two semesters before selecting an adviser and dissertation research area. Both M.S. and Ph.D. students take four required courses:

PCB 5065 Advanced Genetics (4 cr.), PCB 5530 Plant Molecular Biology and Genomics (3 cr.), PCB 6528 Plant Cell and Developmental Biology (3 cr.) and BOT 6935 Special Topics (1-4 cr.), as well as journal colloquium classes (PCB 7922 Journal Colloquium in Plant Molecular and Cellular Biology (1 cr.)). Additional elective courses are taken after approval by the student’s supervisory committee. For additional information see http://pmcb.ifas.ufl.edu.

Successful candidates should have a strong interest in plant molecular and cellular mechanisms controlling development, metabolism, adaptation, and evolution. Applicants typically have a B.S. or M.S. in the agricultural, forestry, biological or chemical sciences.

Degrees Offered

Degrees Offered with a Major in Plant Molecular and Cellular Biology

- Doctor of Philosophy
  - without a concentration
  - concentration in Toxicology
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

College of Agricultural and Life Sciences Courses

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<td>STA 6329</td>
<td>Matrix Algebra and Statistical Computing</td>
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Student Learning Outcomes

Plant molecular & Cellular biology (MS)

SLO 1  Knowledge
Describe and explain fundamental theories and concepts in plant biochemistry, cell and developmental biology, genetics and genomics, molecular biology and general plant biology

SLO 2  Knowledge
Use critical thinking to evaluate research design and experiments

SLO 3  Skills
Critically evaluate the primary scientific literature

SLO 4  Skills
Develop practical experimental research skills

SLO 5  Skills
Communicate effectively using scientific writing and oral presentation skills

SLO 6  Professional Behavior
Effectively work in teams with peers interacting honestly, ethically and with cultural sensitivity

Plant Pathology Department
Chair: R. Loria
Graduate Coordinators: J. Jones

The Department of Plant Pathology offers graduate studies leading to the Master of Science (thesis and nonthesis option) and Doctor of Philosophy degrees. The Department also participates in the Doctor of Plant Medicine interdisciplinary professional degree.

The Department offers a combined bachelor's/master's degree program. Contact the graduate coordinator for information.

For more information, please visit http://plantpath.ifas.ufl.edu/.

Majors
• Plant Pathology (p. 120)

Faculty

Professor
• Gabriel, Dean W.
• Garrett, Karen A.
• Harmon, Phil F.
• Loria, Rosemary
• Momol, Timur Mehmet
• Peres Lauretti, Natalia A.
• Ploetz, Randy C.
• Polston, Jane Elizabeth
• Raid, Richard Neil
• Roberts, Pamela D.
• Rollins, Jeffrey A.
• Rott, Philippe Charles
• Waddill, Christine Taylor
• White, Frank F

Assistant Professor
• Ali, Gul Shad
• Batuman, Ozgur
• Brawner, Jeremy T.
• Cano Mogrovejo, Liliana Maria
• Dhillon, Braham
• Gazis-Seregina, Romina
• Goss, Erica M.
• Levy, Amit
• Richter, Brantlee Spakes
• Small, Ian Malcolm

Eminent Scholar
• Dawson, William O.

Assistant Scientist
• Healy, Rosaria A.

Distinguished Professor
• Jones, Jeffrey B.

Research Assistant Scientist
• Huguet Tapia, Jose
• Johnson, Evan G.

Research Assistant Professor
• Schuerger, Andrew C.

Associate In
• Harmon, Carrie Lapaire

Affiliated Faculty
• Killiny, Nabil
  Associate Professor
• Mou, Zhonglin
  Associate Professor
• Smith, Jason Andrew
  Associate Professor
• Wang, Nian
  Professor

Plant Pathology Program Information

A student may pursue studies in one of several basic areas of plant pathology. These include fungal plant pathology, plant bacteriology, plant virology, diagnostics, control, and also molecular and biochemical aspects of host-pathogen systems, biological control of pathogens and weeds, epidemiology, etiology, genetics of host-pathogen systems, soil microbiology, and pathogen taxonomy. In Florida, the variety of cultivated plants, coupled with an environment ideal for plant disease development, offers the student opportunities to study diseases of many crops as they develop. First-hand knowledge can be gained of diseases of field, fruit, ornamental, pasture, range, turf, and vegetable crops in temperate, subtropical, and tropical environments. Students who
anticipate study in plant pathology at the University of Florida should include in their undergraduate programs training in botany, chemistry (through biochemistry), genetics, and microbiology.

Courses in nematology are offered by the Department of Entomology and Nematology.

**Degrees Offered**

**Degrees Offered with a Major in Plant Pathology**

- Doctor of Philosophy
  - without a concentration
  - concentration in Toxicology
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

### Plant Pathology Departmental Courses

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<td>PLP 5102</td>
<td>Theory and Practice of Plant Disease Control</td>
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<td>PLP 5115C</td>
<td>Citrus Pathology</td>
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<td>PLP 6105</td>
<td>Applied Plant Disease Management</td>
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<td>PLP 6223C</td>
<td>Viral Pathogens of Plants</td>
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**Plant pathology (PHD)**

- **Knowledge**
  - Describe and explain the literature, theories and ideas of plant pathology
- **Skills**
  - Utilize the scientific method to conduct experimental research
  - Communicate effectively in oral and written form
  - Develop, organize and deliver instruction
  - Exhibit professional behavior and ethical practices in the conduct of research and scholarship

**Plant pathology (MS)**

- **Knowledge**
  - Describe and explain the literature, theories and ideas of plant pathology
- **Skills**
  - Utilize the scientific method to conduct experimental research
  - Communicate effectively in oral and written form
  - Develop, organize and deliver instruction
  - Exhibit professional behavior and ethical practices in the conduct of research and scholarship

**School of Forest Resources and Conservation**

Director: Terrell “Red” Baker III
Graduate Coordinator: T.V. Stein
Since 1937 the School of Forest Resources & Conservation has prepared students for professional careers caring for natural resources. We emphasize the role of people in managing both terrestrial and aquatic systems, to produce the myriad of benefits and services they provide. Our faculty have a broad range of interests, including ecology, economics/policy, and recreation/education, and are united by an interest in environmental resources, rather than by traditional academic discipline. The School is composed of three programmatic areas: Fisheries and Aquatic Sciences, Forest Resources and Conservation, and Geomatics. Combined, these programs offer seven different degree options (including two professional masters degrees), as well as concentrations and certificates in a diversity of specific areas. Minimum requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Joint program:** Students may simultaneously earn a juris doctorate from the College of Law and a graduate degree (M.F.R.C., M.S., or Ph.D.) in Forest Resources and Conservation.

**Combined programs:** The School offers a combined bachelor's/master's degree program, which allows qualified students to earn both a bachelor's degree and a master's degree with a savings of 1 semester. Ph.D. students may pursue a co-major with the Department of Statistics (see below).

**Concentration in geomatics:** Students completing 15 or more credits with an SUR designation, as part of an SFRC graduate degree, may earn the concentration in geomatics. Geomatics is the collection, analysis, and management of spatial information and includes such fields as surveying, mapping, land tenure, cadastral systems, geographic information systems, and remote sensing.

**Concentration in ecological restoration:** This concentration is available to M.S. non-thesis students. To earn this concentration a student must complete Ecosystem Restoration Principles and Practice and four of the following courses: Ecological Distribution and Management of Invasive Plants, Ecology and Restoration of Invaded Ecosystems, Ecology and Restoration of Longleaf Pine Ecosystem, Watershed Restoration and Management, Natural Resource Policy and Administration, or Agroforestry in the Southeastern US. Ecological restoration seeks to return ecosystems to a close approximation of condition before a disturbance.

**Statistics co-major:** Ph.D. students with the School may elect the co-major offered jointly with the Department of Statistics. Students focusing on forest genetics, tree improvement, and other statistics-intensive aspects of natural resource management are potential candidates for this option.

**Certificates:** The School administers the Graduate Certificate in Agroforestry, and SFRC students regularly earn certificates in Geographic Information Systems and in Environmental Education and Communication. Requirements are described under Interdisciplinary Graduate Certificates and Concentrations in this catalog.

For additional information, please visit the School's web page at http://sfrc.ufl.edu.

For details on what terms courses will be offered, please visit http://sfrc.ufl.edu/gradcourses.html.
• Jepson, Michael E.
• Johnson, Daniel Jacob
• Lecours, Vincent
• Loudermilk, Eva Louise
• Morales, Nia Aisha Haynes
• Patterson, Joshua T.
• Paudyal, Ramesh
• Qiu, Jiangxiao
• Ribeiro Do Valle, Denis
• Sharma, Ajay
• Vogel, Jason
• Wilkinson, Benjamin E.
• Yang, Huiping

Other
• Bigelow, Seth W.
• Blanchette, Robert Anthony
• Klarenberg, Geraldine

Research Associate Professor
• Lowerre-Barbieri, Susan K.

Distinguished Professor
• Nair, Ramachandran P.

Research Assistant Scientist
• Bartels, Wendy Lin
• Susaeta Larrain, Andres Ignacio
• Tuckett, Quenton

Research Assistant Professor
• Reisinger, Lindsey Sargent
• Struve, Juliane

Associate In
• Buschbacher, Robert John

Extension Agent
• Barry, Savanna C.
• Mcguire, Maia Patterson

Affiliated Faculty
• Adams, Alison Eve
  Assistant Professor
• Allen, Micheal S.
  Professor
• Austin, James D.
  Associate Professor
• Bachmann, Roger Werner
  Professor
• Baker, Shirley M.
  Associate Professor
• Behringer, Donald Charles
  Associate Professor
• Canfield, Daniel E.
  Professor
• Chagaris, David D.
  Research Assistant Professor
• Cichra, Charles
  Professor
• Demopoulos, Amanda
  Courtesy Assistant Professor
• Duarte, Carlos M.
  Professor
• Francis-Floyd, Ruth
  Professor
• Frazer, Tom K.
  Professor
• Hartman, Kathleen H.
  Assistant Professor
• Havens, Karl
  Professor
• Leber, Kenneth Miles
  Professor
• Lorenzen, Kai
  Professor
• Main, Kevan
  Assistant Professor
• Martin, Charles
  Research Assistant Professor
• Mason, Doran M.
  Associate Professor
• Mcbride, Richard S.
  Scientist
• Murie, Debra Jean
  Professor
• Nico, Leo G.
  Associate Professor
• Ohs, Cortney L.
  Associate Professor
• Parkyn, Daryl Charles
  Research Associate Professor
• Philips, Edward J.
  Professor
• Pine, William E.
  Professor
• Prairie, Yves
  Professor
• Putz, Francis E.
  Distinguished Professor
• Scarpa, John
  Professor
• Schelske, Claire L.
  Eminent Scholar
• Stamper, Michael A.
  Assistant Professor
• Swett, Robert Alphonso
  Associate Professor
• Walters, Carl John
  Assistant Professor
Fisheries and Aquatic Sciences

Program Information

Director: Terrell "Red" Baker III
Graduate Coordinator: Robert Ahrens

Since 1937 the School of Forest Resources & Conservation has prepared students for professional careers caring for natural resources. We emphasize the role of people in managing both terrestrial and aquatic systems, to produce the myriad of benefits and services they provide. Our faculty have a broad range of interests, including ecology, economics/policy, and recreation/education, and are united by an interest in environmental resources, rather than by traditional academic discipline. The School is composed of three programmatic areas: Fisheries and Aquatic Sciences, Forest Resources and Conservation, and Geomatics. Combined, these programs offer seven different degree options (including two professional masters degrees), as well as concentrations and certificates in a diversity of specific areas.

The School’s program in Fisheries and Aquatic Sciences leads to the Master of Science, Master of Fisheries and Aquatic Sciences (nonthesis), and Doctor of Philosophy degrees with a program in Fisheries and Aquatic Sciences. Minimum requirements for these degrees are given in the Graduate Degrees section of this catalog.

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

School of Forest Resources and Conservation Courses

Geomatics Concentration Courses

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<th>Code</th>
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<td>Least Squares Adjustment Computations</td>
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<td>Topics in Geographic Information Systems</td>
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<td>GPS-INS Integration</td>
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<td>SUR 6934</td>
<td>Topics in Geomatics</td>
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Fisheries and Aquatic Sciences Program Courses

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<td>Biology of Fishes</td>
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<td>FAS 5255C</td>
<td>Diseases of Warmwater Fish</td>
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<td>FAS 5276C</td>
<td>Field Ecology of Aquatic Organisms</td>
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<td>FAS 5335C</td>
<td>Applied Fisheries Statistics</td>
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<td>FAS 5407</td>
<td>Biology of Fishery and Aquaculture Invertebrates</td>
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<td>FAS 5901</td>
<td>Scientific Thinking in Ecology</td>
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<td>FAS 6154</td>
<td>Marine Adaptations: Environmental Physiology</td>
<td>3</td>
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<tr>
<td>FAS 6165</td>
<td>Fish and Crustacean Nutrition</td>
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<td>FAS 6176</td>
<td>Algae Biology and Ecology</td>
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<td>FAS 6256</td>
<td>Fish and Aquatic Invertebrate Histology</td>
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<td>FAS 6272</td>
<td>Marine Ecological Processes</td>
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<td>FAS 6273</td>
<td>Trophic Ecology of Fishes</td>
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<td>FAS 6337C</td>
<td>Fish Population Dynamics</td>
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<td>FAS 6339C</td>
<td>Advanced Quantitative Fisheries Assessment</td>
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<td>Fisheries Management</td>
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<td>FAS 6408</td>
<td>Aquaculture II</td>
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<td>FAS 6416</td>
<td>Spatial Ecology and Modeling of Fish Populations</td>
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<td>FAS 6905</td>
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<tr>
<td>FAS 6910</td>
<td>Supervised Research</td>
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Degrees Offered

Degrees Offered with a Major in Fisheries and Aquatic Sciences

- Doctor of Philosophy
  - without a concentration
  - concentration in Geographic Information Systems
- Master of Science
  - without a concentration
  - concentration in Geographic Information Systems
  - concentration in Natural Resource Policy and Administration
  - concentration in Wetland Sciences
- Master of Fisheries and Aquatic Sciences
  - without a concentration
  - concentration in Geographic Information Systems
  - concentration in Natural Resource Policy and Administration
  - concentration in Wetland Sciences
- Doctor of Philosophy
  - without a concentration
  - concentration in Geographic Information Systems
  - concentration in Natural Resource Policy and Administration
  - concentration in Wetland Sciences

Faculty encompass both freshwater and marine environments, as well as managed aquaculture systems. Collaborators include the UF College of Veterinary Medicine, National Biological Survey, National Marine Fisheries Service, Harbor Branch Oceanographic Institute, Mote Marine Laboratory, the US Geologic Survey, the Florida Fish and Wildlife Conservation Commission, and others. Academic programs are structured to emphasize direct engagement of students with faculty. Further information, including specific degree options, faculty biographies, and information on the admissions process, is available at: http://sfrc.ufl.edu.
### College of Agricultural and Life Sciences Courses

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<td>ALS 5156</td>
<td>Agricultural Ecology Principles and Applications</td>
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<td>ALS 5905</td>
<td>Individual Study</td>
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<tr>
<td>ALS 5932</td>
<td>Special Topics</td>
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<tr>
<td>ALS 6046</td>
<td>Grant Writing</td>
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<tr>
<td>ALS 6166</td>
<td>Exotic Species and Biosecurity Issues</td>
<td>3</td>
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<td>ALS 6921</td>
<td>Colloquium on Plant Pests of Regulatory Significance</td>
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<tr>
<td>ALS 6925</td>
<td>Integrated Plant Medicine</td>
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<td>ALS 6931</td>
<td>Plant Medicine Program Seminar</td>
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<td>ALS 6935</td>
<td>Topics in Biological Invasions</td>
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<tr>
<td>ALS 6942</td>
<td>Principles of Plant Pest Risk Assessment and Management</td>
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<td>ALS 6943</td>
<td>Internship in Plant Pest Risk Assessment and Management</td>
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<tr>
<td>ANS 6936</td>
<td>Graduate Seminar in Animal Molecular and Cell Biology</td>
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<td>BCH 5045</td>
<td>Graduate Survey of Biochemistry</td>
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<td>FYC 6422</td>
<td>Policy Issues and Case Studies in Nonprofit Organizations</td>
<td>3</td>
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<tr>
<td>STA 6093</td>
<td>Introduction to Applied Statistics for Agricultural and Life Sciences</td>
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<tr>
<td>STA 6329</td>
<td>Matrix Algebra and Statistical Computing</td>
<td>3</td>
</tr>
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</table>

### Student Learning Outcomes

#### Fisheries & Aquatic sciences (PHD)

**SLO 1** Knowledge  
Describe and explain key concepts, theories and information in their discipline.

**SLO 2** Knowledge  
Apply the scientific method and the appropriate methodologies to the generation of new knowledge.

**SLO 3** Skills  
Communicate effectively in both written and oral form.

**SLO 4** Skills  
Develop and execute proper experimental or sampling designs.

**SLO 5** Skills  
Utilize critical thinking to evaluate spoken and written communications.

**SLO 6** Professional Behavior  
Work in teams with peers; interact honestly, ethically and with cultural sensitivity; translate skills, knowledge and motivation into observable behaviors related to success in specific situations.

#### Fisheries & Aquatic sciences (MFAS)

**SLO 1** Knowledge  
Describe and explain key concepts, theories and information in their discipline.

**SLO 2** Knowledge  
Apply the appropriate methodologies to the synthesis of existing knowledge.

**SLO 3** Skills
Communicate effectively in both written and oral form.

SLO 4 Skills
Develop and execute proper project design.

SLO 5 Skills
Utilize critical thinking to evaluate spoken and written communications.

SLO 6 Professional Behavior
Work in teams with peers; interact honestly, ethically and with cultural sensitivity; translate skills, knowledge and motivation into observable behaviors related to success in specific situations.

**fisheries & Aquatic Sciences (MS)**

SLO 1 Knowledge
Describe and explain key concepts, theories and information into their discipline.

SLO 2 Knowledge
Apply the scientific method and the appropriate methodologies to the generation of new knowledge.

SLO 3 Skills
Communicate effectively in both written and oral form.

SLO 4 Skills
Develop and execute proper experimental or sampling designs.

SLO 5 Skills
Utilize critical thinking to evaluate spoken and written communications.

SLO 6 Professional Behavior
Work in teams with peers; interact honestly, ethically and with cultural sensitivity; translate skills, knowledge and motivation into observable behaviors related to success in specific situations.

**Forest Resources and Conservation**

**Program Information**

*Director:* Terrell “Red” Baker III
*Graduate Coordinator:* T.V. Stein

Since 1937 the School of Forest Resources & Conservation has prepared students for professional careers caring for natural resources. We emphasize the role of people in managing both terrestrial and aquatic systems, to produce the myriad of benefits and services they provide. Our faculty have a broad range of interests, including ecology, economics/policy, and recreation/education, and are united by an interest in environmental resources, rather than by traditional academic discipline. The School is composed of three programmatic areas: Fisheries and Aquatic Sciences, Forest Resources and Conservation, and Geomatics. Combined, these programs offer seven different degree options (including two professional masters degrees), as well as concentrations and certificates in a diversity of specific areas.

The SFRC offers graduate programs leading to the Master of Forest Resources and Conservation (professional, non-thesis), Master of Science (thesis and non-thesis), and Doctor of Philosophy degrees in Forest Resources and Conservation. The Master of Science non-thesis degree may be taken entirely online. Minimum requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

The School of Forest Resources and Conservation also offers an interdisciplinary concentration in Agroforestry. For more information, contact the Agroforestry Program Leader, 330 Newins-Ziegler Hall, Phone (352) 846-0880, Fax (352) 846-1277, Email pknair@ufl.edu.

The Forest Resources and Conservation program prepares students to work with the ecological, economic, and social aspects of natural resources, including the management of spatial information gathered through traditional surveying as well as remote sensing. Faculty have a wide variety of specializations, including fire ecology, land tenure, tree genetics, recreation management, environmental education, geographic information systems, silviculture, forest economics, and environmental policy. Further information, including specific degree options, faculty biographies, and information on the admissions process, is available at: http://sfrc.ufl.edu.

**Degrees Offered**

**Degrees Offered with a Major in Forest Resources and Conservation**

- Doctor of Philosophy
  - without a concentration
  - concentration in Agroforestry
  - concentration in Ecological Restoration
  - concentration in Geographic Information Systems
  - concentration in Geomatics
  - concentration in Hydrologic Sciences
  - concentration in Natural Resource Policy and Administration
  - concentration in Tropical Conservation and Development
  - concentration in Toxicology
  - concentration in Wetland Sciences

- Master of Forest Resources and Conservation
  - without a concentration
  - concentration in Agroforestry
  - concentration in Geographic Information Systems
  - concentration in Geomatics
  - concentration in Natural Resource Policy and Administration
  - concentration in Tropical Conservation and Development
  - concentration in Wetland Sciences

- Master of Science
  - without a concentration
  - concentration in Agroforestry
  - concentration in Ecological Restoration
  - concentration in Geographic Information Systems
  - concentration in Geomatics
  - concentration in Hydrologic Sciences
  - concentration in Natural Resource Policy and Administration
  - concentration in Tropical Conservation and Development
  - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.
Courses

School of Forest Resources and Conservation Courses

Geomatics Concentration Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>GIS 6103</td>
<td>GIS Programming and Customization</td>
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<td>GIS 6116</td>
<td>Geographic Information Systems Analysis</td>
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<td>SUR 5365</td>
<td>Digital Mapping</td>
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<td>SUR 5385</td>
<td>Remote Sensing Applications</td>
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<td>Image Processing for Remote Sensing</td>
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<td>SUR 5525</td>
<td>Least Squares Adjustment Computations</td>
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<td>SUR 6395</td>
<td>Topics in Geographic Information Systems</td>
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<td>SUR 6427</td>
<td>Land Tenure and Administration</td>
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<td>SUR 6535</td>
<td>GPS-INS Integration</td>
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<tr>
<td>SUR 6905</td>
<td>Special Problems in Geomatics</td>
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<tr>
<td>SUR 6934</td>
<td>Topics in Geomatics</td>
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Fisheries and Aquatic Sciences Program Courses

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<tr>
<td>FAS 5015</td>
<td>Aquaculture I</td>
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<td>FAS 5203C</td>
<td>Biology of Fishes</td>
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<td>Diseases of Warmwater Fish</td>
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<td>Field Ecology of Aquatic Organisms</td>
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<td>Applied Fisheries Statistics</td>
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<td>Biology of Fishery and Aquaculture</td>
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<td>Marine Adaptations: Environmental</td>
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<td>FAS 6910</td>
<td>Supervised Research</td>
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<td>FAS 6912</td>
<td>Special Topics in Fisheries and Aquatic Sciences</td>
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<td>FAS 6933</td>
<td>Graduate Symposium</td>
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Forest Resources and Conservation Program Courses

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<td>Spatial Models and Decision Analysis</td>
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<td>Research Planning</td>
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<td>FNR 6061</td>
<td>Conflict and Collaboration in Natural Resources</td>
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<td>Intro to Bayesian Statistics for Life Sciences</td>
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<td>Ecolohydrology</td>
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<td>FOR 5157</td>
<td>Ecosystem Restoration Principles and Practice</td>
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<td>FOR 5159</td>
<td>Ecology and Restoration of Longleaf Pine Ecosystems</td>
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<td>Forest Productivity and Health</td>
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<td>Forest Ecosystem Health</td>
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<td>FOR 6164</td>
<td>Silviculture: Concepts and Application</td>
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<td>FOR 6170</td>
<td>Tropical Forestry</td>
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<td>FOR 6215</td>
<td>Fire Paradigms</td>
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<td>FOR 6340</td>
<td>Physiology of Forest Trees</td>
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<td>FOR 6345C</td>
<td>Plant Water Relations Techniques</td>
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<td>FOR 6543</td>
<td>Natural Resource Economics and Valuation</td>
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<td>FOR 6628</td>
<td>Community Forest Management</td>
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<td>FOR 6665</td>
<td>Landscape Planning for Ecotourism</td>
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<tr>
<td>FOR 6905</td>
<td>Research Problems in Forest Resources and Conservation</td>
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<tr>
<td>FOR 6910</td>
<td>Supervised Research</td>
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<tr>
<td>FOR 6933</td>
<td>Seminar</td>
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<td>FOR 6934</td>
<td>Topics in Forest Resources and Conservation</td>
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<td>FOR 6940</td>
<td>Supervised Teaching</td>
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<td>FOR 6971</td>
<td>Research for Master’s Thesis</td>
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<td>FOR 7979</td>
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<td>FOR 7980</td>
<td>Research for Doctoral Dissertation</td>
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<tr>
<td>PCB 5530</td>
<td>Plant Molecular Biology and Genomics</td>
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<tr>
<td>PCB 6528</td>
<td>Plant Cell and Developmental Biology</td>
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<tr>
<td>PCB 6555</td>
<td>Introduction to Quantitative Genetics</td>
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<td>SUR 6377</td>
<td>Geospatial Application of UASs</td>
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<td>SUR 6502C</td>
<td>Foundations of UAS Mapping</td>
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<td>SUR 6940C</td>
<td>Practicum in UAS Mapping</td>
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College of Agricultural and Life Sciences Courses

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<tr>
<th>Code</th>
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<th>Credits</th>
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<td>ALS 5156</td>
<td>Agricultural Ecology Principles and Applications</td>
<td>3</td>
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<tr>
<td>ALS 5905</td>
<td>Individual Study</td>
<td>1-4</td>
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<tr>
<td>ALS 5932</td>
<td>Special Topics</td>
<td>1-4</td>
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<tr>
<td>ALS 6046</td>
<td>Grant Writing</td>
<td>2</td>
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<tr>
<td>ALS 6166</td>
<td>Exotic Species and Biosecurity Issues</td>
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<td>ALS 6921</td>
<td>Colloquium on Plant Pests of Regulatory Significance</td>
<td>1</td>
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<tr>
<td>ALS 6925</td>
<td>Integrated Plant Medicine</td>
<td>4</td>
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<tr>
<td>ALS 6931</td>
<td>Plant Medicine Program Seminar</td>
<td>1</td>
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<tr>
<td>ALS 6935</td>
<td>Topics in Biological Invasions</td>
<td>3</td>
</tr>
<tr>
<td>ALS 6942</td>
<td>Principles of Plant Pest Risk Assessment and Management</td>
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<tr>
<td>ALS 6943</td>
<td>Internship in Plant Pest Risk Assessment and Management</td>
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<tr>
<td>ANS 6936</td>
<td>Graduate Seminar in Animal Molecular and Cell Biology</td>
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</table>
The University of Florida School of Natural Resources and Environment offers interdisciplinary coursework in the basic and applied science of ecology, the related social sciences, and sustainability, leading to M.S. and Ph.D. degrees. Choose from about 450 courses, 280 faculty advisors, and 44 participating departments. Research areas of ecology graduate students range across natural resource ecology, environmental policy and management, and sustainable development.

Environmental problems are fundamentally human problems and should be understood in terms of human motivations and actions in a biophysical context. Their solution requires holistic thinking about dynamic ecological systems and the social, economic, and political forces driving human action. To this end, the goal of the Interdisciplinary Ecology graduate program is to provide advanced training in ecosystems thinking and the main theories and methodologies of the biophysical and social sciences to foster integrative approaches to complex real-world problems. Interdisciplinary Ecology students are intensely interested in the sustainability problem, and they welcome the challenge of addressing it through more than one traditional discipline.

**Combined programs:** The School offers a combined bachelor's/master's degree program, which allows qualified students to earn both a bachelor's degree and a master's degree with a savings of 1 semester.

**Majors**
- Interdisciplinary Ecology (p. 128)

**Interdisciplinary Ecology**

**Program Information**

*Director of Academic Programs and Graduate Coordinator: T. Frazer*

Graduate students are advised by one of the 280 members of the School's affiliate faculty and have a supervisory committee with interdisciplinary composition. For the list of Graduate Faculty, see [http://snre.ifas.ufl.edu/people/affiliated-faculty/](http://snre.ifas.ufl.edu/people/affiliated-faculty/). Graduate students are hosted in one of 44 participating academic units.

The School offers a program of study leading to the Master of Science (thesis and non-thesis options), and Doctor of Philosophy degrees in interdisciplinary ecology. Minimum requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog. The course work requirements and curriculum are described in more detail at [http://snre.ifas.ufl.edu/academics/graduate/courses-syllabi-and-curriculum/](http://snre.ifas.ufl.edu/academics/graduate/courses-syllabi-and-curriculum/). Choices among 450 courses are custom-fitted by the student and the supervisory committee to meet the student's specific needs and interests.

The Interdisciplinary Ecology program views the social-ecological system as the proper framework for addressing the full scope of complex, adaptive systems comprising humans in the natural world. The degree program challenges students to understand both natural and human dynamics to obtain a holistic view and to foster integration of human activities with natural resources and the environment. The learning outcomes of the program are to develop a thorough understanding of the components, processes, and interactions of the social-ecological system, competence in scientific research methodologies, and experience in professional interaction with peers.

The degree programs combine

---

**Student Learning Outcomes**

**Forest resources & Conservation (PHD)**

**SLO 1 Knowledge**
Describes and explains theories and concepts in major-specific and related subject matter areas relevant to the individualized focus of the degree program

**SLO 2 Skills**
Critically evaluates literature, analyzes and synthesizes information, applies experimental and/or descriptive research methodologies, creates new knowledge through discovery, and effectively communicates information

**SLO 3 Professional Behavior**
Displays honest, ethical, and culturally sensitive behavior and practices in all scholarly activities including teaching, research, and outreach

**Forest resources & Conservation (MFRC)**

**SLO 1 Knowledge**
Describes and explains theories and concepts in major-specific and related subject matter areas relevant to the individualized focus of the degree program

**SLO 2 Skills**
Critically evaluates literature, analyzes and synthesizes information, applies experimental and/or descriptive research methodologies, creates new knowledge through discovery, and effectively communicates information

**SLO 3 Professional Behavior**
Displays honest, ethical, and culturally sensitive behavior and practices in all scholarly activities including teaching, research, and outreach

**Forest Resources & Conservation (MS)**

**SLO 1 Knowledge**
Describes and explains theories and concepts in major-specific and related subject matter areas relevant to the individualized focus of the degree program

**SLO 2 Skills**
Critically evaluates literature, analyzes and synthesizes information, applies experimental and/or descriptive research methodologies, creates new knowledge through discovery, and effectively communicates information

**SLO 3 Professional Behavior**
Displays honest, ethical, and culturally sensitive behavior and practices in all scholarly activities including teaching, research, and outreach

---

**School of Natural Resources and Environment**

*Director and Graduate Coordinator: Ramesh Reddy*
1. course work in the science of ecology and additional natural and social sciences; and
2. competence in a recognized discipline in one of these fields of study.

The former is achieved with a core-course and distribution requirement and the latter by extra course work for the master's and a concentration for the doctoral degree. A thesis or dissertation provides first-hand experience creating scientific knowledge. The non-thesis master's option provides rapid, advanced preparation for the job market in 3 to 4 semesters, without research experience. Course requirements are 36 semester hours for the thesis option, 38 hours for the non-thesis option, and 60 hours beyond the master's degree for the doctoral degree.

**Combined programs:** The School offers a combined bachelor's/master's degree program, which allows qualified students to earn both a bachelor's degree and a master's degree with a savings of 1 semester.

### Degrees Offered

#### Degrees Offered with a Major in Interdisciplinary Ecology

- Doctor of Philosophy
  - without a concentration
  - concentration in Agricultural and Biological Engineering
  - concentration in Agricultural Education and Communication
  - concentration in Agronomy
  - concentration in Anthropology
  - concentration in Architecture
  - concentration in Biochemistry and Molecular Biology
  - concentration in Botany
  - concentration in Business Administration
  - concentration in Chemistry
  - concentration in Civil Engineering
  - concentration in Climate Science
  - concentration in Coastal and Oceanographic Engineering
  - concentration in Economics
  - concentration in English
  - concentration in Entomology and Nematology
  - concentration in Environmental Engineering Sciences
  - concentration in Family, Youth and Community Sciences
  - concentration in Farming Systems
  - concentration in Fisheries and Aquatic Sciences
  - concentration in Food and Resource Economics
  - concentration in Food Science
  - concentration in Forest Resources and Conservation
  - concentration in Foundations of Education
  - concentration in Geographic Information Systems
  - concentration in Geography
  - concentration in Geology
  - concentration in Global Systems Agroecology
  - concentration in Health and Human Performance
  - concentration in Horticultural Sciences
  - concentration in Hydrologic Sciences
  - concentration in Landscape Architecture
  - concentration in Mathematics
  - concentration in Microbiology and Cell Science
  - concentration in Nuclear and Radiological Engineering
  - concentration in Philosophy
  - concentration in Political Science
  - concentration in Religion
  - concentration in Sociology
  - concentration in Soil and Water Science
  - concentration in Statistics
  - concentration in Tropical Conservation and Development
  - concentration in Urban and Regional Planning
  - concentration in Veterinary Medical Sciences
  - concentration in Wetland Sciences
  - concentration in Wildlife Ecology And Conservation
  - concentration in Women's/Gender Studies
  - concentration in Zoology

- Master of Science
  - without a concentration
  - concentration in Agricultural and Biological Engineering
  - concentration in Agricultural Education and Communication
  - concentration in Agronomy
  - concentration in Anthropology
  - concentration in Architecture
  - concentration in Biochemistry and Molecular Biology
  - concentration in Botany
  - concentration in Business Administration
  - concentration in Chemistry
  - concentration in Civil Engineering
  - concentration in Climate Science
  - concentration in Coastal and Oceanographic Engineering
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  - concentration in English
  - concentration in Entomology and Nematology
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  - concentration in Family, Youth and Community Sciences
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  - concentration in Food and Resource Economics
  - concentration in Food Science
  - concentration in Forest Resources and Conservation
  - concentration in Foundations of Education
  - concentration in Geographic Information Systems
  - concentration in Geography
  - concentration in Geology
  - concentration in Health and Human Performance
  - concentration in Horticultural Sciences
  - concentration in Hydrologic Sciences
  - concentration in Landscape Architecture
  - concentration in Mathematics
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• concentration in Religion
• concentration in Sociology
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• concentration in Statistics
• concentration in Tropical Conservation and Development
• concentration in Urban and Regional Planning
• concentration in Veterinary Medical Sciences
• concentration in Wetland Sciences
• concentration in Wildlife Ecology And Conservation
• concentration in Women’s/Gender Studies
• concentration in Zoology

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Interdisciplinary Ecology Courses
http://snre.ifas.ufl.edu/academics/graduate/courses-syllabi-and-curriculum/

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<td>EVR 6320</td>
<td>Sustainable Natural Resource Management</td>
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<td>EVR 6933</td>
<td>Seminar</td>
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<td>EVR 6979</td>
<td>Nonthesis Master’s Project</td>
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<td>Research for Master’s Thesis</td>
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<td>PCB 7979</td>
<td>Advanced Research</td>
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<td>PCB 7980</td>
<td>Research for Doctoral Dissertation</td>
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College of Agricultural and Life Sciences Courses

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<th>Code</th>
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<tbody>
<tr>
<td>ALS 5156</td>
<td>Agricultural Ecology Principles and Applications</td>
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<td>Internship in Plant Pest Risk Assessment and Management</td>
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<td>ANS 6936</td>
<td>Graduate Seminar in Animal Molecular and Cell Biology</td>
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<td>BCH 5045</td>
<td>Graduate Survey of Biochemistry</td>
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<td>FYC 6422</td>
<td>Policy Issues and Case Studies in Nonprofit Organizations</td>
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<tr>
<td>STA 6093</td>
<td>Introduction to Applied Statistics for Agricultural and Life Sciences</td>
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</tr>
<tr>
<td>STA 6329</td>
<td>Matrix Algebra and Statistical Computing</td>
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Student Learning Outcomes

Interdisciplinary ecology (MS)

SLO 1 Knowledge
Describe and explain the components, processes, and interactions of the social-ecological system

SLO 2 Skills
Apply the scientific method to generate new knowledge

SLO 3 Professional Behavior
Interact with professional peers with honesty, ethical behavior, cultural sensitivity, teamwork, and effective communication

Soil and Water Sciences Department

Chair: Matt Whiles
Graduate Coordinator: P. Christopher Wilson

Soil and water are vital resources in urban, agricultural, and natural ecosystems. The Soil and Water Sciences Department (SWSD) provides highly visible leadership in teaching, research, and extension/outreach programs as related to improving the productivity of agriculture with environmentally sound management practices, improving water quality, and protecting and conserving natural resources. Our department is one of the few in the nation that offers comprehensive research and educational programs (molecular to landscape level) involving terrestrial, wetland, and aquatic ecosystems. In addition to traditional on-campus educational programs, we use innovative e-technologies to offer educational programs to place-bound students throughout the world. Our graduates and postdoctoral fellows are well-prepared for future careers in universities, state and federal agencies, and private industry. The Soil and Water Sciences Department offers Master of Science and Doctor of Philosophy degrees in the Soil and Water Sciences. Broadly defined emphasis areas for degree programs include:

• biogeochemistry (coastal, landscape, soil, trace metals, and wetlands)
• bioenergy and sustainable technology
• carbon dynamics and ecosystem services
• environmental toxicology
• landscape analysis and modeling
• landscape and soil hydrology
• microbial ecology, molecular biology, bioinformatics
• pedological sciences
• soil quality (natural, agricultural, and urban systems)
• soil physics
• soil, water, and aquifer remediation
• soil, water, and environmental chemistry
• soil, water, and nutrient management
• water quality (natural, agricultural, and urban systems)
• watershed sciences and management
• wetland, aquatic systems, and coastal ecology

Students can work with departmental faculty on the main campus and at Research and Education Centers located throughout the state to customize their graduate program. The department also offers a completely online Master of Science degree (thesis or professional non-thesis option) via distance education for place-bound students interested in environmental sciences or an
agroecology concentration (http://soils.ifas.ufl.edu/sws-online/). Requirements for the M.S. and Ph.D. degrees are given in the Graduate Degrees (http://gradcatalog.ufl.edu/content.php?catoid=12&navoid=2748) section of this catalog. An additional option offered by the Department is a combined bachelor's/ master's degree program that allows students to earn a B.S. in Soil and Water Sciences or Interdisciplinary Studies – Environmental Management in Agriculture and Natural Resources and an M.S. Degree within five years. In addition to the MS and PhD degrees, the Department also offers graduate-level certificates in Biodegradation and Remediation, Global Agroecology, Soil Ecosystem Services, Sustainable Agroecosystems, Sustainable Land Resource and Nutrient Management, and Wetland and Water Resource Management for on-campus and off-campus students via the distance education delivery system (http://soils.ifas.ufl.edu/academics/degree-certificates.shtml). Contact the graduate coordinator for more information.

For more information, please see the program page below and our website: http://soils.ifas.ufl.edu.

Majors

• Soil and Water Sciences (p. 131)

Faculty

Professor

• Alva, Ashok K.
• Daroub, Samira H.
• Grunwald, Sabine
• He, Zhenli
• Jawitz, James W.
• Li, Yuncong
• Mitsch, William
• Morgan, Kelly T.
• Mylavaruapu, Rao S.
• Nkedi-Kizza, Peter
• Obreza, Thomas Anthony
• Ogram, Andrew V.
• Rechcigl, John Edward
• Schumann, Arnold Walter
• Whiles, Matthew R.
• Wilson, Patrick Christopher
• Wood, Charles Wesley
• Wright, Alan Lee

Associate Professor

• Clark, Mark W.
• Gerber, Stefan
• Gu, Binhe
• Inglett, Patrick W.
• Mackowiak, Cheryl
• Silveira, Maria Lucia

Assistant Professor

• Bacon, Allan
• Bhadha, Jehangir
• Bohlen, Patrick Joseph
• Chauhan, Ashvini
• Deitch, Matthew
• Judy, Jonathan
• Kadyampakeni, Davie Mayeso
• Liao, Hui-Ling
• Lin, Yang
• Lusk, Mary G.
• Maltais Landry, Gabriel
• Meyer, Julie
• Newman, Susan
• Osborne, Todd Z.
• Reisinger, Alexander J.
• Reynolds, Laura
• Sharma, Lakesh Kumar
• Smidt, Samuel John
• Smyth, Ashley R.
• Strauss, Sarah L.

Other

• Enloe, Heather Allen

Research Professor

• Nair, Vimala D.
• Sanchez, Pedro
• Wilkie, Ann Christina

Research Assistant Professor

• Fujimoto, Masanori
• Inglett, Kanika Sharma

Senior Lecturer

• Bonczek, James Lee

Graduate Research Professor

• Reddy, Rameshwer Konda

Affiliated Faculty

• Cohen, Matthew J. Professor
• Moore, Kimberly Professor
• Nair, Ramachandran P. Distinguished Professor

Soil and Water Sciences

Program Information

The Soil and Water Sciences Department offers Master of Science (thesis or professional non-thesis option) and Doctor of Philosophy...
degrees in soil and water sciences with the following specializations: ecology, environmental science, hydrologic science, and soil science. The department also offers Master of Science (thesis or professional option) track in environmental science via distance education for place bound students (http://soils.ifas.ufl.edu/academics/degree-environscience.shtml). Requirements for the M.S. and Ph.D. degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Students can also develop specializations in several interdisciplinary areas including biogeochemistry, ecology, geographic information systems, hydrologic science, tropical agriculture, turfgrass management, and wetland science. The Department emphasizes (but is not limited to) the following research areas:

- Nutrient, Pesticide, and Waste Management
- Soil, Water, and Aquifer Remediation
- Carbon Dynamics and Ecosystem Services
- Landscape Analysis and Modeling
- Wetlands and Aquatic Ecosystems

Interests of the student and faculty, the facilities, and funding available will determine the student’s research area. A specific program of study is prepared by an appointed supervisory committee for each student. Students will present a thesis or dissertation in their major field (M.S. thesis option and Ph.D.). In addition, Ph.D. candidates must pass a qualifying examination covering several areas of soil and water science and related fields.

**Prerequisites:** Students who expect to do graduate work in the Soil and Water Sciences Department should hold a bachelor's degree from an accredited college or university with a major in soil and water science or the equivalent background in another field of science. Graduate students should have backgrounds in biology, chemistry, physics, and mathematics and knowledge of basic soil and water science.

For more information, please see our website: http://soils.ifas.ufl.edu.

### Degrees Offered

#### Degrees Offered with a Major in Soil and Water Sciences

- **Doctor of Philosophy**
  - without a concentration
  - concentration in Climate Science
  - concentration in Geographic Information Systems
  - concentration in Global Systems Agroecology
  - concentration in Hydrologic Sciences
  - concentration in Tropical Conservation and Development
  - concentration in Wetland Sciences

- **Master of Science**
  - without a concentration
  - concentration in Agroecology
  - concentration in Climate Science
  - concentration in Geographic Information Systems
  - concentration in Hydrologic Sciences
  - concentration in Tropical Conservation and Development
  - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

#### Soil and Water Sciences Departmental Courses

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<th>Code</th>
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<td>Nanotechnology in Food, Agriculture, and Environment</td>
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<td>ALS 5027</td>
<td>Reusable Learning Objects</td>
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<td>Global Agroecosystems</td>
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<td>CWR 6537</td>
<td>Contaminant Subsurface Hydrology</td>
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<td>SWS 5115</td>
<td>Environmental Nutrient Management</td>
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<td>SWS 5132</td>
<td>Tropical Soil Management</td>
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<td>SWS 5182</td>
<td>Earth System Analysis</td>
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<td>SWS 5208</td>
<td>Sustainable Agricultural and Urban Land Management</td>
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<td>SWS 5224</td>
<td>Environmental Biogeochemistry</td>
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<td>SWS 5234</td>
<td>Environmental Soil, Water, and Land Use</td>
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<td>SWS 5235</td>
<td>South Florida Ecosystems</td>
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<td>SWS 5246</td>
<td>Water Resource Sustainability</td>
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<td>SWS 5247</td>
<td>Hydric Soils</td>
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<td>SWS 5248</td>
<td>Wetlands and Water Quality</td>
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<td>SWS 5305C</td>
<td>Soil Microbial Ecology</td>
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<td>SWS 5308</td>
<td>Ecology of Waterborne Pathogens</td>
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<td>SWS 5406</td>
<td>Soil and Water Chemistry</td>
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<td>SWS 5424C</td>
<td>Soil Chemical Analysis</td>
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<td>SWS 5551</td>
<td>Soils, Water, and Public Health</td>
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<td>Environmental Soil Physics</td>
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<td>SWS 5716C</td>
<td>Environmental Pedology</td>
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<td>SWS 5721C</td>
<td>GIS in Land Resource Management</td>
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<td>SWS 5805</td>
<td>Environmental Soil and Water Monitoring Techniques</td>
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<td>SWS 6134</td>
<td>Soil Quality</td>
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<td>SWS 6136</td>
<td>Soil Fertility</td>
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<td>SWS 6209</td>
<td>Urban Soil and Water Systems</td>
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<td>Soil Contamination and Remediation</td>
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<td>SWS 6323</td>
<td>Advanced Microbial Ecology</td>
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<td>SWS 6366</td>
<td>Biodegradation and Bioremediation</td>
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<td>SWS 6484</td>
<td>Biogeochemistry of Wetlands and Aquatic Systems</td>
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<td>SWS 6454</td>
<td>Advanced Soil and Water Chemistry</td>
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<td>SWS 6456</td>
<td>Advanced Biogeochemistry</td>
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<td>SWS 6722</td>
<td>Soil-Landscape Modeling</td>
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<tr>
<td>SWS 6813C</td>
<td>Modeling Land Biogeochemistry</td>
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<td>SWS 6905</td>
<td>Special Problems</td>
<td>1-4</td>
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<td>SWS 6910</td>
<td>Supervised Research</td>
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<td>SWS 6920</td>
<td>Journal Colloquium in Environmental Science</td>
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<td>SWS 6932</td>
<td>Topics in Soils</td>
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<td>SWS 6971</td>
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<td>SWS 6992</td>
<td>Aquatic Toxicology: Science and Applications</td>
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<td>SWS 7979</td>
<td>Advanced Research</td>
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<tr>
<td>SWS 7980</td>
<td>Research for Doctoral Dissertation</td>
<td>1-15</td>
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</table>
**Student Learning Outcomes**

**soil and water science (PHD)**

SLO 1  Theories and Concepts
Describe and explain theories and concepts in soil and water sciences

SLO 2  Skills
Apply, analyze, and synthesize content knowledge by identifying component parts, relationships and ideas

SLO 3  Professional Behavior
Display ethical behaviors, cultural sensitivity, teamwork, professional conduct and communication

**soil and water science (MS)**

SLO 1  Theories and Concepts in Soil and Water Sciences
Describe and explain theories and concepts in soil and water sciences

SLO 2  Skills
Apply, analyze, and synthesize content knowledge by identifying component parts, relationships and ideas

SLO 3  Professional Behavior
Display ethical behaviors, cultural sensitivity, professional conduct and effective communication

**Wildlife Ecology and Conservation Department**

*Chair:* Eric C. Hellgren  
*Graduate Coordinator:* Kathryn E. Sieving

The Department of Wildlife Ecology and Conservation offers Master of Science (thesis and nonthesis option) and Doctor of Philosophy degrees in wildlife ecology and conservation. Requirements for these degrees are described in the Graduate Degrees (p. 48) section of this catalog.

Program emphases include wildlife biology, ecology, and management; landscape ecology and restoration; human dimensions; tropical and international conservation; and conservation education. Graduate students should have appropriate undergraduate training in the biological, social, and physical sciences including physics, chemistry, and mathematics. Students with inadequate backgrounds may be required to take (without credit at the graduate level) remedial undergraduate courses pertinent to their fields of interest.

For more information, please see our website: [http://www.wec.ufl.edu](http://www.wec.ufl.edu).

**Majors**

- Wildlife Ecology and Conservation (p. 134)

**Faculty**

**Professor**

- Branch, Lyn Clarke
- Hellgren, Eric C.
- Hostetler, Mark E.
- Jacobson, Susan
- Karanth, Ullas K.
- Kitchens, Wiley Mirf
- Loiselle, Bette Ann
- Main, Martin B.
- Mazzotti, Frank J.
- Miller, Deborah Louise
- Nichols, James D.
- Oli, Madan Kumar
- Payne, Jack M.
- Sieving, Kathryn E.
- Wells, Randall Stewart

**Associate Professor**

- De Vasconcelos, Heraldo Luis
- Ernest, Sarah Kelson Morgan
- Fletcher, Robert Jeffrey
- Johnson, Fred Allen
- Johnson, Steven Albert
- Martin, Julien
- McCleery, Robert Alan
- McGowan, Conor Patrick
- Meyer, Kenneth D.
- Miller, Karl Erich
- Monadjem, Ara
- Moulton, Michael P.
- Ober, Holly Karina
- Percival, Henry F.
- Rice, Kenneth G.
- White, Ethan P.
- Wisely, Samantha M.
Wildlife Ecology and Conservation

Program Information

The Department of Wildlife Ecology and Conservation offers a breadth of graduate programs that are designed to prepare students for professional employment in conservation of natural resources in a changing world. WEC faculty teach, conduct research, and provide service and extension in the following areas: avian ecology, behavioral ecology, community ecology, conservation biology, conservation education, conservation genetics, ecosystem management, environmental interpretation, habitat restoration, global change ecology, herpetofaunal ecology, human dimensions of wildlife management, international conservation, introduced species, landscape ecology, macroecology, mammalian behavior, marine mammal ecology, plant ecology, population biology, range ecology, systems ecology, tropical conservation, urban wildlife relations, wetlands ecology, wildlife diseases, and wildlife management.

The Doctor of Philosophy (PhD) program in Wildlife Ecology and Conservation serves graduate students conducting advanced, original studies of fundamental ecological and social sciences (e.g., ecosystem, community, landscape ecology, human dimensions), usually with applications to further society’s understanding of wildlife ecology and to improve conservation of wildlife resources.

The Master of Science (MS) thesis program in Wildlife Ecology and Conservation:

1. prepares graduate students for entry-level professional positions in areas of wildlife biology and ecology, natural resource management, conservation, and
2. provides a solid scientific foundation for further graduate work leading to the PhD degree.

The Master of Science, non-thesis (MS) program in Wildlife Ecology and Conservation provides advanced training for students in technical and professional aspects of wildlife management, conservation, and public education, emphasizing written and oral communication of scientific information.

1. Master of Science in Wildlife Ecology and Conservation with a concentration in Wildlife Forensics Science and Conservation - offered by WEC in conjunction with UF’s Maples Center for Forensic Science as a non-thesis, online option. Students are prepared for real-world situations in wildlife forensics such as poaching and illegal trade and courses are taught by faculty members who have years of experience in the field working with law enforcement and wildlife organizations. See https://masters.wildlife.forensics.med.ufl.edu/
Degrees Offered

Degrees Offered with a Major in Wildlife Ecology and Conservation

• Doctor of Philosophy
  • without a concentration
  • concentration in Geographic Information Systems
  • concentration in Tropical Conservation and Development
  • concentration in Wetland Sciences

• Master of Science
  • without a concentration
  • concentration in Geographic Information Systems
  • concentration in Tropical Conservation and Development
  • concentration in Wetland Sciences
  • concentration in Wildlife Forensic Sciences and Conservation

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Wildlife Ecology and Conservation Courses

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<td>WIS 5555C</td>
<td>Conservation Biology</td>
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<tr>
<td>WIS 5562</td>
<td>Conservation Medicine</td>
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<td>WIS 6306</td>
<td>Applied Wildlife Forensic Genetics</td>
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<td>WIS 6421</td>
<td>Wildlife Toxicology: The Ecohealth Perspective</td>
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<tr>
<td>WIS 6425</td>
<td>Carrion Ecology and Evolution</td>
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<td>WIS 6455</td>
<td>Wildlife Population Ecology</td>
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<td>WIS 6466</td>
<td>Wildlife Population Modeling</td>
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<td>WIS 6468C</td>
<td>Pattern and Process in Landscape Ecology</td>
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<td>WIS 6525</td>
<td>Environmental Interpretation</td>
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<td>WIS 6544</td>
<td>Administration in Natural Resources</td>
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<td>WIS 6556</td>
<td>Trade in Wild Resources</td>
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<tr>
<td>WIS 6557</td>
<td>International Wildlife Conservation Law, Policy and Ethics</td>
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<td>WIS 6558</td>
<td>Introduction to U.S. Wildlife Law, Policy &amp; Ethics</td>
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<td>WIS 6559</td>
<td>Contemporary Issues in Wildlife Protection and Conservation</td>
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<td>WIS 6561</td>
<td>Wildlife Crime Scene Processing</td>
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<td>WIS 6563</td>
<td>Wildlife Forensic Pathology</td>
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<td>WIS 6576</td>
<td>Human and Wildlife Conflict</td>
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<td>WIS 6578</td>
<td>Human Dimensions of Biological Conservation</td>
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<td>WIS 6905</td>
<td>Research Problems in Wildlife and Range Sciences</td>
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<td>Seminar</td>
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<td>WIS 6934</td>
<td>Topics in Wildlife Ecology and Conservation</td>
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<td>WIS 6940</td>
<td>Supervised Teaching</td>
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<tr>
<td>WIS 6971</td>
<td>Research for Master’s Thesis</td>
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Wildlife Ecology and Conservation Departmental Courses

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<td>WIS 7979</td>
<td>Advanced Research</td>
<td>1-12</td>
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<td>WIS 7980</td>
<td>Research for Doctoral Dissertation</td>
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College of Agricultural and Life Sciences Courses

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<td>ALS 5156</td>
<td>Agricultural Ecology Principles and Applications</td>
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<tr>
<td>ALS 5905</td>
<td>Individual Study</td>
<td>1-4</td>
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<td>ALS 5932</td>
<td>Special Topics</td>
<td>1-4</td>
</tr>
<tr>
<td>ALS 6046</td>
<td>Grant Writing</td>
<td>2</td>
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<tr>
<td>ALS 6166</td>
<td>Exotic Species and Biosecurity Issues</td>
<td>3</td>
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<td>ALS 6921</td>
<td>Colloquium on Plant Pests of Regulatory Significance</td>
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<td>ALS 6925</td>
<td>Integrated Plant Medicine</td>
<td>4</td>
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<td>ALS 6931</td>
<td>Plant Medicine Program Seminar</td>
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<td>ALS 6935</td>
<td>Topics in Biological Invasions</td>
<td>3</td>
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<tr>
<td>ALS 6942</td>
<td>Principles of Plant Pest Risk Assessment and Management</td>
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<td>Internship in Plant Pest Risk Assessment and Management</td>
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<tr>
<td>ANS 6936</td>
<td>Graduate Seminar in Animal Molecular and Cell Biology</td>
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Interdisciplinary Department

Genetics and Genomics (CALS)

Program Information

Program Co-Directors: Doug Soltis and Maurice Swanson
Program Coordinator: Samantha Brooks

The University of Florida Genetics Institute is a multi-college, multi-faceted research center which offers the a degree program leading to the Ph.D. in Genetics and Genomics. Minimum requirements for this degree are available in the Graduate Degrees (p. 48) section of this catalog.

What defines the Genetics & Genomics Graduate Program is the philosophy that good geneticists are integrative geneticists, who incorporate many different subfields of genetics into their work. Accordingly, faculty interests and graduate research opportunities include a wide range of areas: advances in gene therapy, understanding the maintenance of genetic variation, understanding plant immune responses, developing improved algorithms for identifying regulatory motifs in DNA sequences, and the challenges of bioethics to strategies for controlling malaria. Due to the fundamental nature of genetics in the life sciences, our training program is distributed across several colleges at UF, including but not limited to the College of Medicine (https://graduate.education.med.ufl.edu/), the College of Liberal Arts and Sciences (https://clas.ufl.edu/), the College of Agricultural and the Life Sciences (https://cals.ufl.edu/), and the Florida Museum of Natural History.

Graduate Program Overview

First Year:

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<tr>
<td>PCB 5065</td>
<td>Advanced Genetics</td>
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<tr>
<td>GMS 6231</td>
<td>Genomics and Bioinformatics</td>
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<tr>
<td>GMS 5905</td>
<td>Special Topics in Biomedical Sciences</td>
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<tr>
<td>BCH 6415</td>
<td>Advanced Molecular and Cell Biology</td>
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<tr>
<td>GMS 6221</td>
<td>Ethics in Genetics</td>
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<tr>
<td>GMS 6290</td>
<td>Genetics/Genomics Program Graduate</td>
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<tr>
<td></td>
<td>Seminar (begins in the first semester and continues throughout students' graduate careers)</td>
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<tr>
<td>ANG 7979</td>
<td>Advanced Research</td>
<td>1-12</td>
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</table>

The first year core training is the research rotation program, in which students “rotate” through three labs in a minimum of two colleges. Rotations are critical to selecting a graduate advisor; they provide a hands-on opportunity to participate in the research being conducted in a lab, and a mutual opportunity to evaluate fit between advisor and prospective student.

Second Year:

- Individual program of courses and requirements is developed in consultation with major professor and dissertation committee

Admission Standards: Prospective students should have strong backgrounds in biology and other hard sciences. Exceptional students with other backgrounds will also be considered. The research statement required as part of the application has a particularly important part in the admissions decision. Each applicant must describe his/her research interests, so that Graduate Faculty can evaluate knowledge of the discipline, fit to the program, and ability to articulate and motivate an interesting research problem. The required Letters of Recommendation are also extremely important in helping identify applicants with
exceptional aptitude for genetics, and with research experience and promise.

Contact the Genetics and Genomics Graduate Program by email, UFGI-Info@ad.ufl.edu or by phone, 352-273-8100.

For more information, visit our website: http://www.ufgi.ufl.edu.

Degrees Offered

Degrees Offered with a Major in Genetics and Genomics

- Doctor of Philosophy
- Doctor of Philosophy - Clinical and Translational Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Genetics and Genomics Courses

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<td>ANG 6532</td>
<td>Molecular Genetics of Disease</td>
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<td>BCH 6415</td>
<td>Advanced Molecular and Cell Biology</td>
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<td>BCH 7410</td>
<td>Advanced Gene Regulation</td>
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<td>CAP 5510</td>
<td>Bioinformatics</td>
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<td>CAP 5515</td>
<td>Computational Molecular Biology</td>
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<td>GMS 6012</td>
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<td>GMS 6013</td>
<td>Developmental Genetics</td>
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<td>GMS 6014</td>
<td>Applications of Bioinformatics to Genetics</td>
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<td>GMS 6015</td>
<td>Human Genetics II</td>
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<td>GMS 6920</td>
<td>Genetics Journal Colloquy</td>
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<td>HOS 6201</td>
<td>Breeding Perennial Cultivars</td>
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<td>PCB 5065</td>
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<td>PCB 5615</td>
<td>Molecular Evolution and Systematics</td>
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<td>PCB 6528</td>
<td>Plant Cell and Developmental Biology</td>
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<td>STA 5325</td>
<td>Fundamentals of Probability</td>
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<td>Fundamentals of Statistical Theory</td>
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<td>Statistical Methods in Research I</td>
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<td>STA 6167</td>
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<td>STA 6208</td>
<td>Basic Design and Analysis of Experiments</td>
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<td>Matrix Algebra and Statistical Computing</td>
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<td>Special Topics in Statistics</td>
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College of Agricultural and Life Sciences Courses

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<td>ALS 5156</td>
<td>Agricultural Ecology Principles and Applications</td>
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<td>Individual Study</td>
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<td>Grant Writing</td>
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<td>Exotic Species and Biosecurity Issues</td>
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<td>BCH 5045</td>
<td>Graduate Survey of Biochemistry</td>
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<td>FYC 6422</td>
<td>Policy Issues and Case Studies in Nonprofit Organizations</td>
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<td>Introduction to Applied Statistics for Agricultural and Life Sciences</td>
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<td>Matrix Algebra and Statistical Computing</td>
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College of the Arts

Dean: O. Ozuzu
Associate Dean: J. Setlow

The arts program at UF began in the 1920s to serve the state of Florida’s needs. Meeting these needs over the past 80 years has propelled the college to excel on a national and international level and has defined its mission to provide instruction for students seeking professional careers in the arts. In addition to providing rich educational experiences and programs in the arts, the college brings national and international recognition to the university through the high-level professionalism associated with the faculty and alumni, and the competence of students and graduates.

For more information about the College of the Arts, please see our website: http://www.arts.ufl.edu. (http://www.arts.ufl.edu)

Departments

- Digital Worlds Institute (p. 138)
  - Digital Arts and Sciences (Arts) (p. 138)
- Music (p. 139)
  - Music (p. 140)
  - Music Education (p. 143)
- School of Art and Art History (p. 145)
  - Art (p. 146)
  - Art Education (p. 148)
  - Art History (p. 149)
- Design and Visual Communications (http://catalog.ufl.edu/graduate/colleges-departments/arts/art-history/design-visual-communications/)
  - Museology (p. 151)
• School of Theatre and Dance (p. 153)
  • Theatre (p. 154)
• Interdisciplinary (p. 155)
  • Arts in Medicine (p. 155)

Digital Worlds Institute

Director: James C. Oliverio
Graduate Coordinator: Justin Marlin

The Digital Worlds Institute exists to nurture leading edge education between the arts, communications, engineering and the sciences, utilizing advanced media systems and digital culture. By bringing together the diverse talents of University of Florida faculty, students, and staff in a multifaceted collaborative environment, the Institute serves as a platform for interdisciplinary research and teaching that would not have occurred within the confines of any one college or department. Through the use of interactive tools and technologies, the Institute promotes transdisciplinary creativity across classrooms, continents and cultures.

For more information, please see the program page below and our website: http://www.digitalworlds.ufl.edu.

Majors

• Digital Arts and Sciences (Arts) (p. 138)

Faculty

Associate Professor
• Barmpoutis, Angelos
• Kolenic, Anthony
• Suvajdzic, Marko

Assistant Professor
• Kang, Hyo Jeong

Assistant Scholar
• Demirbilek, Muhammet

Affiliated Faculty
• Bozia, Eleni
  Assistant Professor
• Oliverio, James Charles
  Professor
• Tremura, Welson Alves
  Professor

Digital Arts and Sciences (Arts)

Program Information

The Master of Arts in Digital Arts & Sciences (DAS) degree seeks to allow students from diverse academic backgrounds the opportunity to develop fluency in the technologies, design practices and collaborative interdisciplinary teamwork increasingly required by the media, communications and entertainment industries. Graduates holding the M.A. in DAS degree would typically seek employment in the creative services sector, applying digital techniques and technologies in a variety of professions. Opportunities range from traditional cinema to interactive games; from broadcast media to online international networks to emergent industries.

Although this is a thesis degree, students usually produce a creative project in lieu of thesis. Students should see the graduate coordinator for the requirements for the creative project, which are also provided in the DAS Student Handbook.

Students seeking admission are expected to have an undergraduate background including:

• A degree in one of the fine arts or liberal arts
• A body of work that demonstrates accomplishment in the intended area
• A body of work that can clearly be enhanced with skills to be acquired in the DAS program.

Deficiencies may be corrected before beginning graduate study. In addition to appropriate academic credentials and prior scholastic achievement, admission into the program requires a well-constructed Statement of Purpose and media-related support material (i.e. samples of design, programming, video, web, writing, etc.) that demonstrates both prior interest and/or achievement in New Media/Digital Arts & Sciences.

Degrees Offered

Degrees Offered with a Major in Digital Arts and Sciences

• Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<td>DIG 555C</td>
<td>Digital Media Projection Design I</td>
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<tr>
<td>DIG 5930</td>
<td>Special Topics</td>
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<td>DIG 5931C</td>
<td>Special Topics</td>
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<tr>
<td>DIG 6027</td>
<td>Digital Storytelling</td>
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<td>DIG 6028</td>
<td>Roots of Digital Culture</td>
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<td>DIG 6050C</td>
<td>Entertainment Technology</td>
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<td>DIG 6125C</td>
<td>Digital Design &amp; Visualization</td>
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<td>DIG 6126C</td>
<td>Interaction Design</td>
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<td>DIG 6256C</td>
<td>Audio Design For Digital Production</td>
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<td>DIG 6358C</td>
<td>Applied 3D Modeling and Animation</td>
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<td>DIG 6556C</td>
<td>Digital Media Projection Design II</td>
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<td>DIG 6589C</td>
<td>Digital Portfolio</td>
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<td>DIG 6719</td>
<td>Videogame Theory and Analysis</td>
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<td>DIG 6744C</td>
<td>Movement, Media and Machines</td>
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<td>DIG 6751C</td>
<td>Protocols for Multimedia Interfaces</td>
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<tr>
<td>DIG 6788C</td>
<td>Digital Production &amp; Game Design</td>
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<td>DIG 6837C</td>
<td>Digital Tools for Arts and Humanities</td>
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<td>DIG 6840</td>
<td>Interdisciplinary Research Seminar in Digital Arts &amp; Sciences</td>
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<td>DIG 6850</td>
<td>Digital Arts &amp; Sciences Convergence</td>
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<td>DIG 6906</td>
<td>Independent Study - Graduate Level</td>
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<td>DIG 6931C</td>
<td>Special Topics</td>
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DIG 6950C Digital Performance Production 1-4
DIG 6971 Research for Master’s Thesis 1-3
DIG 6972C Capstone Project 2-4
DIG 6973 Capstone Project in Lieu of Thesis 1-6

College of the Arts Courses

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<td>1-6</td>
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</table>

Student Learning Outcomes

Digital arts and sciences (MA)

SLO 1 Knowledge
Explains the sociotechnical academic domain of Digital Arts & Sciences (DAS), and describes the transdisciplinary foundations of DAS design, inquiry and expression.

SLO 2 Knowledge
Identifies the principles involved in the creation of interactive digital media artifacts.

SLO 3 Skills
Solves problems and integrates systems thinking skills necessary to develop advanced media systems.

SLO 4 Skills
Collaborates in cross-functional design and development teams.

SLO 5 Professional Behavior
Exhibits the professional behaviors required in the field.

Digital arts and sciences (MS)

SLO 1 Knowledge
Students identify, formulate, and solve computer science and engineering problems.

SLO 2 Knowledge
Students can critically read computer science and engineering literature.

SLO 3 Skills
Students use the techniques, skills, and tools necessary for computer science and engineering practice at an advanced level.

SLO 4 Professional Behavior
An understanding of professional and ethical responsibility.

SLO 5 Professional Behavior
Students can communicate effectively.

Music Department

Director: K. Orr
Graduate Coordinator: L. S. Odom

The School of Music offers programs leading to the Master of Music degree in music and music education. Program concentrations in music include choral conducting, composition, instrumental conducting, musicology, ethnomusicology, music theory, performance, and sacred music. In addition, the School of Music offers the Doctor of Philosophy degree in music and in music education.

The Ph.D. program in music education emphasizes college music teaching. The Ph.D. program in music includes concentrations in:

- Music history and literature, with options in traditional musicology and ethnomusicology
- Composition, with options in acoustic and electroacoustic specialization

All Ph.D. students are encouraged to find opportunities to teach and lecture in their specializations; and with the assistance of their principal professors, to prepare papers, workshops, and clinics for presentation at professional conferences, in the public schools, and at colleges and universities. Students also are encouraged to publish their research in appropriate journals. Minimum requirements for the M.M. and Ph.D. degrees are given in the General Information section of this catalog. The week before classes begin, students must take placement examinations in music history and in music theory. Students wanting to study privately in a performance studio must be auditioned and accepted by the appropriate area faculty. Voice students must demonstrate appropriate skills in language and diction. All deficiencies must be remedied.

For more information, please see the program pages below and our website: http://www.arts.ufl.edu/welcome/music (http://www.arts.ufl.edu/welcome/music/).

Majors

- Music (p. 140)
- Music Education (p. 143)

Faculty

Professor
- Basler, Paul D.
- Bauer, William
- Broadway, Kenneth Lee
- Brophy, Timothy S.
- Burrichter, Ronald G.
- Chobaz, Raymond A.
Music

Program Information

The Master of Music (M.M.) degree is offered in music or music education. The music program offers the following concentrations: choral conducting, composition, electronic music, ethnomusicology, instrumental conducting, music education, music history and literature, music theory, performance, and sacred music. The M.M. degree prepares students for careers as teachers in studios, schools, and universities; performers; music historians; music critics; church musicians; composers; conductors; and accompanists. There is also an available online master’s program (https://musiceducation.arts.ufl.edu/).

For more information, please see our website: http://www.arts.ufl.edu/welcome/music (http://www.arts.ufl.edu/welcome/music/)

Degrees Offered

Degrees Offered with a Major in Music

- Doctor of Musical Arts
  - without a concentration
  - concentration in Choral Conducting
  - concentration in Composition
  - concentration in Instrumental Conducting
  - concentration in Performance
- Doctor of Philosophy
  - without a concentration
  - concentration in Composition
  - concentration in Music History and Literature
- Master of Music
  - without a concentration
  - concentration in Choral Conducting
  - optional second concentration in Composition
  - optional second concentration in Instrumental Conducting
  - optional second concentration in Music History and Literature
  - optional second concentration in Music Theory
  - optional second concentration in Performance
  - optional second concentration in Sacred Music
  - optional second concentration in Piano Pedagogy
  - optional second concentration in Music Education
  - optional second concentration in Electronic Music
  - optional second concentration in Ethnomusicology
- concentration in Composition
  - optional second concentration in Choral Conducting
  - optional second concentration in Instrumental Conducting
  - optional second concentration in Music History and Literature
  - optional second concentration in Music Theory
  - optional second concentration in Performance
  - optional second concentration in Sacred Music
  - optional second concentration in Piano Pedagogy
  - optional second concentration in Music Education
  - optional second concentration in Electronic Music
  - optional second concentration in Ethnomusicology
- concentration in Electronic Music
  - optional second concentration in Choral Conducting
  - optional second concentration in Instrumental Conducting
  - optional second concentration in Music History and Literature
  - optional second concentration in Music Theory
  - optional second concentration in Performance
  - optional second concentration in Sacred Music
  - optional second concentration in Piano Pedagogy
  - optional second concentration in Music Education
  - optional second concentration in Electronic Music
  - optional second concentration in Ethnomusicology
- concentration in Ethnomusicology

Associate Professor

- Butler, Margaret Ruth
- Dos Santos, Silvio
- Ellis, Laura
- Odom, Leslie S.
- Offerle, Anthony
- Sharpe, Kevin M.
- Smith, Brenda Jo
- Thomas, Jennifer S.
- Thomas, Steven Francis
- Watkins, John M.
- Wilson, Scott T.

Assistant Professor

- Arakawa, Mariko Jasmin
- Birkner, Archie Grover
- Davitt, Megan Maureen Sheridan
- Duron-VanTuinen, Danielle
- Haning, Marshall A.
- Hartz, Barry Chris
- Hodges, Lauren
- Lee, Randolph T.
- Lee, Scott F.
- Lowe, Shannon Rae
- Pellegrin, Richard
- Politz, Sarah
- Robertson, Jemmie Howard
- Ruiz-Resto, Jose V.

Music
• optional second concentration in Choral Conducting
• optional second concentration in Composition
• optional second concentration in Electronic Music
• optional second concentration in Instrumental Conducting
• optional second concentration in Music History and Literature
• optional second concentration in Music Theory
• optional second concentration in Performance
• optional second concentration in Sacred Music
• optional second concentration in Piano Pedagogy
• optional second concentration in Music Education
• optional second concentration in Ethnomusicology

• concentration in Instrumental Conducting
  • optional second concentration in Composition
  • optional second concentration in Choral Conducting
  • optional second concentration in Music History and Literature
  • optional second concentration in Music Theory
  • optional second concentration in Performance
  • optional second concentration in Sacred Music
  • optional second concentration in Piano Pedagogy
  • optional second concentration in Music Education
  • optional second concentration in Ethnomusicology

• concentration in Music History and Literature
  • optional second concentration in Composition
  • optional second concentration in Choral Conducting
  • optional second concentration in Instrumental Conducting
  • optional second concentration in Music History and Literature
  • optional second concentration in Music Theory
  • optional second concentration in Performance
  • optional second concentration in Sacred Music
  • optional second concentration in Piano Pedagogy
  • optional second concentration in Music Education
  • optional second concentration in Ethnomusicology

• concentration in Jazz Studies
  • optional second concentration in Performance
  • optional second concentration in Electronic Music
  • optional second concentration in Sacred Music
  • optional second concentration in Music Theory
  • optional second concentration in Music History and Literature
  • optional second concentration in Music Education
  • optional second concentration in Piano Pedagogy
  • optional second concentration in Electronic Music
  • optional second concentration in Ethnomusicology

• concentration in Music Education
  • optional second concentration in Composition
  • optional second concentration in Choral Conducting
  • optional second concentration in Instrumental Conducting
  • optional second concentration in Music History and Literature
  • optional second concentration in Music Theory
  • optional second concentration in Performance
  • optional second concentration in Sacred Music
  • optional second concentration in Piano Pedagogy
  • optional second concentration in Music Education
  • optional second concentration in Ethnomusicology

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

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<th>Credits</th>
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<td>DIG 6288</td>
<td>Music and Sound Design for Digital Media</td>
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<tr>
<td>MUC 5315</td>
<td>Introduction to Electroacoustic Music</td>
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<td>MUC 6444</td>
<td>Composition of Electronic Music</td>
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<td>MUC 6445</td>
<td>Electroacoustic Music Composition: Digital I</td>
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<td>MUC 6446</td>
<td>Electroacoustic Music Composition–Digital II</td>
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<td>MUC 6625</td>
<td>Jazz Composition and Arranging</td>
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<td>MUC 7447</td>
<td>Advanced Seminar in Electroacoustic Music</td>
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<td>MUC 7931</td>
<td>Advanced Graduate Composition</td>
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<td>MUC 7938</td>
<td>Seminar in Digital Sound Processing, Control, and Composition</td>
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<td>MUE 6080</td>
<td>Historical and Philosophical Foundations of Music Education</td>
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<td>MUE 6385</td>
<td>Music in Higher Education</td>
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<td>MUE 6399</td>
<td>Creative Thinking in Music</td>
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<td>MUE 6444</td>
<td>Materials and Methods of String Class Teaching</td>
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<td>MUE 6497</td>
<td>Public School Orchestral Literature</td>
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<td>MUE 6647</td>
<td>Trends in Teaching and Learning Music</td>
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<td>MUE 6696</td>
<td>Technology Assisted Music Learning</td>
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<td>MUE 6747</td>
<td>Assessing Music Learning</td>
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<td>MUE 6785</td>
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<td>MUE 6931</td>
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<td>MUE 7045</td>
<td>Seminar in Music Teacher Education</td>
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<td>MUE 7046</td>
<td>Sociology of Music Education</td>
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<td>MUE 7746</td>
<td>Measurement and Evaluation of Music</td>
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<td>MUE 7784</td>
<td>Quantitative Research Methods</td>
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MUS 7980 Research for Doctoral Dissertation 1-15
MUT 6051 Graduate Music Theory Review 3
MUT 6177 Graduate Jazz Theory 3
MUT 6445 Advanced Counterpoint 3
MUT 6531 Figured Bass and Continuo Performance 3
MUT 6565 Late Nineteenth- and Twentieth-Century Styles 3
MUT 6576 Contemporary Styles 3
MUT 6617 Approaches to Theoretical Analysis in Music Education 3
MUT 6627 Seminar in Reductive Analysis 3
MUT 6629 Analytical Techniques 3
MUT 6751 Pedagogy of Music Theory 3
MUT 6936 Music Theory Seminar 1-3
MUT 7316 Advanced Orchestration 3
MUT 7585 Seminar in Musical Style 3
MUT 7760 History of Music Theory 3
MVK 5156 Improvisational Keyboard Skills and Related Technology 2
MVK 6605 Organ Pedagogy 3
MVO 6250 Secondary Music Performance 1-3
MVO 6460 Music Performance 3
MVO 7460 Music Performance 3
MVS 6651 String Pedagogy I 3
MVV 6651 Vocal Pedagogy 3

College of the Arts Courses

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</tr>
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</table>

Student Learning Outcomes

Music (PHD)

SLO 1 Research Project
Identify and carry out a research project that is appropriate and contributes to the discipline of music

SLO 2 Synthesis & Application
Synthesize and apply knowledge from the major area of emphasis, as well as from any pertinent secondary and cognate areas

SLO 3 Practical Application
Translate knowledge into practical application in teaching, research, and written scholarship

SLO 4 Essential Techniques
Identify and employ essential techniques of research and theory relevant to their area of expertise within the discipline

SLO 5 Professional Behavior
Employ ethical behaviors, cultural sensitivity, teamwork skills, collegiality, and communication skills relevant to working in the music profession

Music (MM)

SLO 1 Project
Identify and carry out a research project or recital that is appropriate and contributes to the area of emphasis within the discipline of music

SLO 2 Theory & Practice
Discuss trends, theories, and practices surrounding a specific area of expertise in music

SLO 3 Practical Application
Translate knowledge into practical application in the context of live performance, composition, or written scholarship

SLO 4 Essential Techniques
Identify and develop essential techniques of performance, research, and theory relevant to their area of expertise

SLO 5 Professional Behavior
Employ ethical behaviors, cultural sensitivity, teamwork skills, collegiality, and communication skills relevant to working in the music profession

Music Education

Program Information
The Master of Music (M.M.) degree is offered in music or music education. The music education program offers the following concentrations: choral conducting, composition, electronic music, ethnomusicology, instrumental conducting, music history and literature, music theory, performance, and piano pedagogy. The M.M. degree prepares students for careers as teachers in studios, schools, and universities; performers; music historians; music critics; church musicians; composers; conductors; and accompanists.

For more information, please see our website: http://www.arts.ufl.edu/welcome/music

Degrees Offered with a Major in Music Education
- Doctor of Philosophy
- Master of Music

- Without a Concentration
- Concentration in Choral Conducting
  - optional second concentration in Piano Pedagogy
  - optional second concentration in Composition
  - optional second concentration in Instrumental Conducting
  - optional second concentration in Music History and Literature
  - optional second concentration in Music Theory
  - optional second concentration in Performance
  - optional second concentration in Electronic Music
  - optional second concentration in Ethnomusicology
- Concentration in Composition
  - optional second concentration in Choral Conducting
  - optional second concentration in Piano Pedagogy
  - optional second concentration in Instrumental Conducting
  - optional second concentration in Music History and Literature
  - optional second concentration in Music Theory
  - optional second concentration in Performance
  - optional second concentration in Piano Pedagogy
  - optional second concentration in Ethnomusicology
- Concentration in Electronic Music
  - optional second concentration in Choral Conducting
  - optional second concentration in Composition
  - optional second concentration in Instrumental Conducting
  - optional second concentration in Music History and Literature
  - optional second concentration in Music Theory
  - optional second concentration in Performance
  - optional second concentration in Piano Pedagogy
  - optional second concentration in Ethnomusicology
- Concentration in Ethnomusicology
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• **optional second concentration in Electronic Music**
• **optional second concentration in Ethnomusicology**

**Concentration in Music Theory**
• **optional second concentration in Choral Conducting**
• **optional second concentration in Composition**
• **optional second concentration in Instrumental Conducting**
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• **optional second concentration in Piano Pedagogy**
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• **optional second concentration in Electronic Music**
• **optional second concentration in Ethnomusicology**

**Concentration in Piano Pedagogy**
• **optional second concentration in Choral Conducting**
• **optional second concentration in Composition**
• **optional second concentration in Instrumental Conducting**
• **optional second concentration in Music History and Literature**
• **optional second concentration in Performance**
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**Concentration in Performance**
• **optional second concentration in Choral Conducting**
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• **optional second concentration in Composition**
• **optional second concentration in Performance**
• **optional second concentration in Electronic Music**
• **optional second concentration in Ethnomusicology**

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

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<td>MUC 7938</td>
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### College of the Arts Courses

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<td>Collaborating Across Disciplines: The Arts Therapies</td>
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### Student Learning Outcomes

**music education**

- **SLO 1** Research Project
  Identify and carry out a research project that is appropriate and contributes to the discipline of music education.

- **SLO 2** Synthesis & Application
  Synthesize and apply knowledge from the major area of emphasis, as well as from any pertinent secondary and cognate areas.

- **SLO 3** Practical Application
  Translate knowledge into practical application in teaching, research, and written scholarship.

- **SLO 4** Essential Techniques
  Identify and apply essential techniques of research and theory relevant to their area of expertise within the discipline.

- **SLO 5** Professional Behavior
  Employ ethical behaviors, cultural sensitivity, teamwork skills, collegiality, and communication skills relevant to working in the music education profession.

### School of Art and Art History

**Director:** Lynn Tomaszewski  
**Graduate Coordinator:** Patrick Grigsby

The School of Art and Art History offers the M.F.A. degree in art with specializations in art + technology, ceramics, creative photography, drawing, graphic design, painting, printmaking, and sculpture. The school also offers Master of Arts degrees in art education, art history, and museology (museum studies) and the Doctor of Philosophy degree in art history. Requirements for these degrees can be found in the Graduate Degrees (p. 48) section of this catalog, and information about each of these graduate programs can be found at the links below.

For more information, please see our website: [http://arts.ufl.edu/](http://arts.ufl.edu/).
Art

Program Information

Master of Fine Arts degree: The school offers the M.F.A. degree in art with specializations in art + technology, ceramics, creative photography, drawing, graphic design, painting, printmaking, and sculpture. Enrollment is competitive and limited. Candidates for admission should have adequate undergraduate training in art. Deficiencies may be corrected before beginning graduate study. Applicants must submit a portfolio for admission consideration (for comprehensive admission information: http://www.arts.ufl.edu/programs/grad.aspx). A minimum of 3 years residency is normally needed to complete the requirements for this degree, which for studio students culminates with an M.F.A. exhibition.

The M.F.A. requires a minimum of 60 credit hours:

- 24 hours must be in an area of specialization.
- Normal course requirements include:
  - 12 hours of studio electives outside the area of specialization
  - 6 hours of art history electives
  - 3 hours of outside SA+AH electives (research/discipline appropriate)
  - 6 hours of electives
  - 6 hours of individual project or thesis research.

Although the M.F.A. is a thesis degree, students usually produce a creative project in lieu of thesis. Students should see the graduate program adviser for the School's requirements for the creative project.

Degrees Offered

Degrees Offered with a Major in Art
- Master of Fine Arts

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

School of Art and Art History

Departmental Courses

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<td>Teaching Art in Higher Education</td>
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<td>ARE 6641</td>
<td>Issues in Art Education</td>
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<td>ARE 6746</td>
<td>Methods of Research in Art Education</td>
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### College of the Arts Courses

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### Student Learning Outcomes

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<tr>
<th>Art (MFA)</th>
<th>SLO 1 Knowledge</th>
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</thead>
</table>
Develop a body of artwork or design that reflects conceptual cohesiveness, creativity/originality, and contribution to the field.

SLO 2  Skills
Solve creative problems within their field of art and design, including research and synthesis of technical, aesthetic, and conceptual knowledge.

SLO 3  Professional Behavior
Organize and communicate their ideas and work products at a professional level with their intended audience using visual, oral, and written skills.

SLO 4  Skills
Execute technical, aesthetic, and conceptual decisions based on an understanding of art and design principles within a student’s stated intention.

SLO 5  Knowledge
Describes and explains the relevance of the student’s work to major cultural and/or aesthetic models.

## Art Education

### Program Information

**Master of Arts degree in Art Education:** The School offers the M.A. in art education. In addition to meeting requirements of the Graduate School for admission, prospective students should:

- Hold a degree in studio art, art history, design, or art education
- Send up to 10 images of original works of art (on CD or in slide form) and a research paper, article, or other sample of academic writing
- Official transcripts from all colleges/universities previously attended
- Statement of professional goals for attending graduate school and earning an M.A. degree in art education
- Current Curriculum Vitae or Resume
- Submit three current letters of recommendation.

The M.A. in art education requires a minimum of 36 credit hours.

### Degrees Offered

**Degrees Offered with a Major in Art Education**

- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

#### School of Art and Art History

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To be admitted to candidacy, students must pass a comprehensive examination at the beginning of the second year. The program culminates in an oral examination on the thesis or project in lieu of thesis.
ARH 6917 Independent Study in Modern Art History 3-4
ARH 6918 Independent Study in Non-Western Art History 3-4
ARH 6930 Special Topics in Museology 3
ARH 6938 Seminar in Museum Studies 3
ARH 6941 Supervised Internship 1-6
ARH 6946 Museum Practicum 1-6
ARH 6948 Gallery Practicum 1-6
ARH 6971 Research for Master's Thesis 1-15
ARH 7979 Advanced Research 1-12
ARH 7980 Research for Doctoral Dissertation 1-15
ART 5674C Digital Fabrication 3
ART 5905C Directed Study 1-5
ART 5930C Special Topics 3
ART 6410C Printmaking Seminar: Mastering Process and Content 3
ART 6411C Printmaking Seminar: Transformation and Change 3
ART 6412C Printmaking Seminar: Ideation, Studies, and Completed Works 3
ART 6413C Printmaking Seminar: Interdisciplinary Studio 3
ART 6671C Advanced Experiments in Digital Art 3
ART 6672 Hypermedia 3
ART 6673C Video Art 3
ART 6675C Digital Art and Animation 3
ART 6691 Digital Art Studio 4
ART 6794C Vessel Aesthetic 1 3
ART 6795C Vessel Aesthetic 2 3
ART 6797C Ceramic Sculpture 2 3
ART 6835C Research in Methods and Materials of the Artist 3-4
ART 6849C Reactive Environments 3
ART 6897 Professional Practices for the Visual Artist 3
ART 6910C Supervised Research 1-5
ART 6925C Art + Technology Workshop 3
ART 6926C Advanced Study I 2-4
ART 6927C Advanced Study II 2-4
ART 6928C Advanced Study III 2-4
ART 6929C Advanced Study IV 2-4
ART 6933 Area Methods: Rotating Topics 1-4
ART 6971 Research for Master's Thesis 1-15
ART 6973C Individual Project 1-10
DIG 5930 Special Topics 3
DIG 6746C Graduate Seminar in Sensors and Electronics 3
GRA 6930 Seminar: Rotating Topics 3
GRA 6931C Research and Practice 3
GRA 6944 Practicum 1-6
GRA 6973 Project in Lieu of Thesis 1-9
IDC 6505C Programming for Artists 3

College of the Arts Courses

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Student Learning Outcomes

**Art education (MA)**

SLO 1 Professional Behavior

Demonstrates how the project is personally relevant and contributes to the field of art education.

SLO 2 Knowledge

The student describes and executes the project proposal, making appropriate adjustments as necessary.

SLO 3 Skills

Synthesizes knowledge obtained in art education literature courses in planning and executing the project.

SLO 4 Skills

Explains and supports his/her thesis or project and the project's underlying ideas.

SLO 5 Professional Behavior

Connects the thesis or capstone project to current or past art education scholarship.

**Art History**

**Program Information**

The School of Art & Art History offers graduate programs leading to the M.A. and Ph.D. degrees. Minimum requirements for these degrees are available in the Graduate Degrees (p. 48) section of this catalog. For complete details of the M.A. and Ph.D. degree requirements, see the Director of Graduate Studies—Art History. Art History students may participate in courses offered by the State University System's programs in Paris, London, and Florence. Other study-abroad programs may be approved by the director of graduate studies.

For the M.A. degree, the School offers areas of emphasis in Ancient, Medieval, Renaissance/Baroque, Modern, and non-Western art history (including African, Asian, and Oceanic). A minimum of 36 credit hours is required.

**College of the Arts Courses**

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**Required Coursework**

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<td>Select 9 credits in related areas with the graduate program</td>
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<td><strong>Total Credits</strong></td>
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Reading proficiency in a foreign language appropriate to the major area of study must be demonstrated before thesis research is begun. Language courses cannot apply toward degree credit.

For the Ph.D. degree, the School offers the same areas of specialization as for the M.A. degree. Up to 30 credits from the M.A. degree may apply toward the 90 credit Ph.D. degree. A program of 60 credit hours beyond the M.A. degree is required. Core courses will consist of a minimum of 30 hours in art history.

- 18 hours in a primary area (5000-level or above)
- 9 hours in a secondary area (5000-level or above)
- 3 hours of theory/methodology of art history (if ARH 5816 Methods of Research and Bibliography (3 cr.) or its equivalent has not been taken as part of the M.A.)
- An additional 12 hours of outside electives taken in other schools or departments are required in a discipline(s) related to the primary area of study
- Finally, 27 hours of dissertation research and writing is required.

By the end of the second semester or equivalent full-time study, students should form their supervisory committee that must include a minimum of four Graduate Faculty members; one of whom must agree to serve as primary dissertation adviser and supervisory committee chair. The supervisory committee will also act as the qualifying examination committee. Normally students will take the qualifying examination during the spring term of the third year in residence. The examination is both written and oral. It will cover the major and minor art history areas of emphasis as well as the student's preliminary formulation of a dissertation topic and provisional statement of the approaches to that topic as expressed in the dissertation prospectus. On successful completion of the qualifying examination, the approval by the supervisory committee of the dissertation prospectus, and fulfilling all other course and language requirements, the student makes formal application for a change of status to Ph.D. candidacy. Normally, a student will be expected to present the completed dissertation and defend it at an oral defense conducted by the supervisory committee by the end of the sixth year in the program. For Ph.D. students, reading knowledge of two research languages other than English must be demonstrated by the end of the second year of course work, or by the end of the first semester in the case of transfer students. Language courses are not applicable toward degree credit.

For more information, please see our website: [http://arts.ufl.edu/academics/art-and-art-history](http://arts.ufl.edu/academics/art-and-art-history/).

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**Degrees Offered**

**Degrees Offered with a Major in Art History**

- Doctor of Philosophy
- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

**School of Art and Art History**

**Departmental Courses**

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ARH 6918 Independent Study in Non-Western Art History 3-4
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ARH 6938 Seminar in Museum Studies 3
ARH 6941 Supervised Internship 1-6
ARH 6946 Museum Practicum 1-6
ARH 6948 Gallery Practicum 1-6
ARH 6971 Research for Master's Thesis 1-15
ARH 7979 Advanced Research 1-12
ARH 7980 Research for Doctoral Dissertation 1-15
ART 5674C Digital Fabrication 3
ART 5905C Directed Study 1-5
ART 5930C Special Topics 3
ART 6410C Printmaking Seminar: Mastering Process and Content 3
ART 6411C Printmaking Seminar: Transformation and Change 3
ART 6412C Printmaking Seminar: Ideation, Studies, and Completed Works 3
ART 6413C Printmaking Seminar: Interdisciplinary Studio 3
ART 6671C Advanced Experiments in Digital Art 3
ART 6672 Hypermedia 3
ART 6673C Video Art 3
ART 6675C Digital Art and Animation 3
ART 6691 Digital Art Studio 4
ART 6794C Vessel Aesthetic 1 3
ART 6795C Vessel Aesthetic 2 3
ART 6797C Ceramic Sculpture 2 3
ART 6835C Research in Methods and Materials of the Artist 3-4
ART 6849C Reactive Environments 3
ART 6897 Professional Practices for the Visual Artist 3
ART 6910C Supervised Research 1-5
ART 6925C Art + Technology Workshop 3
ART 6926C Advanced Study I 2-4
ART 6927C Advanced Study II 2-4
ART 6928C Advanced Study III 2-4
ART 6929C Advanced Study IV 2-4
ART 6933 Area Methods: Rotating Topics 1-4
ART 6971 Research for Master's Thesis 1-15
ART 6973C Individual Project 1-10
DIG 5930 Special Topics 3
DIG 6746C Graduate Seminar in Sensors and Electronics 3
GRA 6930 Seminar: Rotating Topics 3
GRA 6931C Research and Practice 3
GRA 6944 Practicum 1-6
GRA 6973 Project in Lieu of Thesis 1-9
IDC 6505C Programming for Artists 3
HUM 5357 Creativity and Health: Foundations of the Arts in Medicine 3
HUM 5595 Arts in Medicine in Practice 3
HUM 6308 Arts and Compassion 3
HUM 6340 Arts Advocacy and Public Policy 3
HUM 6350 The Art of Self-Care 3
HUM 6352 Art and Design in the Environment of Care 3
HUM 6353 Arts in Medicine Professional Seminar 3
HUM 6354 Arts in Medicine Advanced Professional Seminar 3
HUM 6355 Arts in Medicine Summer Intensive 3
HUM 6358 Arts in Medicine Capstone Proposal 2
HUM 6359 Arts in Medicine Capstone 3
HUM 6365 Collaborating Across Disciplines: The Arts Therapies 3
HUM 6375 The Arts and Human Development 3
HUM 6596 Arts in Medicine Capstone 4
HUM 6597 Research and Evaluation in Arts in Medicine 3
HUM 6930 Special Topics in Fine Arts 1-3
HUM 6942 Arts in Medicine Graduate Practicum 3
HUM 6944 Arts in Action: Consulting Project in Performing Arts Management
THE 6930 Special Topics 1-6
THE 6933 Arts and Public Health Professional Seminar 3
TPA 6930 Special Topics 1-6
TPP 6930 Special Topics 1-6

Student Learning Outcomes

Art History (PHD)

SLO 1 Knowledge
Identifies, describes, and explains the historiography, methodology, and theory of art

SLO 2 Skills
Selects area of specialization and identifies scholarly resources for original advanced art historical research

SLO 3 Professional Behavior
Produces written scholarly research that conforms to academic publishing conventions

SLO 4 Skill
Verbally describes thesis research, relevant historiography, and theory

Art history (MA)

SLO 1 Knowledge
Recalls and describes historiography, methodology, and theory of art

SLO 2 Skills
Identifies a thesis project that contributes to the state of the field

SLO 3 Professional Behavior
Produces written scholarly research that synthesizes the primary and secondary source materials

SLO 4 Skills
Student is engaging primary and secondary resource materials

SLO 5 Professional Behavior
Student verbally communicates the claims of the thesis

Museology

Program Information

Master of Arts degree in Museology (Museum Studies): The School offers this interdisciplinary program that consists of both academic and practical work. The curriculum allows students to do graduate work in a disciplinary emphasis (art history, anthropology, history, education,
or the natural sciences, for example) and at the same time complete a concentrated study in professional museum practice. The M.A. degree in museology requires 48 credit hours including:

- 15 credits of museum studies courses (museology seminar, 3 credits; collections management, 3 credits; museum education, 3 credits; exhibitions, 3 credits; special topics, 3 credits)
- 15 graduate credits in a disciplinary focus
- 6 credits of internship
- 6 credits of electives
- 6 credits of individual credit.

Several on-campus sites provide the program with laboratories for training students in museum work, including the University Galleries, Harn Museum of Art, Florida Museum of Natural History, and the gallery at the Reitz Union. Students must complete a 6-credit internship of at least 320 hours at an approved museum. In this experience, students undertake specific projects in which they gain first-hand experience in museum work. The Harn Museum of Art or the Florida Museum of Natural History may be able to oversee a few interns, but students are encouraged to apply for internships at other U.S. institutions or abroad.

A project-in-lieu-of-thesis (or thesis) is selected, researched, and carried out under the direction of a supervisory committee.

Degrees Offered

Degrees Offered with a Major in Museology

- Master of Arts
  - concentration in Historic Preservation
  - without a concentration

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

School of Art and Art History

Departmental Courses

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<td>Research in Methods and Materials of the Artist</td>
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<td>ART 6849C</td>
<td>Reactive Environments</td>
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<td>ART 6897</td>
<td>Professional Practices for the Visual Artist</td>
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<td>ART 6910C</td>
<td>Supervised Research</td>
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<td>ART 6925C</td>
<td>Art + Technology Workshop</td>
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<td>ART 6926C</td>
<td>Advanced Study I</td>
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ART 6927C  Advanced Study II  2-4  
ART 6928C  Advanced Study III  2-4  
ART 6929C  Advanced Study IV  2-4  
ART 6933  Area Methods: Rotating Topics  1-4  
ART 6971  Research for Master's Thesis  1-15  
ART 6973C  Individual Project  1-10  
DIG 5930  Special Topics  3  
DIG 6746C  Graduate Seminar in Sensors and Electronics  3  
GRA 6930  Seminar: Rotating Topics  3  
GRA 6931C  Research and Practice  3  
GRA 6944  Practicum  1-6  
GRA 6973  Project in Lieu of Thesis  1-9  
IDC 6505C  Programming for Artists  3

**College of the Arts Courses**

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**Student Learning Outcomes**

**Museology (MA)**

SLO 1  Knowledge  
Indicates broad knowledge of the responsibilities of museum departments and how they function together.

SLO 2  Skills  
Constructs coherent written articulation about specific knowledge of a specialized area of museum work.

SLO 3  Professional Development  
Assembles skills needed for a specific museum job.

SLO 4  Skills  
Appraises pertinent issues raised by the project and evaluates them.

SLO 5  Professional Behavior  
Produces a coherent verbal presentation.

**School of Theatre and Dance**

Director: R. Remshardt  
Graduate Performance Program Coordinator: T. Altmeyer  
Graduate Design Program Coordinator: S. Galloway

The graduate program offered by the School of Theatre and Dance leads to the degree of Master of Fine Arts in Theatre. Minimum requirements for this degree are given in the General Information section of this catalog.

The M.F.A. degree prepares students for professional entry in acting, production, or teaching. Placement in the M.F.A. program is determined by audition/portfolio review, academic credentials, and personal interview. Candidates for admission should have adequate training in theatre. Deficiencies may be corrected before beginning graduate study.

The program emphasizes the study and practice of theatre as an art and discipline. Students of acting and design study concepts of theatre together while working in their areas of specialization. Focus is on the collaboration and synthesis of theatre artistry. Each incoming class is composed of approximately 12 to 18 students in acting and all design areas.

The student’s artistic and academic progress will be reviewed at the end of each semester. The School of Theatre Handbook gives details on the form and focus of each review. This information is online at https://arts.ufl.edu/academics/theatre-and-dance/forms-manuals-handbooks/154.

During the final year of study, each student must successfully complete the comprehensive examination and oral defense. The project in lieu of thesis includes research, analysis, rehearsal process, and evaluation. Development and execution of the project includes public performance (acting or design). The written document and oral defense of the project which follow must demonstrate the ability to communicate the creative process.

Graduate acting students audition for all departmental productions.

**Majors**

- Theatre (p. 154)

**Faculty**

**Professor**

- Carpenter, Peter J.
- Dickey, Jerry Richard
- Frosch, Joan D.
- Kaye, Stanley
- Lavelli, Lucinda S.
- Marshall, Kevin A.
- Mata, Tony
- Ozuzu, Onyekwere P.
- Pinkney, Michael Lynn
- Remshardt, Ralf E.
- Williams, Judith Willa

**Associate Professor**

- Altmeyer, Timothy
- Ciupe, Mihai A.
- Galloway, Stacey
• Garland, Christina
• Mitchell, Charles P.
• Setlow, Jennifer
• Soledade, Augusto Cesar

Assistant Professor
• Carrico, Rachel
• Gossmann, Monika
• Johnson, Elizabeth
• Rua, Colleen
• Schuld, Susan
• Williams, Trent Dwight

Other
• Clark, Michael
• Gets, Hugh M.
• Zhao, Jing

Lecturer
• Goelz, Jenny

Theatre

Degrees Offered

Degrees Offered with a Major in Theatre
• Master of Fine Arts

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Theatre and Dance Departmental Courses

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<td>TPA 6026</td>
<td>Lighting Design II</td>
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<td>TPA 6048</td>
<td>Costume Design II</td>
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<td>TPA 6054</td>
<td>Detail Design for Costume Designers</td>
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<tr>
<td>TPA 6069</td>
<td>Scene Design II</td>
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<td>TPA 6235</td>
<td>Costume Construction</td>
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<tr>
<td>TPA 6237</td>
<td>Pattern Making: Flat Patterning</td>
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<tr>
<td>TPA 6243</td>
<td>Pattern Making: Draping</td>
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<td>TPA 6258</td>
<td>Computer Drafting 2D</td>
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<td>TPA 6357</td>
<td>Programming and Presentation for the Lighting Designer</td>
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<td>TPP 6115</td>
<td>Graduate Acting I: Modern Acting Theory and Practice</td>
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<td>TPP 6116</td>
<td>Graduate Acting II: Shakespeare and High Style</td>
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<td>TPP 6145</td>
<td>Graduate Acting III: Period Styles</td>
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<td>TPP 6149</td>
<td>Acting IV: Contemporary Realism</td>
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<td>MFA Company Acting Workshop</td>
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<td>Acting for the Camera</td>
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<td>Voice and Movement I</td>
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<td>The Alexander Technique II</td>
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<td>The Alexander Technique III</td>
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<td>TPP 6385</td>
<td>Directing</td>
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<td>Graduate Movement Training</td>
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<td>Graduate Stage Combat</td>
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<td>MFA Voice and Speech III: Period Styles</td>
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<td>TPP 6947</td>
<td>MFA Voice and Speech IV: Advanced Vocal Training for the Actor 2-3</td>
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Degrees Offered

Degrees Offered with a Major in Arts in Medicine

- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Arts in Medicine Courses

Practicum

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College of the Arts Courses

Warrington College of Business

Dean: John Kraft

The mission of the Warrington College of Business is to build a better society by creating influential research and educating tomorrow’s business leaders. The mission emphasizes service to society, a key feature of a Land Grant university. The activities through which the College achieves this global aim are research and teaching. These two activities are highly complementary, indeed intertwined, and both are vital to the continued excellence of the Warrington College. The Hough Graduate School of Business has specialized programs tailored to fit students’ strengths and interests.
Graduate degrees offered (http://warrington.ufl.edu/graduate/academics/) by the Warrington College of Business are the Doctor of Philosophy with major programs in business administration; the Master of Science with major programs in Business Administration, in Finance, in Management, and in Real Estate; the Master of Business Administration; the Master of Entrepreneurship; the Master of Science in Information Systems and Operations Management; the Master of International Business; and the Master of Accounting. Fields of concentration and minimum requirements for the M.B.A. are given in the Graduate Degrees (p. 48) section of this catalog, as well as admission and degree requirements for the Ph.D.

For more information, please see the associated department and program pages in this catalog, and our website: http://warrington.ufl.edu.

### Faculty

**Complete faculty listings:** Follow this link (http://gradschool.ufl.edu/GimsPublic/Acalog/Faculty.aspx).

### Finance, Insurance, and Real Estate Department

**Chair:** Andy Naranjo  
**Graduate Coordinator:** Mahen Nimalendran

The Department of Finance, Insurance, and Real Estate offers graduate work leading to the Master of Science degree with major programs in finance and real estate; the Master of Science in Entrepreneurship (M.S.E.); and the Doctor of Philosophy degree in business administration with a concentration in finance, insurance, quantitative analysis, or real estate. Complete descriptions of the minimum requirements for the M.S., M.S.E, and Ph.D. degrees are provided in the Graduate Degrees (p. 48) section of this catalog.

Finance, Real Estate, and Entrepreneurship are also available as concentrations within the M.B.A program. For information about the M.B.A. program, please consult that listing in the Graduate Degrees (p. 48) section.

For more information see the program pages below, and visit our website: http://warrington.ufl.edu/departments/fire (http://warrington.ufl.edu/departments/fire/).

### Majors

- Business Administration (Finance, Insurance, and Real Estate) (p. 157)  
- Entrepreneurship (p. 160)  
- Finance (p. 161)  
- Real Estate (p. 162)

### Professor

- Archer, Wayne R.  
- Houston, Joel F.  
- Kraft, John  
- Ling, David Curtis  
- Livingston, Miles B.  
- Naranjo, Andy  
- Nimalendran, Mahendrarajah  
- Ryngaert, Michael David

### Associate Professor

- Brown, David T.

### Assistant Professor

- Da Silva Cortes Goncalves, Gustavo  
- Kim, Sehoon  
- Kumar, Nitish  
- Lee, Jongsub  
- Li, Tao  
- Tang, Yuehua  
- Wang, Baolian

### Eminent Scholar

- Flannery, Mark Jeffrey  
- James, Christopher  
- Ritter, Jay Rial

### Clinical Assistant Professor

- Aitsahlia, Farid
Business Administration (Finance, Insurance, and Real Estate)

Program Information

The Ph.D. in Business Administration - Finance and Real Estate program prepares students to engage in productive scholarly research and teaching in the broad area of financial and real estate economics. Graduates of this program typically are placed with major universities in the United States, although some students choose to work in research positions at non-academic institutions.

The Ph.D. program has a strong emphasis on scholarly research training. Admissions are based on several criteria including academic performance in the undergraduate and graduate programs, standardized test scores, proficiency in English, and potential for research and teaching. For more specific admission information on our Ph.D. program, please visit our website at [http://warrington.ufl.edu/graduate/academics/phd-fre/](http://warrington.ufl.edu/graduate/academics/phd-fre/). Generally, admitted students will also be considered for financial aid.

Finance

The student pursuing a concentration in finance typically specializes in corporate finance, financial markets and institutions, or investments. The Ph.D. curriculum consists of course work of four types: research foundations, the major field, a minor or supporting field, and a breadth requirement.

The research foundation requirements are comprised of courses in microeconomic theory, macroeconomic theory, mathematical methods and applications to economics, mathematical statistics, and econometrics. The actual courses will depend on the student's background and proposed thesis research.

The major field in finance consists of at least 16 credit hours in graduate course work in finance including financial theory, corporate finance, and seminars in empirical methods, market microstructure, and special topics. Students may elect to have one "strong" minor (16 credit hours), two "weak" minors (8 credit hours each), or a supporting field which is not declared as a minor. If a supporting field is chosen, at least 16 hours of course work acceptable to the student's supervisory committee must be taken. The supporting field option is selected when a student wishes to take courses across a number of departments. The department offers a combined B.S./M.S. program. Contact the graduate coordinator for information.

The breadth requirement applies only to students with no prior course work in business and consists of financial and managerial accounting or their equivalents, plus two courses out of the following areas: managerial economics, production operations management, or problems and methods in marketing management.

Real Estate

The research foundations are identical to those listed above for finance. The major field, minor, and supporting field requirements have the same credit stipulation as those outlined above for finance, except that the major work is in real estate.

The breadth requirement, as in all concentrations for the business administration program, applies only to students entering without prior course work in business. It consists of at least three courses from the following list (two or more fields must be represented): managers and legal environment of business, finance, money and capital markets, problems and methods of marketing management, consumer behavior, and financial and managerial accounting.

Other degree requirements are listed in the Graduate Degrees (p. 48) section of this catalog.

For more information, please see our website: [http://warrington.ufl.edu/graduate/academics/phd-fre/](http://warrington.ufl.edu/graduate/academics/phd-fre/).

Degrees Offered

Degrees Offered with a Major in Business Administration

- Doctor of Philosophy
  - concentration in Finance
  - concentration in Insurance
  - concentration in Quantitative Finance
  - concentration in Real Estate and Urban Analysis

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Finance, Insurance, and Real Estate Departmental Courses

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<td>Finance II: Capital Structure and Risk Management Issues</td>
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<td>Corporation Finance</td>
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<td>Measuring and Managing Value</td>
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<td>Financial Decision Making</td>
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<td>FIN 6608</td>
<td>Financial Management of the Multinational Corporation</td>
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### Business Administration (Finance, Insurance, and Real Estate)

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<td>Investment Property Analysis</td>
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<td>REE 6397</td>
<td>Real Estate Securities and Portfolios</td>
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<td>Geographic Information Systems and Location Analysis</td>
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<td>REE 6948</td>
<td>Capstone Seminar and Applied Project</td>
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### Information Systems and Operations Management Departmental Courses

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<td>ISM 6123</td>
<td>Systems Analysis and Design</td>
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<td>ISM 6128</td>
<td>Advanced Business Systems Design and Development I</td>
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<td>Database Management Systems</td>
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<td>ISM 6236</td>
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<td>ISM 6257</td>
<td>Intermediate Business Programming</td>
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<td>ISM 6423</td>
<td>Data Analysis for Decision Support</td>
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<td>ISM 6485</td>
<td>Electronic Commerce and Logistics</td>
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<td>ISM 6486</td>
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<td>Risks and Controls in eCommerce</td>
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<td>ISM 6562</td>
<td>Business Data Presentation and Visualization</td>
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<td>ISM 7166</td>
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<td>Accounting for Income Taxes</td>
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<td>Issues in Audit Practice</td>
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<td>Information Systems Assurance</td>
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<td>Logistics and Distribution Management</td>
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<td>Quality Management and Control Systems</td>
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### Marketing Departmental Courses

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Entrepreneurship

Program Information

The Masters of Science in Entrepreneurship (M.S.E.) program is a one-year, 36-credit, campus-based program designed for young and aspiring entrepreneurs and change-makers. Offered to both business and non-business majors alike, the program is a combination of classroom delivery and experiential learning activities with a focus on opportunity assessment, feasibility analysis, lean entrepreneurial concept testing, business plan development, entrepreneurial leadership, and the sourcing of capital. Students are exposed to cutting edge entrepreneurial theory, which they apply immediately by consulting for small business, commercializing UF technology, and creating their own businesses.

Combined Degree: The Master of Science in Entrepreneurship offers a combined bachelor's/master's degree option for students pursuing a bachelor's degree in any discipline.

For more information, please see our website: http://warrington.ufl.edu/graduate/academics/mse.

Degrees Offered

Degrees Offered with a Major in Entrepreneurship

• Master of Science in Entrepreneurship

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Finance, Insurance, and Real Estate Departmental Courses

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Warrington College of Business Courses

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Warrington College of Business Courses

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Student Learning Outcomes

**Entrepreneurship (MS)**

SLO 1 Knowledge
Assess and evaluate potential new value-driven creative venture opportunities in ways that convey a vision

SLO 2 Professional Behavior
Apply professional entrepreneurial skills to leverage resources, manage risk, plan when nothing exists, develop an action orientation and be tenacious in the face of setbacks.

SLO 3 Skills
Utilize professional experience effectively to adapt and build action-oriented networks in the pursuit of entrepreneurial opportunities

**Finance**

**Program Information**

The student pursuing a major in finance typically specializes in corporate finance, financial markets and institutions, or investments.

**Master of Science degree in Finance, non-thesis option:** This M.S. program option consists of at least 32 credits in letter-graded courses. It is designed to ensure that each student acquires a basic knowledge of the major financial economics subject areas: corporate finance, derivatives, fixed income securities, investments, international finance, and real estate. The program is designed to prepare students for positions in commercial banking, asset management, investment banking, securities markets and more. See the program's website or contact the Associate Director for further information and criteria. This program is predominantly a combined bachelor's/master's program, with applications due early in the sophomore year at UF.

**Master of Science degree in Finance/Juris Doctorate joint degree program:** This joint degree program culminates in the M.S. and J.D. degrees. Applicants must meet the entrance requirements for both the Warrington College of Business Administration and the Levin College of Law. Admission to the second degree program is required no later than the end of the second consecutive semester after beginning one degree in the joint program.

For more information, please see our website: http://warrington.ufl.edu/graduate/academics/msf (http://warrington.ufl.edu/graduate/academics/msf/).

**Degrees Offered**

**Degrees Offered with a Major in Finance**

- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

**Finance, Insurance, and Real Estate Departmental Courses**

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teams to undertake a real estate problem for real clients. This two-tiered
specialized areas. The capstone course (2 cr.) involves actual projects in which students work in
dynamic student body, significant interaction with high-level working
professionals, and nationally recognized professors. The program is a
unique combination of theory and practice that will both enhance your
profession and develop your professional skills.

Student Learning Outcomes

Finance (MS)

SLO 1  Knowledge
Produce a valuation of financial claims.

SLO 2  Skills
Synthesize financial and economic data, apply the appropriate
framework, and recommend a financial strategy.

SLO 3  Skills
Independently assess financial strategies.

SLO 4  Professional Behavior
Write business documents and make clear, concise presentations that are
supported by convincing analysis.

Real Estate

Program Information

The ten-month, full-time in residence, Nathan S. Collier Master of
Science in Real Estate (MSRE) Program, housed in the Warrington
College of Business Administration (WCBA), thrives on innovation, a
dynamic student body, significant interaction with high-level working
professionals, and nationally recognized professors. The program is a
unique combination of theory and practice that will both enhance your
real estate education and develop your professional skills.

Master of Science degree in real estate, non-thesis option: This M.S.
option consists of at least 34 credits of letter-graded courses. It is
designed to ensure that each student acquires a basic knowledge of the
various functional areas in real estate, real estate finance and investment,
real estate development, real estate law and institutions, real estate
asset management, international real estate, and advanced training in
specialized areas. The capstone course (REE 6948 Capstone Seminar and
Applied Project (2 cr.)) involves actual projects in which students work in
teams to undertake a real estate problem for real clients. This two-tiered
program of study provides both a firm theoretical foundation for later professional effectiveness and an applied bridge to professional practice.

**Master of Science degree in real estate/juris doctorate joint program:**
This joint degree program culminates in the M.S. and J.D. degrees. Applicants must meet the entrance requirements for both the Warrington College of Business Administration and the Levin College of Law. Admission to the second degree program is required no later than the end of the second consecutive semester after beginning one degree of the joint program.

The Department also offers a combined bachelor’s / master’s program for all undergraduate disciplines.

For more information, please contact the admissions director and see our website: http://warrington.ufl.edu/graduate/academics/msre (http://warrington.ufl.edu/graduate/academics/msre/).

### Degrees Offered

#### Degrees Offered with a Major in Real Estate

- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

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#### Warrington College of Business Courses

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Student Learning Outcomes

Real estate (MS)

SLO 1  Knowledge
Identify elements in construction methods and materials, market analysis, real estate finance and investment, real estate law, real estate appraisal, business statistics, and ethical and social responsibility.

SLO 2  Skills
Specify and implement a framework for identifying a real estate problem/decision, apply appropriate decision making tools, techniques, and evaluation criteria to the problem/decision, and develop alternative solutions.

SLO 3  Skills
Predict the outcomes of a decision or course of action and make appropriate adjustments to changing conditions and information.

SLO 4  Skills
Critically assess the impact of various courses of action on multiple stakeholders, including investors, lenders, and the local community.

SLO 5  Professional Behavior
Write business documents clearly, concisely, and analytically.

SLO 6  Professional Behavior
Speak in groups and in public clearly, concisely, and analytically, with appropriate use of visual aids.

Fisher School of Accounting

Director: Gary A. McGill
Graduate Coordinators: John Laibson and Jenny Tucker

As a professional school in a major public research university, the Fisher School of Accounting (FSAO) is committed to scholarly research, teaching, and service to advance knowledge and prepare future leaders for business, professional, and academic careers.

The Fisher School of Accounting offers graduate work leading to the Master of Accounting (M.Acc.) degree with a major in accounting and optional concentrations in auditing and taxation, and the Ph.D. degree with a major in business administration and an accounting concentration. Requirements for these degrees are available in the Graduate Degrees section of this catalog.

For more information, please see the program pages below, or visit our website: http://warrington.ufl.edu/about/fisher/.

Major

• Accounting (p. 164)
• Business Administration (Accounting) (p. 165)

Faculty

Professor

• Asare, Stephen K.
• Knechel, W Robert
• Mcgil, Gary A.
• Tucker, Jennifer Wu

Associate Professor

• Boyles, Jesse V.
• Kirk, Marcus
• Madsen, Paul

Assistant Professor

• Bowley, Blake
• Carnes, Robert R.
• Hinson, Lisa
• Lee, Ruby Sophia
• Mayberry, Michael A.
• Rane, Scott G.
• Ricci, Michael Anthony
• Wang, Kailong
• Watson, Val Lucas

Clinical Assistant Professor

• Impink, Johannes

Accounting

Program Information

Master of Accounting: Three variations of the Master of Accounting degree program are available. These allow students to select one of three options: a concentration in Auditing, a concentration in Taxation, or no concentration. Minimum admission requirements include an acceptable score on the Graduate Management Admission Test (GMAT), with a minimum score of 550 and completion of essays with a minimum score of 4. International students must submit a satisfactory score on the following: TOEFL (Test of English as a Foreign Language: internet based, minimum score 100), or IELTS (International English Language Testing System: minimum overall score 7.0). Minimum scores on individual test sections are also required. Additional information, including minimum GPA standards for admission, may be viewed at http://warrington.ufl.edu/master-of-accounting/requirements/.

Combined degree program: The recommended curriculum to prepare for a professional career in accounting is the 3/2 five-year program with a joint awarding of the Bachelor of Science in Accounting and Master of Accounting degrees upon completion of the 150-hour program. The entry point into the 3/2 program is the beginning of the senior year.

Traditional Master of Accounting program: Students who have already completed an undergraduate degree in accounting may enter the 1-year M.Acc. degree program which requires satisfactory completion of 34 hours of course work. A minimum of 28 credits must be in graduate-level courses; a minimum of 20 credits must be in graduate-level accounting courses. The remaining credits are selected from business core courses and elective courses. Students are cautioned to seek early advisement, since many graduate courses are offered only once a year.

J.D./M.Acc. program: A joint program leading to the Juris Doctor and Master of Accounting degrees is offered by the Fisher School of Accounting and Levin College of Law.
Specific details for the M.Acc., J.D./M.Acc., and Ph.D. programs are available at http://warrington.ufl.edu/Jd-macc/requirements (http://warrington.ufl.edu/Jd-macc/requirements/).

## Degrees Offered

### Degrees Offered with a Major in Accounting
- Master of Accounting
  - no concentration
  - concentration in Auditing
  - concentration in Taxation

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

## Courses

### Accounting Departmental Courses

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### Student Learning Outcomes

#### Accounting (MACC)

- **SLO 1** Knowledge
  - Conduct effective professional tax research.
- **SLO 2** Knowledge
  - Conduct effective professional accounting research.
- **SLO 3** Professional Behavior
  - Write clearly and concisely.
- **SLO 4** Professional Behavior
  - Write effective business reports.
- **SLO 5** Skills
  - Solve complex business problems.
- **SLO 6** Professional Behavior
  - Identify and interpret professional standards of conduct.
- **SLO 7** Professional Behavior
  - Identify legal, ethical, and social responsibilities to stakeholders.

### Business Administration (Accounting)

#### Program Information

The Ph.D. program offers a broad-based interdisciplinary training that prepares students to conduct empirical research. The curriculum consists of course work of three types: the major field, a breadth requirement, and a research foundation requirement. In addition, students must demonstrate competency in conducting research and teaching, and must complete a dissertation on an accounting topic.

The major field in accounting consists of course work including research analysis, archival research, experimental research, readings, a research project, and dissertation. The breadth requirement consists of course work including microeconomic theory, game theory, information economics, corporate finance theory, and asset pricing. The research foundation requirement consists of graduate course work in mathematical economics, statistics, or econometrics. Students demonstrate competency in conducting research by completing a research project in the summer of the first year. Teaching competence is demonstrated by completing a teaching training class and by teaching for at least one 1 semester.
Admission requirements include a history of academic excellence, an adequate score on the GMAT (the average score of recently admitted applicants is 720 for GMAT) with a writing score of at least 5, competence in written and spoken English (TOEFL Internet-Based test (IBT) required for applicants whose native language is not English), appreciation of accounting issues, and institutional and math competency. The school requires a total score of 100 on the TOEFL, including a minimum of 26 on the speaking section.

**Degrees Offered**

**Degrees Offered with a Major in Business Administration**
- Doctor of Philosophy
- concentration in Accounting

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

**Accounting Departmental Courses**

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**Finance, Insurance, and Real Estate Departmental Courses**

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MAN 6575  Purchasing and Supplier Relationship Management  3
MAN 6581  Project Management  2
MAN 6586  Project Management  3
MAN 6598  Logistics and Distribution Management  3
MAN 6599  Tactical Logistics Planning  3
MAN 6617  International Operations/Logistics  2
MAN 6619  International Logistics  3
QMB 5303  Managerial Statistics  3
QMB 5304  Introduction to Managerial Statistics  2
QMB 5305  Advanced Managerial Statistics  2
QMB 6358  Statistical Analysis for Managerial Decisions II  2
QMB 6359  Statistical Analysis for Managerial Decisions II  2
QMB 6607  Decision Processes Under Uncertainty I  2
QMB 6616  Business Process Analysis  3
QMB 6693  Quality Management and Control Systems  2
QMB 6697  Optimization in Simulation Modeling I  2
QMB 6755  Managerial Quantitative Analysis I  2
QMB 6756  Managerial Quantitative Analysis II  2
QMB 6845  Supply Chain Analytics: Gaming the Supply Chain  2
QMB 6905  Individual Work in Information Systems and Operations Management  1-5
QMB 6910  Supervised Research  1-5
QMB 6930  Special Topics in Information Systems and Operations Management  1-4
QMB 6940  Supervised Teaching  1-5
QMB 6941  Internship  1-4
QMB 6957  International Studies in Quantitative Methods  1-4
QMB 6971  Research for Master's Thesis  1-15
QMB 7565  Stat Research Methods  3
QMB 7931  Special Topics in Information Systems and Operations Management  1-4
QMB 7933  Seminar in Information Systems and Operations Management  1-4
QMB 7979  Advanced Research  1-12
QMB 7980  Research for Doctoral Dissertation  1-15

Management Departmental Courses

Code  Title  Credits
BUL 5810  Legal Environment of Business  3
BUL 5811  Law, Ethics, and Organizations  2
BUL 5832  Commercial Law for Accountants  2
BUL 6441  Business Ethics and Corporate Social Responsibility  2
BUL 6516  Law of Real Estate Transactions  2
BUL 6656  Law for Entrepreneurs  2
BUL 6841  Employment Law  2
BUL 6852  International Business Law  2
BUL 6905  Individual Work  1-5
BUL 6930  Special Topics  1-3
ENT 5275  Family Business Management  2
ENT 6006  Entrepreneurship  2
ENT 6008  Entrepreneurial Opportunity  2
ENT 6016  Venture Analysis  2
ENT 6116  Business Plan Formation  2
ENT 6416  Venture Finance  2
ENT 6506  Social Entrepreneurship  2
ENT 6616  Creativity in Entrepreneurship  2
ENT 6706 Global Entrepreneurship 2
ENT 6905 Individual Work in Entrepreneurship 1-4
ENT 6930 Special Topics 1-4
ENT 6933 Entrepreneurship Lecture Series 1-4
ENT 6946 Entrepreneurial Consulting Project 2
ENT 6950 Integrated Technology Ventures 1-4
ENT 7932 Entrepreneurship 3
MAN 5141 Leadership Skills 1
MAN 5245 Organizational Behavior 3
MAN 5246 Organizational Behavior 2
MAN 5265 Managing Groups and Teams 1
MAN 6149 Developing Leadership Skills 2
MAN 6257 Power and Politics in Organizations 1-3
MAN 6266 Managing Groups and Teams in Organizations 2
MAN 6331 Compensation in Organizations 2
MAN 6365 Organizational Staffing 3
MAN 6366 Organizational Staffing 2
MAN 6446 Negotiations 3
MAN 6447 Art and Science of Negotiation 2
MAN 6635 International Aspects of Human Resource Management 2
MAN 6636 Global Strategic Management 2
MAN 6637 Global Strategic Management 3
MAN 6721 Business Policy 3
MAN 6724 Strategic Management 2
MAN 6900 Capstone Project 2
MAN 6905 Individual Work in Management 1-5
MAN 6910 Supervised Research 1-5
MAN 6930 Special Topics 1-3
MAN 6940 Supervised Teaching 1-5
MAN 6973 Project in Lieu of Thesis 1-4
MAN 7108 Seminar in Research Concepts and Methods in Management 1-3
MAN 7109 Seminar in Motivation and Attitudes 1-3
MAN 7208 Seminar in Contemporary Approaches to Organizations 1-3
MAN 7249 Org Behavior 3
MAN 7267 Seminar on Groups and Teams Research 1-3
MAN 7328 Seminar on Staffing and Selection 1-3
MAN 7778 Seminar in Strategic Adaptation to Environment 1-3
MAN 7779 Strategic Processes and Structure in Organizations 1-3
MAN 7934 Org Res Methods Sem 3
MAN 7935 Strategic Management 3
MAN 7979 Advanced Research 1-12
MAN 7980 Research for Doctoral Dissertation 1-15

Marketing Departmental Courses

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<td>MAR 6157</td>
<td>International Marketing</td>
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<td>MAR 6237</td>
<td>The Art and Science of Pricing</td>
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<td>MAR 6256</td>
<td>Strategy and Tactics of Pricing</td>
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<td>MAR 6335</td>
<td>Building and Managing Brand Equity</td>
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<td>MAR 6456</td>
<td>Business-to-Business Marketing</td>
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<td>MAR 6479</td>
<td>Professional Selling</td>
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<td>MAR 6507</td>
<td>Customer Insights and Analysis</td>
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<td>MAR 6646</td>
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<td>MAR 6722</td>
<td>Web-Based Marketing</td>
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<td>Product Development and Management</td>
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<td>Marketing of Science and Technology</td>
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<td>MAR 6837</td>
<td>Consumer-Centered Product Design</td>
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<td>MAR 6838</td>
<td>Brand Management</td>
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<td>MAR 6839</td>
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<td>MAR 6861</td>
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<td>MAR 7507</td>
<td>Perspectives on Consumer Behavior</td>
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<td>Judgment and Decision Making</td>
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Warrington College of Business Courses

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<td>Professional Communication in Business</td>
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<td>GEB 5225</td>
<td>Advanced Business Writing</td>
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<td>GEB 5929</td>
<td>Foundations Review</td>
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<td>GEB 6229</td>
<td>Professional Communication for Accountants</td>
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<td>GEB 6365</td>
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Information Systems and Operations Management Department

Chair: Hsing K. Cheng
Graduate Coordinator: Anuj Kumar

The primary mission of the Department of Information Systems & Operations Management is a commitment to scholarly research, teaching and service to advance the state of knowledge in information systems.
and supply chain management and to train future leaders for professional and academic careers.

The Department offers graduate courses leading to the Master of Science in Information Systems and Operations Management (M.S.ISOM); the Ph.D. degree in Business Administration; and a concentration in the Master of Business Administration (M.B.A.) program. Minimum requirements for these degrees are available in the Graduate Degrees (p. 48) section of this catalog.

Combined Bachelor/Master of Science: The Department also offers a combined bachelor's/master's degree program. This program allows qualified students to earn both the bachelor’s and master's degrees, using 12 to 16 credit hours of graduate-level courses for both degrees.

For more information, please see the program pages below and our website: http://warrington.ufl.edu/departments/isom (http://warrington.ufl.edu/departments/isom/).

Majors

• Business Administration (Information Systems and Operations Management) (p. 169)
• Information Systems and Operations Management (p. 172)

Faculty

Professor
• Aytug, Haldun
• Bandyopadhyay, Subhajyoti
• Cheng, Hsing
• Erenguc, Sahin S.
• Piramuthu, Selwyn
• Vakharia, Asoo J.

Associate Professor
• Carrillo, Janice Ellen
• Kumar, Anuj
• Pathak, Praveen Ashok
• Paul, Anand Abraham

Assistant Professor
• Demirezen, Emre
• Kwark, Young
• Pan, Xiajuan
• Qiu, Liangfei
• Rajapakshe, Tharanga
• Wang, Yining

Affiliated Faculty
• Tighe, Patrick J.
  Associate Professor

Business Administration (Information Systems and Operations Management)

Program Information
The Department of Information Systems & Operations Management offers graduate courses leading to the Master of Science in Information Systems and Operations Management (M.S.ISOM); the Ph.D. degree in Business Administration; and a concentration in the Master of Business Administration (M.B.A.) program. Minimum requirements for these degrees are available in the Graduate Degrees (p. 48) section of this catalog.

Doctor of Philosophy: The mission of the Ph.D. Program is to educate scholars who will make substantial contributions in their field of research. Our primary goal is to train graduate students to make such contributions. To achieve this goal, we attempt to place students in productive academic research environments. The major areas of study within the department are Information Systems/Information Technology (IS/IT) and Operations Management (OM).

Students come from a variety of backgrounds, with the most common being engineering, computer sciences, mathematics, business, and statistics. Students admitted for the Ph.D. choose to specialize either in information systems/information technology or in operations management. The course schedule taken by each student is always personalized to fit the background of the student and is developed in consultation with the Ph.D. program coordinator and/or chair of the dissertation committee. Additionally, doctoral students will be required to attend all ISOM Workshops and the Department Seminar Series (regardless of area of specialization) held at the University of Florida.

Admission requirements for the Ph.D. include

• A minimum grade point average of 3.2
• A minimum GMAT score of 650, or GRE scores acceptable to the program
• For nonnative speakers of English, submit an acceptable score on one of the following: TOEFL (Test of English as a Foreign Language: computer=213, paper=550, web=80), IELTS (International English Language Testing System: 6), MELAB (Michigan English Language Assessment Battery: 77), or successful completion of the UF English Language Institute program.

For more information, please see our website: http://warrington.ufl.edu/graduate/academics/phd-isom (http://warrington.ufl.edu/graduate/academics/phd-isom/).

Degrees Offered with a Major in Business Administration

• Doctor of Philosophy
  • concentration in Information Systems and Operations Management

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.
### Information Systems and Operations Management Departmental Courses

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<td>Supply Chain Analytics: Gaming the Supply Chain</td>
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### Accounting Departmental Courses

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<td>Financial and Managerial Accounting</td>
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<td>Managerial Accounting</td>
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<td>ACG 5815</td>
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<td>Accounting Theory</td>
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<td>ACG 7399</td>
<td>Accounting Research and Analysis</td>
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<td>Data Analysis Skills</td>
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<td>Research Analysis in Accounting</td>
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## Finance, Insurance, and Real Estate Departmental Courses

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## Management Departmental Courses

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Warrington College of Business Courses

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Information Systems and Operations Management

Program Information

The Department of Information Systems & Operations Management offers graduate courses leading to the Master of Science in Information Systems and Operations Management (M.S.ISOM); the Ph.D. degree in Business Administration; and a concentration in the Master of Business Administration (M.B.A.) program. Minimum requirements for these degrees are available in the Graduate Degrees (p. 48) section of this catalog.

Master of Science: The M.S.ISOM program provides computing, analytical, and application skills to be used in a business setting. The primary areas of emphasis in the M.S.ISOM program are business intelligence and analytics, information systems/information technology, and supply chain management. Requirements span traditional academic disciplines to produce a multiple-discipline focus. Typical positions for graduates include decision support specialist, information systems specialist, systems analyst, and logistic support specialist.

For a student with a bachelor’s degree in business, the M.S.ISOM non-thesis on-campus program consists of a minimum of 36 credit hours, normally requiring a minimum of three semesters of study, not including summer. For students without a bachelor’s degree in business, the M.S.ISOM non-thesis on-campus program consists of a minimum of 40 credit hours, normally requiring a minimum of four semesters of study, not including summer.
All M.S.ISOM candidates must complete 26 credits of core coursework:

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</table>

All M.S.ISOM candidates must also complete 6 credits of track coursework for the information technology, supply chain management, or business intelligence and analytics track:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ISM 6216</td>
<td>Business Database Systems II</td>
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</tr>
<tr>
<td>ISM 6236</td>
<td>Business Objects I</td>
<td>2</td>
</tr>
<tr>
<td>ISM 6259</td>
<td>Business Programming</td>
<td>2</td>
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<tr>
<td>MAN 6511</td>
<td>Production Management Problems</td>
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<tr>
<td>MAN 6528</td>
<td>Principles of Logistics/Transportation Systems</td>
<td>2</td>
</tr>
<tr>
<td>MAN 6573</td>
<td>Purchasing and Materials Management</td>
<td>2</td>
</tr>
<tr>
<td>ISM 6216</td>
<td>Business Database Systems II</td>
<td>2</td>
</tr>
<tr>
<td>ISM 6405</td>
<td>Business Intelligence</td>
<td>2</td>
</tr>
<tr>
<td>ISM 6423</td>
<td>Data Analysis for Decision Support</td>
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</tbody>
</table>

These required courses total 32 credit hours. In addition, each M.S.ISOM student with an undergraduate major or minor in business must take a minimum of 4 additional hours of approved graduate business electives for a total of 36 credit hours required for the M.S.ISOM degree. For students without an undergraduate business degree or minor, instead of graduate business electives, they must complete four of the following core business courses:

<table>
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<td>ACG 5075</td>
<td>Managerial Accounting</td>
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<td>ECP 5702</td>
<td>Managerial Economics</td>
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<tr>
<td>FIN 5437</td>
<td>Finance I: Asset Valuation, Risk, and Return</td>
<td>2</td>
</tr>
<tr>
<td>FIN 5439</td>
<td>Finance II: Capital Structure and Risk Management</td>
<td>2</td>
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<tr>
<td>MAN 5246</td>
<td>Organizational Behavior</td>
<td>2</td>
</tr>
<tr>
<td>MAR 5806</td>
<td>Problems and Methods in Marketing Management</td>
<td>2</td>
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</table>

Bachelor/Master of Science: The Department also offers a combined bachelor's/master's degree program. This program allows qualified students to earn both the bachelor's and master's degrees, using 12 to 16 credit hours of graduate-level courses for both degrees.

For more information, please see our website: http://warrington.ufl.edu/graduate/academics/ms-isom/combined/.

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### Degrees Offered

#### Degrees Offered With a Major in Information Systems and Operations Management

- Master of Science in Information Systems and Operations Management

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

#### Information Systems and Operations Management Departmental Courses

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<td>ISM 5021</td>
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<td>ISM 6123</td>
<td>Systems Analysis and Design</td>
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<td>ISM 6128</td>
<td>Advanced Business Systems Design and Development I</td>
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<td>ISM 6216</td>
<td>Business Database Systems II</td>
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<tr>
<td>ISM 6217</td>
<td>Database Management Systems</td>
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<tr>
<td>ISM 6222</td>
<td>Business Telecom Strategy and Applications I</td>
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<td>ISM 6223</td>
<td>Business Telecom Strategy and Applications II</td>
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<td>ISM 6224</td>
<td>Business Telecom Strategy and Applications III</td>
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<td>ISM 6226</td>
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<td>ISM 6239</td>
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<td>ISM 6251</td>
<td>Programming for Business Analytics</td>
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<td>ISM 6257</td>
<td>Intermediate Business Programming</td>
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<tr>
<td>ISM 6259</td>
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<td>ISM 6405</td>
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<td>ISM 6423</td>
<td>Data Analysis for Decision Support</td>
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<td>ISM 6485</td>
<td>Electronic Commerce and Logistics</td>
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<td>ISM 6486</td>
<td>eCommerce Technologies</td>
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<td>ISM 6487</td>
<td>Risks and Controls in eCommerce</td>
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<td>ISM 6562</td>
<td>Business Data Presentation and Visualization</td>
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<td>ISM 6942</td>
<td>Electronic Commerce Practicum</td>
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<td>ISM 7166</td>
<td>Advanced Business Systems Design and Development III</td>
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<td>MAN 5501</td>
<td>Management</td>
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<td>MAN 5502</td>
<td>Production and Operations Management</td>
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<td>MAN 5508</td>
<td>Management of Service Operations</td>
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<td>MAN 6511</td>
<td>Production Management Problems</td>
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<tr>
<td>MAN 6528</td>
<td>Principles of Logistics/Transportation Systems</td>
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</tbody>
</table>
MAN 6573  Purchasing and Materials Management  2
MAN 6575  Purchasing and Supplier Relationship Management  3
MAN 6581  Project Management  2
MAN 6586  Project Management  3
MAN 6598  Logistics and Distribution Management  3
MAN 6599  Tactical Logistics Planning  3
MAN 6617  International Operations/Logistics  2
MAN 6619  International Logistics  3
QMB 5303  Managerial Statistics  3
QMB 5304  Introduction to Managerial Statistics  2
QMB 5305  Advanced Managerial Statistics  2
QMB 6358  Statistical Analysis for Managerial Decisions I  2
QMB 6359  Statistical Analysis for Managerial Decisions II  2
QMB 6607  Decision Processes Under Uncertainty I  2
QMB 6616  Business Process Analysis  3
QMB 6693  Quality Management and Control Systems  2
QMB 6697  Optimization in Simulation Modeling I  2
QMB 6755  Managerial Quantitative Analysis I  2
QMB 6756  Managerial Quantitative Analysis II  2
QMB 6845  Supply Chain Analytics: Gaming the Supply Chain  2
QMB 6905  Individual Work in Information Systems and Operations Management  1-5
QMB 6910  Supervised Research  1-5
QMB 6930  Special Topics in Information Systems and Operations Management  1-4
QMB 6940  Supervised Teaching  1-5
QMB 6941  Internship  1-4
QMB 6957  International Studies in Quantitative Methods  1-4
QMB 6971  Research for Master's Thesis  1-15
QMB 7565  Stat Research Methods  3
QMB 7931  Special Topics in Information Systems and Operations Management  1-4
QMB 7933  Seminar in Information Systems and Operations Management  1-4
QMB 7979  Advanced Research  1-12
QMB 7980  Research for Doctoral Dissertation  1-15

Warrington College of Business Courses

**Management Department**

*Chair:* Mo Wang  
*Graduate Coordinator:* Joyce Bono

The Management Department offers graduate work leading to a Ph.D. degree with a major in Business Administration and a concentration in Management; a Master of Business Administration degree with a concentration in Management; a Master of Science degree with a major in Management; and a Master of International Business (M.I.B.). Complete descriptions of the minimum requirements for these degrees are provided in the Graduate Degrees Section (p. 48) of this catalog.

The Department participates in combined bachelor's/master's degree programs for the Master of International Business (M.I.B.) and Master of Science (M.S.) with a major in management. The Master of International Business is open to students pursuing a bachelor's degree in a business discipline or minor in business administration. The M.S. with a major in management program is only open to non-business majors. Contact the graduate coordinator for information.

For more information, please see the program pages below and our website: http://warrington.ufl.edu/departments/mgt (http://warrington.ufl.edu/departments/mgt/).

**Majors**

- Business Administration (Management) (p. 175)
- International Business (p. 178)
- Management (p. 181)

**Faculty**

**Professor**

- Bono, Joyce
- Di Matteo, Larry Alan
- Emerson, Robert W.
- Erez, Amir

**Student Learning Outcomes**

**Information systems & Operations management (MS)**

**SLO 1** Knowledge

Interpret and explain elements of economics, finance, accounting, marketing, operations management, organizational behavior, business law, information technology, business statistics, and social responsibility.

**SLO 2** Skills

Specify and implement a framework for identifying a business problem and develop alternative solutions and a set of evaluation criteria.

**SLO 3** Skills

Assess the outcomes of a course of action and make appropriate adjustments.

**SLO 4** Skills

Solve intricate problems by applying expanded knowledge of ever evolving technologies, processes, and technical skills.

**SLO 5** Skills

Critically assess the impact of business decisions on stakeholders.

**SLO 6** Professional Behavior

Write business documents clearly, concisely, and analytically.

**SLO 7** Professional Behavior

Speak in groups and in public clearly, concisely, and analytically, with appropriate use of visual aids.
The Ph.D. program in business administration in the Department of Management prepares students for careers as faculty members of universities that emphasize research and teaching. The program is designed so that the student will:

1. develop strong competence in the base discipline crucial to the study of organizations and organization processes and
2. follow a field of specialization in organizational behavior or strategy.

Admission requirements for the Ph.D. include:

1. a minimum grade point average of 3.0,
2. a minimum GMAT score of 600, and
3. for nonnative speakers of English, a minimum score of 550 on the TOEFL. Although these are the minimum requirements, most students accepted into the Ph.D. in management have a GPA above 3.5 and a GMAT score above 650.

The research interests of the faculty are quite broad and details of current research interests can be found on the management departments’ faculty page. Students will also have exposure to scholars and faculty members from other universities, and from other departments in the University, who are invited to give workshops in the Department.

**Breadth Requirement:** It is preferred, but not required that students pursuing the Ph.D. be well versed in the structure and functioning of business organizations and the environment within which they operate. This expectation may be met through undergraduate or master’s level work in business administration, but a background in business administration is not required for the Ph.D.

**Research Skills Requirement:** The general nature of the research requirement has been specified by the Graduate Committee of the Warrington College of Business. Students must take at least six methods and statistical courses, some which are offered in the department and college, and some which are taken through other colleges. The specific program is determined by the Ph.D. Coordinator in conjunction with the student’s advisor and will be tailored to fit the student’s prior preparation and the specialization that the student chooses.

**Major Course Requirements:** The program of study for each student will include required management seminars covering topics in both Organizational Behavior and Strategy.

**Program Milestones:** To maintain acceptable progress in the Ph.D. program, each student is required to present a first year research project in the second year and a second year research project in the third year. Procedures for these qualifying papers, dissertation, and final examination are given in the Requirements for the PhD. section of this catalog.

For more information, please see our website: http://warrington.ufl.edu/graduate/academics/phd-mgt (http://warrington.ufl.edu/graduate/academics/phd-mgt/).

**Degrees Offered**

**Degrees Offered with a Major in Business Administration**

- Doctor of Philosophy
- concentration in Management

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

**Management Departmental Courses**

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<thead>
<tr>
<th>Code</th>
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<td>BUL 5810</td>
<td>Legal Environment of Business</td>
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<tr>
<td>BUL 5811</td>
<td>Law, Ethics, and Organizations</td>
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<tr>
<td>BUL 5832</td>
<td>Commercial Law for Accountants</td>
<td>2</td>
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<tr>
<td>BUL 6441</td>
<td>Business Ethics and Corporate Social</td>
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<td></td>
<td>Responsibility</td>
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<td>BUL 6516</td>
<td>Law of Real Estate Transactions</td>
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<td>BUL 6656</td>
<td>Law for Entrepreneurs</td>
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<td>BUL 6841</td>
<td>Employment Law</td>
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<td>BUL 6852</td>
<td>International Business Law</td>
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<td>BUL 6905</td>
<td>Individual Work</td>
<td>1-5</td>
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<td>BUL 6930</td>
<td>Special Topics</td>
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<td>ENT 5275</td>
<td>Family Business Management</td>
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<td>ENT 6006</td>
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<td>ENT 6008</td>
<td>Entrepreneurial Opportunity</td>
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<td>ENT 6016</td>
<td>Venture Analysis</td>
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<td>ENT 6116</td>
<td>Business Plan Formation</td>
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<td>ENT 6416</td>
<td>Venture Finance</td>
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<td>ENT 6506</td>
<td>Social Entrepreneurship</td>
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<td>ENT 6616</td>
<td>Creativity in Entrepreneurship</td>
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<td>ENT 6706</td>
<td>Global Entrepreneurship</td>
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<td>ENT 6930</td>
<td>Special Topics</td>
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<td>ENT 6950</td>
<td>Integrated Technology Ventures</td>
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<td>ENT 7932</td>
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<td>MAN 5141</td>
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<td>MAN 5246</td>
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<tr>
<td>MAN 5265</td>
<td>Managing Groups and Teams</td>
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<td>Developing Leadership Skills</td>
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<td>MAN 6257</td>
<td>Power and Politics in Organizations</td>
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<td>MAN 6266</td>
<td>Managing Groups and Teams in Organizations</td>
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<td>MAN 6331</td>
<td>Compensation in Organizations</td>
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<td>MAN 6365</td>
<td>Organizational Staffing</td>
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<td>MAN 6446</td>
<td>Negotiations</td>
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<td>MAN 6447</td>
<td>Art and Science of Negotiation</td>
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<td>MAN 6635</td>
<td>International Aspects of Human Resource</td>
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<td>MAN 6636</td>
<td>Global Strategic Management</td>
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<td>Business Policy</td>
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<td>MAN 6724</td>
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<td>MAN 6900</td>
<td>Capstone Project</td>
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<td>Supervised Research</td>
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<td>MAN 6930</td>
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<td>MAN 6940</td>
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<td>MAN 6973</td>
<td>Project in Lieu of Thesis</td>
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<tr>
<td>MAN 7108</td>
<td>Seminar in Research Concepts and Methods</td>
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<tr>
<td>MAN 7109</td>
<td>Seminar in Motivation and Attitudes</td>
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<td>MAN 7208</td>
<td>Seminar in Contemporary Approaches to</td>
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<td>MAN 7249</td>
<td>Org Behavior</td>
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<td>MAN 7267</td>
<td>Seminar on Groups and Teams Research</td>
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<td>MAN 7328</td>
<td>Seminar on Staffing and Selection</td>
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<td>MAN 7778</td>
<td>Seminar in Strategic Adaptation to Environment</td>
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<td>MAN 7779</td>
<td>Strategic Processes and Structure in Organizations</td>
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<td>MAN 7934</td>
<td>Org Res Methods Sem</td>
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<td>MAN 7979</td>
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**Accounting Departmental Courses**

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<td>ACG 5065</td>
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<td>ACG 5505</td>
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<td>ACG 5637</td>
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<td>ACG 5647</td>
<td>Auditing II</td>
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<td>ACG 5815</td>
<td>Accounting Regulation</td>
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<tr>
<td>ACG 6107</td>
<td>Accounting for Income Taxes</td>
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<td>ACG 6136</td>
<td>Accounting Theory</td>
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<td>ACG 6175</td>
<td>Financial Reporting and Analysis</td>
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<td>ACG 6207</td>
<td>Accounting for Risk</td>
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<td>ACG 6385</td>
<td>Controllership</td>
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<td>Issues in Audit Practice</td>
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<td>ACG 6685</td>
<td>Forensic Accounting</td>
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<td>ACG 6691</td>
<td>International Auditing</td>
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<td>ACG 6697</td>
<td>Information Systems Assurance</td>
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<td>Individual Work in Accounting</td>
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<td>ACG 6935</td>
<td>Special Topics in Accounting</td>
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<td>ACG 6940</td>
<td>Supervised Teaching</td>
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<td>ACG 7399</td>
<td>Accounting Research and Analysis</td>
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<td>ACG 7848</td>
<td>Data Analysis Skills</td>
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<td>Web Crawling and Textual Analysis</td>
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**Finance, Insurance, and Real Estate Departmental Courses**

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Information Systems and Operations Management Departmental Courses

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Marketing Departmental Courses

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### International Business

#### Program Information

The Master of International Business (M.I.B.) is a non-thesis interdisciplinary graduate business program designed to enhance a student's knowledge and understanding of global business trends and problems.

All M.I.B. candidates must complete the 30-credit curriculum, which consists of 14 core credits and 16 elective credits, with a grade point average (major and overall) of 3.0 or higher. The curriculum includes a mandatory global immersion experience and a non-thesis capstone project.

Combined Degree: The Master of International Business offers a combined bachelor's/master's degree option for students pursuing a bachelor's degree in a business discipline or minor in business administration.

For more information, please see our website: [http://warrington.ufl.edu/graduate/academics/mib](http://warrington.ufl.edu/graduate/academics/mib).

#### Degrees Offered

**Degrees Offered with a Major in International Business**

- Master of International Business

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

#### Courses

**Management Departmental Courses**

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**Warrington College of Business Courses**

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EN 7932 | Entrepreneurship | 3  
MAN 5141 | Leadership Skills | 1  
MAN 5245 | Organizational Behavior | 3  
MAN 5246 | Organizational Behavior | 2  
MAN 5265 | Managing Groups and Teams | 1  
MAN 6149 | Developing Leadership Skills | 2  
MAN 6257 | Power and Politics in Organizations | 1-3  
MAN 6266 | Managing Groups and Teams in Organizations | 2  
MAN 6331 | Compensation in Organizations | 2  
MAN 6365 | Organizational Staffing | 3  
MAN 6366 | Organizational Staffing | 2  
MAN 6446 | Negotiations | 3  
MAN 6447 | Art and Science of Negotiation | 2  
MAN 6635 | International Aspects of Human Resource Management | 2  
MAN 6636 | Global Strategic Management | 2  
MAN 6637 | Global Strategic Management | 3  
MAN 6721 | Business Policy | 3  
MAN 6724 | Strategic Management | 2  
MAN 6900 | Capstone Project | 2  
MAN 6905 | Individual Work in Management | 1-5  
MAN 6910 | Supervised Research | 1-5  
MAN 6930 | Special Topics | 1-3  
MAN 6940 | Supervised Teaching | 1-5  
MAN 6973 | Project in Lieu of Thesis | 1-4  
MAN 7108 | Seminar in Research Concepts and Methods in Management | 1-3  
MAN 7109 | Seminar in Motivation and Attitudes | 1-3  
MAN 7208 | Seminar in Contemporary Approaches to Organizations | 1-3  
MAN 7249 | Org Behavior | 3  
MAN 7257 | Seminar on Groups and Teams Research | 1-3  
MAN 7328 | Seminar on Staffing and Selection | 1-3  
MAN 7778 | Seminar in Strategic Adaptation to Environment | 1-3  
MAN 7779 | Strategic Processes and Structure in Organizations | 1-3  
MAN 7934 | Org Res Methods Sem | 3  
MAN 7935 | Strategic Management | 3  
MAN 7979 | Advanced Research | 1-12  
MAN 7980 | Research for Doctoral Dissertation | 1-15

### Finance, Insurance, and Real Estate

#### Departmental Courses

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### Degrees Offered with a Major in Management

- Master of Science
- without a concentration

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Management Program Core Courses

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**Warrington College of Business Courses**

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**Student Learning Outcomes**

**Management (MS)**

SLO 1  Knowledge  
Produce a significant business knowledge gain compared to knowledge at program entry.

SLO 2  Skills  
Identify the essential elements of core business principles to examine and evaluate problems and to construct and implement solutions in the business environment.

SLO 3  Skills  
Identify appropriate analytical models and critical reasoning processes to evaluate evidence, select among alternatives, and generate creative options to advance effective decision making.

SLO 4  Professional Behavior
Write business documents clearly, concisely, and analytically.

SLO 5 Professional Behavior
Speak in groups and in public clearly, concisely, and analytically, with appropriate use of visual aids.

**Marketing Department**

*Chair: Richard J. Lutz*
*Graduate Coordinator: Aner Sela*

The Marketing Department at the University of Florida is a recognized leader in the discipline of marketing. For over a decade, our faculty has ranked as one of the most productive and influential in the field. Our faculty is known for conducting provocative, cutting-edge research that contributes both to the scientific understanding and practice of marketing. Our Ph.D. program has produced many leading researchers in the discipline. And the David F. Miller Center for Retailing Education and Research is known as one of the foremost centers for developing the science of retailing.

The Marketing Department offers a graduate program leading to the degree of Ph.D. in Business Administration (Marketing). Requirements for the Ph.D. degree are described in the Graduate Degrees (p. 48) section of this catalog.

For more information, please see our website: http://warrington.ufl.edu/departments/mkt.

**Majors**

- Business Administration (Marketing - Master’s) (p. 185)
- Business Administration (Marketing - Ph.D.) (p. 186)

**Faculty**

**Professor**
- Janiszewski, Christopher Allen
- Lutz, Richard J.
- Xie, Jinhong

**Associate Professor**
- Brenner, Lyle A.
- Cooke, Alan David
- Mitra, Debanjan
- Sela, Aner
- Shin, Woochoel

**Assistant Professor**
- Tu, Yanping
- Yang, Yang
- Zou, Tianxin

**Eminent Scholar**
- Shugan, Steven Mark

**Distinguished Professor**
- Alba, Joseph W.

**Clinical Professor**
- Podsakoff, Philip M.

**Affiliated Faculty**
- Tufts, Steven Dale
  Clinical Professor

**Business Administration (Marketing - Master’s)**

The Marketing Department only accepts master’s students in special cases. If you are interested in this program, please contact the department graduate coordinator in the first instance. Do not submit an online application without first contacting the graduate coordinator.

The M.A. degree in Business Administration with a concentration in marketing focuses on consumer behavior, marketing management, and marketplace phenomena. Students study the critical linkages between an organization and its environment, particularly customers and competitors.

The M.S. degree in Business Administration with a concentration in marketing is intended for students whose ultimate objective is to earn a Ph.D. in marketing at another institution. Applicants must have:

1. an undergraduate degree from a nationally accredited program,
2. a minimum 3.5 undergraduate GPA,
3. a minimum 600 GMAT (1250 GRE), and
4. evidence of a strong interest in academic research in marketing.

The concentration requires 30 credits of graduate-level courses, at least half of which must be in marketing.

**Degrees Offered**

**Degrees Offered with a Major in Business Administration**

- Master of Arts
  - concentration in Marketing
- Master of Science
  - concentration in Marketing

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

**Marketing Departmental Courses**

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Business Administration (Marketing - Ph.D.)

The doctoral program is research-focused and offers the opportunity for concentrated study in consumer behavior or in quantitative or analytical modeling of marketplace phenomena.

The Ph.D. curriculum consists of course work in three areas: research foundations, the major field, and electives. In addition, students are required to complete a first-year summer research project, a second year summer paper, a third-year review paper, and a dissertation. Other requirements are outlined in the Graduate Degrees (p. 48) section of this catalog.

The research foundations requirement comprises a set of research methods and data analysis courses chosen from statistics, psychology, and/or economics. The major field course work is made up of a set of required seminar courses and electives to complement the student's research program.

Degrees Offered

Degrees Offered with a Major in Business Administration

- Doctor of Philosophy
- concentration in Marketing

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

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186    Business Administration (Marketing - Ph.D.)
Accounting Departmental Courses

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Information Systems and Operations Management Departmental Courses

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Interdisciplinary Departments

- Business Administration (M.A.) (p. 189)
- Business Administration (M.B.A.) (p. 192)

### Business Administration (M.A.)

#### Degrees Offered

#### Degrees Offered with a Major in Business Administration

- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

#### Courses

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### Warrington College of Business Courses

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BTE 7171 Preparing to Teach in Business 2
GEB 5212 Professional Writing in Business 1-3
GEB 5215 Professional Communication in Business 1-3
GEB 5225 Advanced Business Writing 1-3
GEB 5929 Foundations Review 1-3
GEB 6229 Professional Communication for Accountants 2
GEB 6365 International Business 3
GEB 6905 Individual Work 1-4
GEB 6930 Special Topics 1-3
GEB 6941 Internship 1-4
GEB 6957 International Studies in Business 1-4

### Accounting Departmental Courses

#### Code  Title  Credits
ACG 5005 Financial Accounting 2
ACG 5065 Financial and Managerial Accounting 3
ACG 5075 Managerial Accounting 2
ACG 5226 Advanced Accounting 2
ACG 5505 Governmental Accounting 2
ACG 5637 Auditing I 2
ACG 5647 Auditing II 2
ACG 5815 Accounting Regulation 2
ACG 6107 Accounting for Income Taxes 2
ACG 6136 Accounting Theory 2
ACG 6175 Financial Reporting and Analysis 2
ACG 6207 Accounting for Risk 2
ACG 6385 Controllership 2
ACG 6635 Issues in Audit Practice 2
ACG 6685 Forensic Accounting 2
ACG 6691 International Auditing 2
ACG 6697 Information Systems Assurance 2
ACG 6905 Individual Work in Accounting 1-4
ACG 6935 Special Topics in Accounting 1-4
ACG 6940 Supervised Teaching 1-5
ACG 7399 Accounting Research and Analysis 3
ACG 7848 Data Analysis Skills 2
ACG 7849 Web Crawling and Textual Analysis 2
ACG 7885 Accounting Research I 4
ACG 7886 Accounting Research II 4
ACG 7887 Research Analysis in Accounting 3
ACG 7939 Theoretical Constructs in Accounting 3
ACG 7979 Advanced Research 1-12
ACG 7980 Research for Doctoral Dissertation 1-15
TAX 5005 Introduction to Federal Income Taxation 3
TAX 5025 Federal Income Tax 1 2
TAX 5027 Federal Income Tax 2 2
TAX 5065 Tax Professional Research 2
TAX 6105 Corporate Taxation 2
TAX 6115 Advanced Corporate Taxation 2
TAX 6205 Partnership Taxation 2
TAX 6526 International Taxation 2
TAX 6726 Executive Tax Planning 2
TAX 6877 State and Local Taxation 2
Finance, Insurance, and Real Estate Departmental Courses

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Information Systems and Operations Management Departmental Courses

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<td>Optimization in Simulation Modeling I</td>
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<td>The Art and Science of Pricing</td>
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<td>MAR 6256</td>
<td>Strategy and Tactics of Pricing</td>
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<td>Building and Managing Brand Equity</td>
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The Master of Business Administration (M.B.A.) degree gives students:

1. conceptual knowledge for understanding the functions and behaviors common to business organizations and
2. analytical, problem-solving, and decision-making skills essential for effective management.

Emphasis is on developing the student’s capacities and skills for business decision making. All programs (except the Executive, which requires eight years) require at least two years of full-time, post-undergraduate work experience as well as a bachelor’s degree from an accredited four year institution.

The MBA program is structured so that students may complete coursework through a variety of educational platforms. Students may earn the MBA degree in our full-time format, attending class during the week in Gainesville; on the weekends, once a month in Gainesville; and online, participating mostly via online lectures and discussions and attending class in Gainesville quarterly.

For more information, please see our website: http://floridamba.ufl.edu.

Program Options

Full-Time

• Full-Time Two-Year:
  • 48 credit program requires 4 terms of full-time study over two academic years.
  • Students are admitted for the fall term only.
  • Students spend the summer between academic years working at internships.

• Full-Time One-Year All Majors:
  • 48 credit program requires 3 terms, students are expected to complete coursework within 12 months.
  • Program starts in late spring/early summer.

• Full-Time One-Year Business Majors:
  • 32 credit program requires two and a half terms
  • Program starts in mid-summer and students expected to complete all course work within 10 months.
  • Applicants to this program are required to have a bachelor’s degree in business from a four-year accredited institution (conferred within the last seven years) and at least two years of post-undergraduate work experience.

Executive

• Executive MBA Program:
  • 48 credit, 20-month program for working professionals, students attend classes one extended weekend per month (Friday-Sunday).
  • Program is divided into five terms each lasting about four months.
  • Program requires and includes a one-week two credit international experience.
  • This option requires eight years of post-undergraduate work experience, and students are expected to have people or project management responsibilities in their current positions.

Professional (Class One Weekend per Month)

• Professional Two-Year MBA:
  • 27-month program is five terms.
  • Students attend classes one weekend per month (Saturday-Sunday) and must attend a one-week in-residence elective class.

• Professional One-Year MBA:
  • 16-month, three term option starts only in January.
  • Students attend classes one weekend per month (Saturday-Sunday) and must attend a one-week in-residence elective class.

Emphasis is on developing the student’s capacities and skills for business decision making. All programs (except the Executive, which requires eight years) require at least two years of full-time, post-undergraduate work experience as well as a bachelor’s degree from an accredited four year institution.

The MBA program is structured so that students may complete coursework through a variety of educational platforms. Students may earn the MBA degree in our full-time format, attending class during the week in Gainesville; on the weekends, once a month in Gainesville; and online, participating mostly via online lectures and discussions and attending class in Gainesville quarterly.

For more information, please see our website: http://floridamba.ufl.edu.

Program Options

Full-Time

• Full-Time Two-Year:
  • 48 credit program requires 4 terms of full-time study over two academic years.
  • Students are admitted for the fall term only.
  • Students spend the summer between academic years working at internships.

• Full-Time One-Year All Majors:
  • 48 credit program requires 3 terms, students are expected to complete coursework within 12 months.
  • Program starts in late spring/early summer.

• Full-Time One-Year Business Majors:
  • 32 credit program requires two and a half terms
  • Program starts in mid-summer and students expected to complete all course work within 10 months.
  • Applicants to this program are required to have a bachelor’s degree in business from a four-year accredited institution (conferred within the last seven years) and at least two years of post-undergraduate work experience.

Executive

• Executive MBA Program:
  • 48 credit, 20-month program for working professionals, students attend classes one extended weekend per month (Friday-Sunday).
  • Program is divided into five terms each lasting about four months.
  • Program requires and includes a one-week two credit international experience.
  • This option requires eight years of post-undergraduate work experience, and students are expected to have people or project management responsibilities in their current positions.

Professional (Class One Weekend per Month)

• Professional Two-Year MBA:
  • 27-month program is five terms.
  • Students attend classes one weekend per month (Saturday-Sunday) and must attend a one-week in-residence elective class.

• Professional One-Year MBA:
  • 16-month, three term option starts only in January.
  • Students attend classes one weekend per month (Saturday-Sunday) and must attend a one-week in-residence elective class.

First meeting includes a one-week, on-campus foundations review of basic course work.

Applicants to this program are required to have a bachelor’s degree in business from a four-year accredited institution
Applications are then due according to admission schedules for that declare their intent to apply for the second degree during their first year. and the Levin College of Law. Current M.B.A. or J.D. students must the joint auspices of the Warrington College of Business Administration of Business Administration and Juris Doctor degrees is offered under MBA./J.D. program:

- post-undergraduate work experience.

**Professional MBA in South Florida:**
- 24 month, five term program and students attend classes once every three weeks (Saturday-Sunday) at the UF MBA Sunrise Center in Sunrise, Florida.
- Program requires and includes a one-week three credit international experience.

**Online**
- Online Two-Year MBA:
  - 27-month program allows students to earn their MBA through streamed or downloaded class lectures. Students interact with faculty and classmates via e-mail, online group discussions, and multimedia coursework.
  - Students visit campus one weekend (Saturday-Sunday) every four months.
- Online One-Year MBA:
  - 16-month option gives students and faculty the same interactive technology as the Online Two-Year MBA.
  - Students visit campus one weekend (Saturday-Sunday) every four months. The first meeting includes a mandatory five-day, on-campus foundations review of core business concepts.
  - Applicants to this program are required to have a bachelor's degree in business from a four-year accredited institution (conferred within the last seven years) and at least two years of post-undergraduate work experience.

**Full-Time Joint Degree Options**

**M.B.A./M.S. in medical sciences (biotechnology) program:** Concurrent studies leading to the Master of Business Administration and Master of Science degrees, offered in cooperation with the College of Medicine, are in response to the needs of businesses engaged in biotechnological sciences. Both degrees can be obtained in 3 years. The program requires 1 year of science courses, 1 year of business courses, and a year devoted to research and electives in business and science. Research is done in one of the Interdisciplinary Center for Biotechnology Research core laboratories. Students must meet the admission and curriculum requirements of both degrees. Requirements of the M.B.A. program are those in effect when an applicant is admitted to the program. A student must at all times remain in good standing in both degree programs to remain in the M.B.A. program. Applicants are expected to have previous professional work experience prior to starting the M.B.A. program.

**M.B.A./Ph.D. in medical sciences program:** Concurrent studies leading to the Master of Business Administration and Doctor of Philosophy degrees are offered in cooperation with the College of Medicine. This 120-credit program trains research scientists to assume responsibilities as managers of biotechnical industries. Estimated time to complete both degrees is 5 to 7 years. Students must meet the admission and curriculum requirements of both programs. Requirements of the M.B.A. program are those in effect when an applicant is admitted to the program. Applicants are expected to have previous professional work experience prior to starting the M.B.A. program.

**M.B.A./J.D. program:** A program of joint studies leading to the Master of Business Administration and Juris Doctor degrees is offered under the joint auspices of the Warrington College of Business Administration and the Levin College of Law. Current M.B.A. or J.D. students must declare their intent to apply for the second degree during their first year. Applications are then due according to admission schedules for that year. Both degrees are awarded after a 4-year course of study. Students must take both the LSAT and the GMAT before admission and meet the admission and curriculum requirements of both degrees. Requirements of the M.B.A. program are those in effect when an applicant is admitted to the program. Applicants are expected to have previous professional work experience prior to starting the M.B.A. program.

**M.B.A./Pharm.D. program in management and pharmacy administration:** A program of concurrent studies culminating in both the Master of Business Administration and Doctor of Pharmacy degrees allows students interested in both management and pharmacy administration to obtain the appropriate education in both areas. Candidates must meet the entrance requirements and follow the entrance procedures of both the Warrington College of Business Administration and the College of Pharmacy. The degrees may be granted after 5 years of study. Requirements of the M.B.A. program are those in effect when an applicant is admitted to the program. Applicants are expected to have previous professional work experience prior to starting the MBA program.

**M.B.A./M.I.M. program in international management:** A dual degree program between the University of Florida (UF) and the American Graduate School of International Management (Thunderbird) makes it possible to earn both degrees after 3 years of study. Students start the program at UF and apply to Thunderbird in their first year. Requirements of the M.B.A. program are those in effect when an applicant is admitted to the program. This program requires 2 years of post-undergraduate work experience.

**Exchange programs:** The M.B.A. program offers students exchange opportunities at numerous international universities. Currently, exchange programs exist with schools in Australia, Belgium, Brazil, Chile, China, Canada, Denmark, England, Finland, France, Germany, Italy, Japan, Korea, Liechtenstein, the Netherlands, Norway, Poland, Spain, Sweden, Taiwan, Thailand, and Turkey. For a complete list of exchange partners, see http://warrington.ufl.edu/graduate/academics/maib/exchange.asp.

### Degrees Offered

**Degrees Offered with a Major in Business Administration**

- Master of Business Administration
  - without a concentration
  - concentration in Business Analytics
  - concentration in Competitive Strategy
  - concentration in Finance
  - concentration in Human Capital
  - concentration in Marketing
  - concentration in Real Estate
  - concentration in Supply Chain Management

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

**Accounting Departmental Courses**

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<td>BUL 5811</td>
<td>Law, Ethics, and Organizations</td>
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<td>BUL 5832</td>
<td>Commercial Law for Accountants</td>
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<td>BUL 6441</td>
<td>Business Ethics and Corporate Social Responsibility</td>
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<td>BUL 6516</td>
<td>Law of Real Estate Transactions</td>
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<td>BUL 6656</td>
<td>Law for Entrepreneurs</td>
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<td>BUL 6841</td>
<td>Employment Law</td>
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<td>BUL 6852</td>
<td>International Business Law</td>
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<td>BUL 6905</td>
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<td>Venture Analysis</td>
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<td>Business Plan Formation</td>
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<td>ENT 6416</td>
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<td>ENT 6506</td>
<td>Social Entrepreneurship</td>
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<td>Creativity in Entrepreneurship</td>
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<td>ENT 6706</td>
<td>Global Entrepreneurship</td>
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<td>Individual Work in Entrepreneurship</td>
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<td>ENT 6930</td>
<td>Special Topics</td>
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<td>ENT 6933</td>
<td>Entrepreneurship Lecture Series</td>
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<td>ENT 6946</td>
<td>Entrepreneurial Consulting Project</td>
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<td>ENT 6950</td>
<td>Integrated Technology Ventures</td>
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<td>ENT 7932</td>
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<td>Managing Groups and Teams</td>
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<td>MAN 6149</td>
<td>Developing Leadership Skills</td>
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<td>Power and Politics in Organizations</td>
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<td>MAN 6266</td>
<td>Managing Groups and Teams in Organizations</td>
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<td>MAN 6331</td>
<td>Compensation in Organizations</td>
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<td>MAN 6357</td>
<td>Organizational Staffing</td>
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<td>MAN 6446</td>
<td>Negotiations</td>
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<td>MAN 6447</td>
<td>Art and Science of Negotiation</td>
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<td>MAN 6635</td>
<td>International Aspects of Human Resource Management</td>
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<td>MAN 6910</td>
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<td>MAN 6930</td>
<td>Special Topics</td>
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### Marketing Departmental Courses

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<td>MAR 5806</td>
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<tr>
<td>MAR 6157</td>
<td>International Marketing</td>
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<tr>
<td>MAR 6237</td>
<td>The Art and Science of Pricing</td>
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<td>MAR 6256</td>
<td>Strategy and Tactics of Pricing</td>
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<tr>
<td>MAR 6335</td>
<td>Building and Managing Brand Equity</td>
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<td>MAR 6456</td>
<td>Business-to-Business Marketing</td>
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<td>MAR 6479</td>
<td>Professional Selling</td>
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<td>MAR 6507</td>
<td>Customer Insights and Analysis</td>
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<td>Customer Analysis</td>
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<td>MAR 6601</td>
<td>Entrepreneurial Marketing I</td>
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<td>MAR 6602</td>
<td>Entrepreneurial Marketing II</td>
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<td>MAR 6646</td>
<td>Marketing Research for Managerial Decision Making</td>
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<td>MAR 6648</td>
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<td>MAR 6722</td>
<td>Web-Based Marketing</td>
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<td>MAR 6816</td>
<td>Advanced Marketing Management (MBA)</td>
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<td>MAR 6818</td>
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<td>MAR 6833</td>
<td>Product Development and Management</td>
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<td>MAR 6834</td>
<td>Marketing of Science and Technology</td>
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<td>MAR 6837</td>
<td>Consumer-Centered Product Design</td>
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<td>MAR 6838</td>
<td>Brand Management</td>
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<td>MAR 6839</td>
<td>Product Development and Management</td>
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<td>MAR 6861</td>
<td>Customer Relationship Management</td>
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<td>MAR 6862</td>
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<td>MAR 6905</td>
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<td>MAR 6910</td>
<td>Supervised Research</td>
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<td>MAR 6930</td>
<td>Special Topics in Marketing</td>
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<td>MAR 6940</td>
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<td>MAR 6957</td>
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<td>MAR 6971</td>
<td>Research for Master’s Thesis</td>
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<td>MAR 7507</td>
<td>Perspectives on Consumer Behavior</td>
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<td>MAR 7588</td>
<td>Consumer Information Processing and Decision Making</td>
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<td>MAR 7589</td>
<td>Judgment and Decision Making</td>
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<td>MAR 7626</td>
<td>Multivariate Statistical Methods in Marketing</td>
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<td>MAR 7636</td>
<td>Research Methods in Marketing</td>
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<td>MAR 7666</td>
<td>Marketing Decision Models</td>
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<td>MAR 7786</td>
<td>Marketing Literature</td>
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<td>MAR 7925</td>
<td>Workshop in Marketing Research</td>
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<td>MAR 7979</td>
<td>Advanced Research</td>
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<td>MAR 7980</td>
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### Warrington College of Business Courses

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<td>GEB 5212</td>
<td>Professional Writing in Business</td>
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<td>GEB 5215</td>
<td>Professional Communication in Business</td>
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<td>GEB 5225</td>
<td>Advanced Business Writing</td>
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<td>GEB 5929</td>
<td>Foundations Review</td>
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<td>GEB 6229</td>
<td>Professional Communication for Accountants</td>
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<td>GEB 6365</td>
<td>International Business</td>
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<td>GEB 6941</td>
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<td>GEB 6957</td>
<td>International Studies in Business</td>
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### Student Learning Outcomes

#### Business administration (MBA)

**SLO 1** Knowledge
Interpret the essential elements of core business principles to examine and evaluate problems and to construct and implement solutions in the business environment.

**SLO 2** Skills
Identify core leadership skills to examine and evaluate problems, choose from and generate alternative solutions, for the purpose of affecting organizational change or influencing others.

**SLO 3** Skills
Interpret the appropriate analytical models and examine critical reasoning processes to evaluate evidence, select among alternatives, and generate creative options in furtherance of effective decision making.

**SLO 4** Professional Behavior
Write business documents clearly, concisely, and analytically.

**SLO 5** Professional Behavior
Speak in groups and in public clearly, concisely, and analytically, with appropriate use of visual aids.

### Business Administration (M.S.)

#### Program Information

Specialized Masters of Sciences degrees offered are:

- Master of Science in Information Systems and Operations Management (p. 172)
- Master of Science in Entrepreneurship (p. 160)
- Master of Science in Finance (p. 161)
- Master of Science in Management (p. 181)
- Master of Science in Real Estate (p. 162)
Degrees Offered

Degrees Offered with a Major in Business Administration

- Master of Science
  - without a concentration
  - concentration in Retailing

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Accounting Departmental Courses

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<td>Controllership</td>
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<td>Issues in Audit Practice</td>
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<td>Forensic Accounting</td>
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Finance, Insurance, and Real Estate Departmental Courses

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### Information Systems and Operations Management Departmental Courses

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<td>Systems Analysis and Design</td>
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<td>Business Database Systems I</td>
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<td>Business Telecom Strategy and Applications I</td>
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### Management Departmental Courses

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<td>Commercial Law for Accountants</td>
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<td>Law for Entrepreneurs</td>
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<td>BUL 6841</td>
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<td>Creativity in Entrepreneurship</td>
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<td>ENT 6706</td>
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<td>Special Topics</td>
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MAR 6601  Entrepreneurial Marketing I  2
MAR 6646  Marketing Research for Managerial Decision Making  3
MAR 6648  Marketing Research for Managerial Decision Making  2
MAR 6722  Web-Based Marketing  2
MAR 6816  Advanced Marketing Management (MBA)  3
MAR 6818  Advanced Marketing Management  2
MAR 6833  Product Development and Management  2
MAR 6834  Marketing of Science and Technology  2
MAR 6835  Marketing of Science and Technology  3
MAR 6837  Consumer-Centered Product Design  3
MAR 6838  Brand Management  3
MAR 6839  Product Development and Management  3
MAR 6861  Customer Relationship Management  2
MAR 6862  Customer Relationship Management  3
MAR 6905  Individual Work  1-4
MAR 6910  Supervised Research  1-5
MAR 6930  Special Topics in Marketing  1-4
MAR 6940  Supervised Teaching  1-5
MAR 6957  International Studies in Marketing  1-4
MAR 6971  Research for Master’s Thesis  1-15
MAR 7507  Perspectives on Consumer Behavior  3
MAR 7588  Consumer Information Processing and Decision Making  3
Warrington College of Business Courses

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<td>Advanced Business Writing</td>
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<td>Foundations Review</td>
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<td>Professional Communication for Accountants</td>
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Business Administration (Ph.D.)

Program Information

For the Ph.D. in Business Administration, students must have a concentration in one of the following:

- Accounting (p. 165)
- Finance (p. 157)
- Information Systems and Operation Management (p. 169)
- Insurance (p. 157)
- Management (p. 175)
• Quantitative Finance (p. 157)
• Marketing (p. 186)
• Real Estate and Urban Analysis (p. 157)

Minimum requirements for the various departments and specialties are given in the Graduate Degrees (p. 48) section in this catalog.

All candidates for the Ph.D. in business administration must satisfy the following general requirements:

**Breadth requirement:** All applicants for Ph.D. in the business administration program are expected to have completed prior business-related course work at either the advanced undergraduate or graduate level. Students entering without prior work are required to take a minimum of three graduate courses in at least two fields other than their chosen area of concentration. Most often, the appropriate courses will be found in the M.B.A. first-year core; the particular courses to be taken by a student will be decided in consultation with the student’s academic adviser. After a student enters the Ph.D. program, the courses taken to satisfy the breadth requirement must be taken in the College of Business Administration.

**Research foundations requirement:** All students must complete a six-course research skills sequence that prepares them for scholarly research in their chosen area of concentration. Research foundations are defined as essential methodological tools (e.g., statistics, quantitative analysis) and/or substantive content domains (e.g., psychology, economics) outside the student’s major field that are considered essential to conducting high quality research in the chosen field. The specific research skills required by each area of concentration can be found in the field descriptions in this Catalog.

**Other requirements** include satisfactory completion of graduate course work in the major field of concentration, as well as one or two minor fields designed to add depth to the student’s research training. Minors are selected by the student in consultation with his or her advisory committee, and may be within or outside the College of Business Administration.

For more information, please see the links above and our website: http://warrington.ufl.edu/graduate/academics (http://warrington.ufl.edu/graduate/academics/).

**Degrees Offered**

**Degrees Offered with a Major in Business Administration**

- Doctor of Philosophy

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

### Accounting Departmental Courses

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**Finance, Insurance, and Real Estate Departmental Courses**

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<td>Finance I: Asset Valuation, Risk, and Return</td>
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<td>Personal Financial Management</td>
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<td>Money and Capital Markets</td>
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<td>Capitalism</td>
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<td>FIN 6306</td>
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<td>Measuring and Managing Value</td>
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<td>FIN 6489</td>
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<td>FIN 6496</td>
<td>Mergers &amp; Acquisitions</td>
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<td>FIN 6518</td>
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<td>Portfolio Theory</td>
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<td>Asset Allocation and Investment Strategy</td>
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<td>Fixed Income Security Valuation</td>
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For more information, please see the links above and our website: http://warrington.ufl.edu/graduate/academics (http://warrington.ufl.edu/graduate/academics/).
Information Systems and Operations Management Departmental Courses

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<td>Advanced Business Systems Design and</td>
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<td>Business Telecom Strategy and Applications</td>
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<td>Production Management Problems</td>
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<td>Principles of Logistics/Transportation</td>
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<td>Decision Processes Under Uncertainty</td>
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<td>Business Process Analysis</td>
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<td>Quality Management and Control Systems</td>
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<td>QMB 6697</td>
<td>Optimization in Simulation Modeling</td>
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<td>QMB 6755</td>
<td>Managerial Quantitative Analysis I</td>
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Management Departmental Courses

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Marketing Departmental Courses

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<td>MAR 6157</td>
<td>International Marketing</td>
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<td>MAR 6237</td>
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<td>MAR 6256</td>
<td>Strategy and Tactics of Pricing</td>
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<td>MAR 6335</td>
<td>Building and Managing Brand Equity</td>
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<td>MAR 6456</td>
<td>Business-to-Business Marketing</td>
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<td>Customer Insights and Analysis</td>
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Warrington College of Business Courses

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<td>GEB 5929</td>
<td>Foundations Review</td>
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<td>GEB 6229</td>
<td>Professional Communication for Accountants</td>
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<td>International Business</td>
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Student Learning Outcomes

Business Administration

2017-18 PhD SLO 1 Knowledge
Manage the technical tools (theory, methodology, statistical analyses, and reporting norms) essential to the departmental area of study.

2017-18 PhD SLO 2 Skills
Interpret with technical tools to create new knowledge through original research.

2017-18 PhD SLO 3 Professional Behavior
Communicate specialized information from a field of expertise verbally and in writing.

2017-18 PhD SLO 4 Professional Behavior
Communicate specialized information from a field of expertise verbally at an educated layman or university undergraduate student level.

College of Dentistry

Dean: Isabel Garcia
Associate Dean & Director: Roberta Pileggi

Advanced education has progressed over the years to be an integral component of the College of Dentistry, growing from six certificate residency programs, with an enrollment of only 36 students in 1979, to fourteen certificate programs and various fellowship programs. Enrollment is now over 140. In 1993, the college started master degree programs in endodontics, orthodontics, periodontics and prosthodontics, and continues today to grow.

Follow this link for more information about UF’s College of Dentistry graduate programs: http://admissions.dental.ufl.edu/advanced-graduate-programs/programs-application-process/ (http://dental.ufl.edu/admissions/)

Departments

- Dental Sciences (p. 204)
- Dental Sciences (p. 205)

Faculty

Professor
- Aukhil, Ikramuddin
- Bhattacharyya, Indraneel
- Catalanotto, Frank Alfred
- Caudle, Robert M.
- Cha, Seunghee
- Clark, Arthur E.
- Cohen, Donald M.
- Culp, David J.
- Dolce, Calogero
- Gordan, Valeria Veiga
- Guelmann, Marcio
- Katz, Joseph
- Nimmo, Joseph
- Riley, Joseph Leo
- Roulet, Jean-Francois

Associate Professor
- Esquivel-Upshaw, Josephine F.
- Neubert, John K.
- Wallet, Shannon Margaret

Assistant Professor
- Papp, Bernadett

Distinguished Professor
- Fillingim, Roger Benton

Research Assistant Professor
- Shields, Robert Colquhoun

Affiliated Faculty

- Abranches, Jacqueline
- Ahn, Sang-Joon
- Brady, Linda J.
- Burne, Robert Arthur
- Chang, Jia
- Cooper, Brian Y.
- Davey, Mary Ellen
- Delgado, Alejandro
- Diamond, Gill
- Dias Ribeiro, Ana Paula

Clinical Associate Professor

- Clinical Assistant Professor
The College of Dentistry offers the Master of Science degree in dental sciences with concentrations in endodontics, orthodontics, periodontics, and prosthodontics. These concentrations include a minimum of 38 hours of appropriate course work and research in topics relevant to each specialization. Requirements for the master’s degree include:

- Satisfactory completion of all course work
- Meeting the requirements for clinical certification in the respective dental specialty
- Thesis or project based on research.

Prerequisites for admission, in addition to those of the Graduate School, include:

- D.D.S. or D.M.D. degree
- Completion of Parts I and II of the American Dental Association’s National Board of Dental Examinations.

The application deadline for Endodontics, Periodontics, and Prosthodontics is August 1
The application deadline of Orthodontics is September 2

Send applications to:
Master of Science Program,
College of Dentistry,
P.O. Box 100402,
Health Science Center,
University of Florida,
Gainesville, FL 32610-0402

Requirements for the M.S. degree are provided in the Graduate Degrees (p. 48) section of this catalog.

For further information, see the Dental Science program link below.

Majors
- Dental Sciences (p. 205)

Faculty

Professor
- Aukhil, Ikramuddin
- Bhattacharyya, Indraneel
- Catalanotto, Frank Alfred
- Caudle, Robert M.
- Cha, Seunghee
- Clark, Arthur E.
- Cohen, Donald M.
- Culp, David J.
- Dolce, Calogero
- Gordan, Valeria Veiga
- Guelmann, Marcio
- Katz, Joseph
- Nimmo, Arthur
- Riley, Joseph Leo
- Roulet, Jean-Francois
Dental Sciences

Program Information

The College of Dentistry offers the Master of Science degree in dental sciences with concentrations in endodontics, orthodontics, periodontics, and prosthodontics. These concentrations include a minimum of 38 hours of appropriate course work and research in topics relevant to each specialization. Requirements for the master's degree include

- Satisfactory completion of all course work
- Meeting the requirements for clinical certification in the respective dental specialty
- Thesis or project based on research.

Prerequisites for admission, in addition to those of the Graduate School, include

- D.D.S. or D.M.D. degree
- Completion of Parts I and II of the American Dental Association's National Board of Dental Examinations according to individual program requirements.

Application deadlines for these programs can be found on the webpage http://admissions.dental.ufl.edu/advanced-graduate-programs/programs-application-process/

Send applications to:

Master of Science Program
College of Dentistry
P.O. Box 100402
Degrees Offered

Degrees Offered with a Major in Dental Sciences

- Master of Science
  - without a concentration
  - concentration in Endodontics
  - concentration in Orthodontics
  - concentration in Periodontics
  - concentration in Prosthodontics
  - concentration in Operative and Esthetic Dentistry

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Dental Sciences General Courses

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>DEN 6674</td>
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<td>DEN 6675</td>
<td>Craniofacial Pain</td>
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<td>DEN 6678</td>
<td>Advanced Oral Medicine and Drug Interactions in Dentistry</td>
<td>1</td>
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<tr>
<td>DEN 6679</td>
<td>Advanced Radiology and Interpretation</td>
<td>1</td>
</tr>
<tr>
<td>DEN 6905</td>
<td>Individual Study</td>
<td>1-6</td>
</tr>
<tr>
<td>DEN 6910</td>
<td>Supervised Research</td>
<td>1-5</td>
</tr>
<tr>
<td>DEN 6934</td>
<td>Special Topics in Dentistry</td>
<td>1-3</td>
</tr>
<tr>
<td>DEN 6935</td>
<td>Special Topics in Dentistry</td>
<td>1-6</td>
</tr>
<tr>
<td>DEN 6936</td>
<td>Practice Management</td>
<td>1</td>
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<td>DEN 6940</td>
<td>Supervised Teaching</td>
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</tr>
<tr>
<td>DEN 6941</td>
<td>Clinical Teaching in Dentistry</td>
<td>1</td>
</tr>
<tr>
<td>DEN 6942</td>
<td>Grand Rounds</td>
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</tr>
<tr>
<td>DEN 6971</td>
<td>Research for Master’s Thesis</td>
<td>1-6</td>
</tr>
<tr>
<td>DEN 6973</td>
<td>Project in Lieu of Thesis</td>
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</table>

Endodontics Courses

<table>
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<tbody>
<tr>
<td>DEN 6642</td>
<td>Introduction to Advanced Endodontics</td>
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<tr>
<td>DEN 6644</td>
<td>Nonsurgical Endodontic Care I</td>
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<tr>
<td>DEN 6645</td>
<td>Nonsurgical Endodontic Care II</td>
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Orthodontics Courses

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<tr>
<td>DEN 6602</td>
<td>Orthodontic Treatment?Appliance Management and Effect of Treatment Part 1: Class I Treatment</td>
<td>1</td>
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<tr>
<td>DEN 6603</td>
<td>Orthodontic Treatment?Appliance Management and Effect of Treatment Part 2: Class II Treatment</td>
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<tr>
<td>DEN 6604</td>
<td>Appliance Mgmt and Effect of Orthodontic Treatment Part 3: Class II and Overbite Treatments</td>
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Prosthodontics Courses

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<tr>
<td>DEN 6605</td>
<td>Appliance Mgmt and Effect of Orthodontic Treatment Part 4: Class II and Overbite Treatments</td>
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</tr>
<tr>
<td>DEN 6606</td>
<td>Appliance Mgmt and Effect of Orthodontic Treatment Part 5: Class III and Crossbite Tmts, Soft Tissue</td>
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<tr>
<td>DEN 6607</td>
<td>Appliance Mgmt and Effect of Orthodontic Treatment Part 6: Impactions, Transplantations, and Stability</td>
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Periodontics Courses

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<tr>
<td>DEN 6652</td>
<td>Review of Periodontics Literature I</td>
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<tr>
<td>DEN 6654</td>
<td>Review of Periodontics Literature III</td>
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<tr>
<td>DEN 6655</td>
<td>Review of Periodontics Literature IV</td>
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<tr>
<td>DEN 6656</td>
<td>Introduction to Advanced Periodontology</td>
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<tr>
<td>DEN 6657</td>
<td>Periodontal Histology and Histopathology</td>
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</tr>
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<td>DEN 6658</td>
<td>Treatment Planning in Periodontal Therapy</td>
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College of Dentistry Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>DEN 6905</td>
<td>Individual Study</td>
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<tr>
<td>DEN 6910</td>
<td>Supervised Research</td>
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<tr>
<td>DEN 6934</td>
<td>Special Topics in Dentistry</td>
<td>1-3</td>
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<td>DEN 6935</td>
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<tr>
<td>DEN 6936</td>
<td>Practice Management</td>
<td>1</td>
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<tr>
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<td>DEN 6942</td>
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</tr>
<tr>
<td>DEN 6973</td>
<td>Project in Lieu of Thesis</td>
<td>1-9</td>
</tr>
</tbody>
</table>

Student Learning Outcomes

Dental Sciences (MS)

SLO 1 Knowledge
Describe and show didactic and scientific proficiency in their specialty as required by each specific Advanced Graduate Education standards

SLO 2 Skills
Develop and apply clinical skills based on evidence based practice and scientific literature

SLO 3 Professional Behavior
Connect and align standards for professional behavior

College of Design, Construction, and Planning

Dean: Chimay Anumba

DCP is home to five independent professional disciplines: architecture, construction management, interior design, landscape architecture and urban and regional planning. The college also is home to an interdisciplinary program in historic preservation, which allows graduate students to gain expertise in research and application of historic preservation in the United States and abroad.

Accreditation and Degrees

The academic programs in the college have an accreditation process from the professional organizations of each discipline.

- Architecture – National Architectural Accrediting Board
- Construction Management – American Council for Construction Education
- Interior Design – Foundation for Interior Design Education Research
- Landscape Architecture – American Society of Landscape Architects
- Urban and Regional Planning – Planning Accreditation Board

DCP offers both undergraduate and graduate degrees and programs. Through its academic units, the college offers doctoral, master’s, and bachelor’s degrees, as well as distance education programs, combined degrees, joint degrees, certificate programs, and academic minors.

College Institutes, Centers and Programs

Research and service projects conducted through the research centers and institutes often entail multidisciplinary, cross-campus student input and effort. Each division of the college is involved in on-going projects that advance both scholarly study and professional practice. The college contributes to community, state, regional and national efforts to conserve and improve the quality of the natural and built environments through its research centers. The college’s teaching and research programs have national and international prominence.

For more information, please see our website: http://www.dcp.ufl.edu.

(http://www.dcp.ufl.edu)

Faculty

Interior Design Department

Chair: M. Portillo
Graduate Coordinator: N. Park

Doctor of Philosophy:

The College offers an interdisciplinary program leading to the Doctor of Philosophy degree in design, construction, and planning. Areas of specialization within this program include architecture, building construction, interior design, landscape architecture, and urban and regional planning. For information, write to

The Ph.D. Director
College of Design, Construction, and Planning Doctoral Program
331 ARCH, P.O. Box 115701.

Master of Interior Design:

The Master of Interior Design (M.I.D.) provides opportunities for students to direct their attention toward a variety of topics, including

- Design pedagogy and processes
- Sustainable, healthy, safe, and secure environments
- Creative performance and innovation
- Built heritage conservation

Regardless of the study emphasis selected by the student, the M.I.D. program has a central focus with three categories of course work:

- Design studio
- Seminars in current interior design topics
- Theories and methods of research.

All M.I.D. students must complete an approved research topic with a written thesis. Requirements for the M.I.D. and Ph.D. degrees are given in the General Information section of this catalog.

Applications:

All applications must include acceptable GRE scores, transcripts for all previous academic work, and if the applicant’s native language is not English, a satisfactory score on one of the following: TOEFL (Test of English as a Foreign Language: computer=213, paper=550, web=80), IELTS (International English Language Testing System: 6), MELAB (Michigan English Language Assessment Battery: 77), or successful completion of the UF English Language Institute. This information must be received in the Office of the Registrar by February 2. In addition to satisfying University requirements for admission, the applicants are required to submit to the Department of Interior Design the following:

- A portfolio of your design work (if you received a design-based degree). The portfolio should be emailed to the department as a pdf to mmatckie@dcp.ufl.edu or sent via WeTransfer as a pdf to mmatckie@dcp.ufl.edu.
- A written essay on your goals and aspirations related to graduate studies; attach to your application or email to mmatckie@dcp.ufl.edu.

Departments

- Interior Design (p. 207)
- Interior Design (p. 208)
- Landscape Architecture (p. 209)
- Landscape Architecture (p. 211)
- M.E. Rinker, Sr. School of Construction Management (p. 212)
- Construction Management (p. 213)
- Fire and Emergency Sciences (p. 215)
- International Construction Management (p. 217)
- Sustainable Construction (p. 218)
- School of Architecture (p. 220)
- Architecture (p. 221)
- Urban and Regional Planning (p. 223)
- Urban and Regional Planning (p. 224)
- Interdisciplinary (p. 226)
- Design, Construction, and Planning (Ph.D.) (p. 226)
- Historic Preservation (p. 228)
experience as a practicing designer, architect, or other professional.

Estimates of the number of credit hours and length of study time may be adjusted based on the individual student's previous preparation including experience as a practicing designer, architect, or other professional.

There are four options.

- For students enrolled in the Bachelor of Interior Design program at the University of Florida may apply to the M.I.D. program during their junior year by applying for a Combined Degree (see below).

The Department reserves the right to retain student course work for the purposes of record, exhibition, or instruction. Field trips are required for all students; students should plan to have adequate funds available.

Admission: Applications are processed through February 2 for fall term and all applicants are encouraged to apply as soon as possible. Admission decisions are made between February and the end of April. All new students begin their studies in the fall to coincide with curriculum sequencing.

Graduate course requirements according to background: After assessment of previous design work, leveling courses may be required to prepare the student for the M.I.D. 36 hours of graduate course work. Therefore, each student entering the Master of Interior Design program works with the graduate coordinator to evaluate the student's unique background to determine the specific courses needed to facilitate interest and experience. Estimated credit hours and length of study time vary according to each student's individual baccalaureate degree and experience.

There are four options.

- For students enrolled in the Bachelor of Design program at the University of Florida, 12 hours of graduate-level course work in the senior year can be counted for both the undergraduate and the M.I.D. degrees. An additional 24 graduate credit hours are required. Expect at least 1 additional year to complete the M.I.D. (Combined Degree form found on the Graduate School site)

- For students who graduated from a Council of Interior Design Accreditation (CIDA) accredited first professional degree program within an architectural framework, the course of study is estimated to be 36 graduate credit hours. Expect 2 years to complete the M.I.D.

- For students who graduated from a design-related (architecture or interior design) baccalaureate degree program, the course of study is estimated to be a maximum of 59 graduate credit hours (includes the 36-hour M.I.D.). Expect 3 years to complete leveling courses and the master's degree.

- For students with a bachelor's degree in a field other than design, the course of study is estimated to be 93 undergraduate and graduate credit hours. Expect 3 to 4 years to complete leveling courses and the M.I.D.

Program requirements: After leveling courses are completed and with approval by the graduate coordinator and supervisory committee chair, a student completes 24 hours of departmentally approved graduate work in the Department of Interior Design. In addition, with the graduate coordinator’s approval, the student is required to take 3 hours of course work in graduate statistics and 9 hours of multidisciplinary graduate electives that reinforce and extend the research.

Courses from such academic units as Psychology, Anthropology, Sociology, Engineering, Education, and Business Administration provide possible electives. The College of Design, Construction and Planning offers the Certificate in Historic Preservation. If the focus of a student is the renovation and preservation of built environments, then historic preservation courses leading to a certificate would strengthen the research and design effort. Likewise, existing appropriate courses in Architecture, Landscape Architecture, Urban and Regional Planning, and Building Construction offer both collaborative study and research opportunities for M.I.D students.

Each student must select a two-member supervisory committee to guide course selection and to guide thesis selection, study, and production.

Program requirements: After leveling courses are completed and with approval by the graduate coordinator and supervisory committee chair, a student completes 24 hours of departmentally approved graduate work in the Department of Interior Design. In addition, with the graduate coordinator’s approval, the student is required to take 3 hours of course work in graduate statistics and 9 hours of multidisciplinary graduate electives that reinforce and extend the research.

Courses from such academic units as Psychology, Anthropology, Sociology, Engineering, Education, and Business Administration provide possible electives. The College of Design, Construction and Planning offers the Certificate in Historic Preservation. If the focus of a student is the renovation and preservation of built environments, then historic preservation courses leading to a certificate would strengthen the research and design effort. Likewise, existing appropriate courses in Architecture, Landscape Architecture, Urban and Regional Planning, and Building Construction offer both collaborative study and research opportunities for M.I.D students.

Each student must select a two-member supervisory committee to guide course selection and to guide thesis selection, study, and production.

Majors

- Interior Design (p. 208)

Faculty

Professor

- Portillo, Margaret B.
- Rengel Chardon, Roberto

Associate Professor

- Meneely, Jason
- Park, Nam-Kyu

Assistant Professor

- Cunningham, Erin K.
- Valipoor, Shabboo

Lecturer

- Carmel-Gilfillen, Candy N.

Affiliated Faculty

- Bosch, Sheila Jones
- Platt, Lisa Sundahl

Assistant Professor

- Portillo, Margaret B.
- Rengel Chardon, Roberto

Associate Professor

- Meneely, Jason
- Park, Nam-Kyu

Assistant Professor

- Cunningham, Erin K.
- Valipoor, Shabboo

Lecturer

- Carmel-Gilfillen, Candy N.

Affiliated Faculty

- Bosch, Sheila Jones
- Platt, Lisa Sundahl

Assistant Professor

- Portillo, Margaret B.
- Rengel Chardon, Roberto

Associate Professor

- Meneely, Jason
- Park, Nam-Kyu

Assistant Professor

- Cunningham, Erin K.
- Valipoor, Shabboo

Lecturer

- Carmel-Gilfillen, Candy N.
• Aid design and problem-solving skills to achieve excellence in the design of interiors
• Enable students to propose and conduct research that adds to the body of knowledge in the field, building on previous research findings
• Explore a specialized area of interest and expertise

MID graduate students can join practices within interior design and architecture firms or other specialized fields; can achieve advanced study in areas of specialization often of interest to contract public interior design firms; have the opportunity to pursue entry-level teaching positions within interior design programs; can enter Ph.D. Programs for advanced research specialization(s) in interior design or related design disciplines; and are offered the opportunity to disseminate knowledge through publications, conferences, teaching, and collaboration with various professionals in related fields.

For more information, visit https://dcp.ufl.edu/interior/academics-
paths/ degrees

Degrees Offered with a Major in Interior Design

• Master of Interior Design
  • without a concentration
  • concentration in Historic Preservation
  • concentration in Sustainable Design

Requirements for these degrees are given in the Graduate Degrees section of this catalog.

Courses

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<tr>
<td>IND 5106</td>
<td>History of Interior Design I</td>
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<tr>
<td>IND 5136</td>
<td>History of Interior Design II</td>
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</tr>
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<td>IND 5212C</td>
<td>Architectural Interiors I</td>
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<td>IND 5227C</td>
<td>Advanced Architectural Interiors I</td>
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<td>IND 5231C</td>
<td>Architectural Interiors II</td>
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<td>IND 5326</td>
<td>Color Theory Planning and Practice</td>
<td>3</td>
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<tr>
<td>IND 5427C</td>
<td>Interior Design Construction Documents</td>
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<td>IND 5434C</td>
<td>Interior Lighting</td>
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<td>IND 5454C</td>
<td>Advanced Interior Design Detailing and Construction Documents</td>
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<td>IND 5466</td>
<td>Interior Environmental Technology</td>
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<td>IND 5508</td>
<td>Business and Professional Practices for Interior Designers</td>
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<td>IND 5633</td>
<td>Readings in Design Studies</td>
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<td>IND 5638</td>
<td>Design Environments and Human Interaction</td>
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<td>IND 5937</td>
<td>Current Topics in Interior Design</td>
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<td>IND 6639</td>
<td>Methods of Interior Design Research</td>
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</tr>
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<td>IND 6906</td>
<td>Independent Studies and Readings</td>
<td>1-3</td>
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<td>IND 6939</td>
<td>Creativity Applied</td>
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<td>Supervised Teaching</td>
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<td>Interior Design Internship</td>
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<tr>
<td>IND 6971</td>
<td>Research for Master's Thesis</td>
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Student Learning Outcomes

Interior Design (MID)

SLO 1 Knowledge
Illustrate an understanding of a specialized topic within the knowledge base of Interior Design

SLO 2 Skills
Identify, formulate, test and analyze research questions in interior design

SLO 3 Professional Behavior
Engage in field experience

Landscape Architecture Department

Chair: Tina Gurucharri
Graduate Coordinator: Dan Manley

The mission of the Department of Landscape Architecture is to conduct research to enhance the understanding and practice of the profession of landscape architecture, and address societal challenges; train practitioners and scholars who are committed to advancing the efficacy, impact and knowledge of the discipline of landscape architecture; and provide service to the diverse communities of our state, region and abroad. The Master of Landscape Architecture seeks excellence through professional practice and service, and through research and scholarly pursuit.
The department offers a combined bachelor's/master's degree program with the Bachelor of Sustainability and the Built Environment. The department also offers a combined bachelor/master degree program for current UF landscape architecture undergraduate students who intend to complete a graduate landscape architecture degree at UF. Please contact a College of Design, Construction and Planning Advisor and/or Graduate Coordinator for the Department of Landscape Architecture to learn more and for information about application procedures for both combined degree programs.

Interstate field trips are required as a part of the normal program curriculum. Students should plan to have adequate funds for field trips, studio materials, and use of the Infinity Fab Lab. Students are also required to own a laptop computer meeting minimum department requirements. These specifications are available through the Department of Landscape Architecture's website at URL: http://www.dcp.ufl.edu/landscape (http://www.dcp.ufl.edu/landscape/).

The graduate program in landscape architecture offers flexibility in meeting the needs of applicants with varied backgrounds. Students entering the graduate program in landscape architecture follow one of the four following tracks:

First Professional MLA Program

Graduate students who do not possess an LAAB accredited professional degree in landscape architecture are invited to enroll in the First Professional MLA program.

The First Professional MLA Program aids the development of basic analytical, design and graphic skills. Upon successful completion of the First Professional Summer term, students advance into a two-semester sequence of articulation courses that provide a foundation of applied landscape design and planning theory as well as competencies in landscape construction.

MLA Advanced Graduate Studies Program

Graduate students having completed the summer and first year of the First Professional program or entering the MLA program with an LAAB accredited professional baccalaureate degree in landscape architecture commence a two-year program of advanced graduate coursework towards the completion of the MLA degree.

Graduate students with a non-accredited or non-LAAB accredited degree in landscape architecture may be required to take additional coursework beyond the two-year program of advanced graduate coursework to develop core competencies required for advanced graduate study.

MLA Research Degree

Graduate students with an LAAB accredited professional degree in landscape architecture and a significant history of achievement in professional practice may tailor a program of advanced study to meet their specific needs.

The normal tenure of advanced graduate study is five semesters which includes a summer semester internship. Students complete a minimum of 52 credit hours composed of lecture courses, seminars, design and construction studios, internship and individual study (special studies, supervised research and thesis or terminal project).

This time period would be extended should a student elect to expand the course work or seek a concurrent degree in a related field.

Design studios: Graduate design studios build on required lecture and seminar courses. A core of three advanced design studios are topically-oriented focusing on issues of human, ecological and regional concern. Each studio requires students to engage a method appropriate to the studio's selected projects, to analyze the findings generated by this research and to use the findings to build a rational argument that leads to a defensible design position. Interdisciplinary and multidisciplinary collaborations are encouraged on both a formal and an informal basis. Graduate studio projects also deal with current issues related to the mission of the Department with an additional focus on research and community service.

Thesis or terminal project: The Department recognizes that students have different professional goals and personal strengths and interests. A thesis is appropriate for students interested in further research or teaching, or in pursuing advanced degrees. A project (with a significant research component) is appropriate for students interested in design or project-oriented aspects of landscape architecture, or if their specific areas of interest suggest a nontraditional approach.

Programs, centers, and institutes: The College of Design, Construction, and Planning has several research centers and institutes. Please see the College's webpage for more information (https://dcp.ufl.edu/research/centers-institutes/).

Graduate advisement: Students are initially advised by the Graduate Coordinator. He or she has guided the student's application through the acceptance process and is familiar with the student's background and needs. A plan of study is developed that includes required and optional courses. By the end of the second semester of the MLA1 year, each student is required to form a supervisory committee composed of two faculty members. The primary purpose of the graduate committee is to advise the student on educational objectives and the thesis or terminal project course work.

Application Procedure

Details of application procedure are found on the Department of Landscape Architecture's website. Applicants are encouraged to familiarize themselves with the details of the application procedures and the application requirements. Applications will ONLY be considered for the track for which they have been submitted. Make certain you are applying to the correct track based on your background and credentials and the criteria detailed above.

Application Dates

Applications are to be completed and submitted prior to the deadline noted on the Department's website. Unless otherwise noted, applications must be received no later than February 1st. Early applications are encouraged.

Application materials to be submitted online and/or to the Office of the Registrar.

Application materials include the online application form accompanied by official transcripts, Letters of Recommendation, GRE scores, and TOEFL scores (applicants with English as a second language) to:

Office of the Registrar
Admissions Section
Criser Hall
University of Florida
Gainesville, Florida 32611.
In addition, applicants must also submit a letter of intention to the Department of Landscape Architecture.

**Application Portfolio**

All applicants are encouraged to submit a portfolio of creative works. Applicants with a baccalaureate landscape architecture degree or other design affiliated degree are required to submit a portfolio that both exhibits creative work experience and shows evidence of acquired technical proficiencies in, or related to, the practice of landscape architecture.

All portfolio must be digital. PDF is preferred.

**Application Status**

Applications will be processed once all material has been received and must be complete prior to the application deadline. Applicants will be contacted by the program's Academic Assistant if their application is incomplete. Please respond quickly if you have been contacted to increase the chances of your application being considered in the current review period. Only completed applications will be processed for review.

Once the application has been processed for review, applicants will receive written notification of their application status, generally sometime in the middle of March. Please do not contact the department with inquiries of your application status prior to the end of March.

Preparatory courses (see Undergraduate Catalog):

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>LAA 2330</td>
<td>Site Analysis</td>
<td>3</td>
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<tr>
<td>LAA 2360C</td>
<td>Principles of Landscape Architecture</td>
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<td>LAA 2532</td>
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<td>HOS 5117C</td>
<td>Horticultural Plant Morphology and Identification</td>
<td>3</td>
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</table>

**Majors**

- Landscape Architecture (p. 211)

**Faculty**

**Associate Professor**

- Gurucharri, Maria Christina
- Murtha, Timothy M.
- Thompson, Kevin R.

**Assistant Professor**

- Alexakis, Konstantinos
- Nawre, Alpa

**Research Associate Professor**

- Hoctor, Thomas Scott

**Lecturer**

- Kuang, Huiqing
- Manley, Daniel P

**Research Assistant Professor**

- Volk, Michael Ives

**Assistant Scholar**

- Galinski, Andrea Rene

**Affiliated Faculty**

- Hulse, David W.
- Luo, Yi

**Landscape Architecture**

**Program Information**

The Department of Landscape Architecture offers graduate programs leading to the Master of Landscape Architecture (MLA) degree in Landscape Architecture. A Ph.D. degree with a concentration in Landscape Architecture is also offered through the College of Design, Construction and Planning. Minimum requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Master of Landscape Architecture: The First Professional MLA is a Landscape Architecture Accreditation Board (LAAB) accredited professional Master's degree in Landscape Architecture. Graduation from an accredited program is an essential first step toward licensing in Florida and other states that regulate the practice of landscape architecture.

For more information, please see our website: http://www.dcp.ufl.edu/landscape (http://www.dcp.ufl.edu/landscape/).

**Degrees Offered**

**Degrees Offered with a Major in Landscape Architecture**

- Master of Landscape Architecture
  - without a concentration
  - concentration in Geographic Information Systems
  - concentration in Historic Preservation
  - concentration in Sustainable Design
  - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

**Landscape Architecture Departmental Courses**

<table>
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<tr>
<th>Code</th>
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<td>LAA 6231</td>
<td>Landscape Architecture Theory</td>
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LAA 6322 Project Management for Landscape Architects 3
LAA 6342 Landscape Architecture Criticism 3
LAA 6382 Ecological and Environmental Policy 3
LAA 6525L Advanced Landscape Construction Design 4
LAA 6536 Landscape Management 3
LAA 6656C Advanced Landscape Architectural Design 1-6
LAA 6713 Cultural Landscapes 3
LAA 6905 Directed Study 1-3
LAA 6931 Water Conservation through Site Design and Green Roofs 3
LAA 6935 Gardens of the World 3
LAA 6941 Supervised Internship 3
LAA 6971 Research for Master’s Thesis 2-6
LAA 6979 Terminal Project 1-6

College of Design, Construction, and Planning Courses

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<tr>
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<td>Ecological Issues in Sustainability and the Built Environment</td>
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<td>DCP 6212</td>
<td>Sustainable Design Issues: Ecology, Architecture, and Planning</td>
<td>4</td>
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<tr>
<td>DCP 6218</td>
<td>Developing Sustainable Projects</td>
<td>3</td>
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<td>DCP 6301</td>
<td>Sustainable Planning and Design Studio</td>
<td>6</td>
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<td>DCP 6701</td>
<td>World Heritage Research and Stewardship</td>
<td>3</td>
</tr>
<tr>
<td>DCP 6710</td>
<td>History and Theory of Historic Preservation</td>
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<tr>
<td>DCP 6711</td>
<td>History of the Built Environment for Preservation Practice</td>
<td>3</td>
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<td>DCP 6712</td>
<td>Preservation Technology: Conserving Modern Buildings</td>
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<td>DCP 6714</td>
<td>Built Heritage Resources: Research, Documentation, And Conservation</td>
<td>3</td>
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<td>DCP 6715</td>
<td>Preservation Building Technology</td>
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<td>DCP 6943</td>
<td>Practicum in Historic Preservation</td>
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<td>DCP 6971</td>
<td>Research for Master's Thesis</td>
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<td>DCP 7790</td>
<td>Doctoral Core I</td>
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<td>Doctoral Seminar</td>
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<td>Advanced Design, Construction, and Planning Research I</td>
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<td>Supervised Teaching</td>
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<td>Professional Internship</td>
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<tr>
<td>DCP 7980</td>
<td>Research for Doctoral Dissertation</td>
<td>1-15</td>
</tr>
</tbody>
</table>

Combine and analyze information from multiple sources to support design decision making

SLO 4 Skills
Produce professional visual, oral and written communications

SLO 5 Skills
Devise research methodologies and conclusions appropriate to individual area of interest

SLO 6 Professional Behavior
Display ethical behaviors and professional conduct

M.E. Rinker, Sr. School of Construction Management

School Director: Raymond Issa
Director of Research and Graduate Programs: Ian Flood

Doctoral Degree (Ph.D.): The school offers a concentration in Construction Management within the College of Design, Construction and Planning's doctor of philosophy program. Research areas in construction management include, but are not limited to, sustainable construction, information systems and automation, industrialized construction, energy and life cycle modeling, materials science, project management, safety and health, affordable housing, and construction law. These specializations prepare students to assume college-level faculty positions and industry research positions in construction management and the building sciences. To be eligible for admission to the doctoral program, a student must hold a 4-year undergraduate degree from an accredited university, with a master’s degree preferred, and have competitive GRE scores. For more information on the doctoral program with a concentration in construction management, please visit the Rinker School's website: https://dcp.ufl.edu/rinker/. (https://dcp.ufl.edu/rinker/)

Masters Degrees: The M.E. Rinker Sr. School offers the following masters’ degrees

- Master of Science in Construction Management (M.S.C.M.), with thesis, Gainesville campus.
- Master of Construction Management (M.C.M.), without thesis, Gainesville campus.
- Professional Master of Construction Management (p.M.C.M.), weekend program, without thesis, CityLab-Orlando.
- Master of International Construction Management (M.I.C.M.), without thesis, distance education program for experienced professionals. This program prepares students to assume upper-level management responsibilities in multinational companies.

Specialization areas include sustainable construction, information systems and automation, industrialized construction, energy and life cycle modeling, materials science, project management, safety and health, affordable housing, and construction law.

Admissions and other requirements:

- M.S.C.M and M.C.M:
  - 4-year undergraduate degree from an accredited university, with a grade point average of 3.0 on a 4.0 scale (or equivalent).
  - Competitive GRE scores (verbal and quantitative).
  - International students from countries where English is not the official language must submit an acceptable score on one of the following: TOEFL (Test of English as a Foreign Language:}

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<thead>
<tr>
<th>Code</th>
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</thead>
<tbody>
<tr>
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<td>DCP 6218</td>
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<td>Research for Doctoral Dissertation</td>
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paper=560, web=84 with 21 in each section), IELTS (International English Language Testing System: 6.5), MELAB (Michigan English Language Assessment Battery: 80 with a 3 on the Speaking Test), or successful completion of the UF English Language Institute program.

- Some students may need to take levelling courses to provide a foundation for advanced courses.
- No more than 3 credits of BCN 6971 (http://gradcatalog.ufl.edu/preview_entity.php?catoid=8&ent_oid=3682&returnto=1482&ft=t9828) may be used to satisfy the credit requirements for the M.S.C.M. degree.

- **p.M.C.M. and M.I.C.M.:**
  - 4-year undergraduate degree from an accredited university, with a grade point average of 3.0 on a 4.0 scale (or equivalent).
  - 3-5 years of relevant construction management experience.
  - Acceptable GRE scores (verbal and quantitative).
  - International students from countries where English is not the official language must submit an acceptable score on one of the following: TOEFL (Test of English as a Foreign Language: paper=550, web=80), IELTS (International English Language Testing System: 6), MELAB (Michigan English Language Assessment Battery: 77), or successful completion of the UF English Language Institute program.
  - All candidates are required to complete a master's research report.
  - No more than 3 research report credits may be used to satisfy the credit requirements.

**Research facilities:** The Powell Center for Construction and the Environment conducts research on implementing sustainability in creating, operating, and constructing a built environment. The Fluor Program for Construction Safety researches and disseminates information on matters related to construction safety and health. The Center for Advanced Construction Information Modeling (CACIM) conducts research into emerging information technologies including Building Information Modeling (BIM), Virtual Design and Construction (VDC), and Automation. The Shimberg Center for Housing Studies, operating within the School, researches the problems and possible solutions associated with developing and producing affordable housing. The Human-Centered Technology in Construction (HCTC) lab focuses on theoretical and experimental investigation of human-computer/robot systems in construction.

**Combined program:** The School offers a combined bachelor's/master's degree program which allows qualified undergraduate students to earn both degrees at an accelerated pace. Qualified students are allowed to begin the M.S.C.M. degree course work in their first senior semester and up to 12 credits of coursework may count towards both degrees. Students must have a 3.4 grade point average and competitive GRE scores in order to be eligible.

For more information, please see our website: https://dcp.ufl.edu/Rinker.

**Faculty**

**Professor**
- Ahrentzen, Sherry
- Anumba, Chinemelu J.
- Chini, Abdul Reza
- Flood, Ian
- Issa, Raja Raymond
- Kibert, Charles Joseph
- Minchin, Robert E.
- Oppenheim, Paul
- Ries, Robert

**Associate Professor**
- Muszynski, Larry C.
- Shanker, Ajay
- Srinivasan, Ravi Shankar

**Assistant Professor**
- Costin, Aaron M.
- Franz, Bryan Willam
- Gheisari, Masoud
- Liu, Rui

**Lecturer**
- Cook, Michael John

**Senior Lecturer**
- Sullivan, James G.

**Affiliated Faculty**
- Alwisy, Aladdin
  Assistant Professor
- Idris Jeelani, Fnu
  Assistant Professor
- Von Meding, Jason Kyle
  Associate Professor

**Construction Management Program Information**

Master of Construction Management (MCM) or Master of Science in Construction Management (MSCM):

The M.E. Rinker Sr. School of Construction Management offers courses leading to the degrees of MSCM (30 credit hours with a thesis) and MCM (36 credit hours without a thesis). Specialization areas include sustainable construction, information systems and automation, industrialized construction, energy and life cycle modeling, materials science, project management, safety and health, affordable housing, and construction law. Requirements for the MSCM and MCM degrees are given in the Graduate Degrees (http://gradcatalog.ufl.edu/content.php?catoid=12&navoid=2748) section of this catalog.

To be eligible for admission to the MSCM or MCM programs, a student must hold a bachelor's degree from an accredited university with an
acceptable grade point average, as well as an acceptable score on the Graduate Record Examination (GRE). Students with undergraduate credentials outside the Construction Management area may need a longer residence for the MCM and MSCM programs, as they will be required to take specified basic courses to provide a foundation for advanced courses. There is no foreign language requirement. International students from countries where English is not the official language must submit an acceptable score on one of the following: TOEFL (Test of English as a Foreign Language: paper=560, web=84 with 21 in each section), IELTS (International English Language Testing System: 6.5), MELAB (Michigan English Language Assessment Battery: 80 with a 3 on the Speaking Test), or successful completion of the UF English Language Institute program.

No more than 3 credits of BCN 6971 (http://gradcatalog.ufl.edu/preview_program.php?catoid=12&poid=5018#tt4193) (Master’s Research) may be used to satisfy the credit requirements for the MSCM degree without written permission of the director of the graduate programs.

Degrees Offered

Degrees Offered with a Major in Construction Management

- Master of Construction Management
  - without a concentration
  - concentration in Historic Preservation
  - concentration in Hydrologic Sciences
  - concentration in Sustainable Construction
  - concentration in Sustainable Design
- Master of Science in Construction Management
  - without a concentration
  - concentration in Historic Preservation
  - concentration in Hydrologic Sciences
  - concentration in Sustainable Construction
  - concentration in Sustainable Design

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Construction Management Departmental Courses

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<td>BCN 5470</td>
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<td>Comprehensive Estimating</td>
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<td>BCN 5625</td>
<td>Construction Cost Analysis</td>
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<td>BCN 5705C</td>
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<td>BCN 5715</td>
<td>Advanced Construction Labor Problems</td>
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<td>BCN 5722</td>
<td>Advanced Construction Planning and Control</td>
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<td>BCN 5729</td>
<td>Design-Build Delivery Methods</td>
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<td>BCN 5737</td>
<td>Advanced Issues in Construction Safety and Health</td>
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<td>BCN 5776</td>
<td>International Construction Business Management</td>
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<td>BCN 5778</td>
<td>Facilities Operation and Maintenance</td>
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<td>BCN 5789C</td>
<td>Construction Project Delivery</td>
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<td>BCN 5874</td>
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<td>Methods and Management for Heavy Construction</td>
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<td>Graduate Construction Management Internship</td>
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<td>BCN 5957</td>
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<td>BCN 6036</td>
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<td>BCN 6558C</td>
<td>Building Integrated Renewable Energy Systems</td>
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<td>BCN 6586</td>
<td>Construction Ecology and Metabolism</td>
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<td>BCN 6641</td>
<td>Construction Value Engineering</td>
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<td>BCN 6748</td>
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<td>BME 6585C</td>
<td>Bldg Energy Modeling</td>
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<td>FES 6705</td>
<td>Communications in Emergency Management</td>
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<td>Fire and Emergency Services Response Planning</td>
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<td>FES 6726</td>
<td>Hazard Mitigation and Preparedness</td>
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<td>FES 6735</td>
<td>International Emergency/Disaster Management</td>
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<td>Homeland Security and Emergency Management</td>
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<td>FES 6806</td>
<td>Disaster Response and Recovery</td>
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<td>Emergency Services - Disaster Planning</td>
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<td>Business Continuity and Disaster Planning</td>
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<td>FES 6836</td>
<td>Impacts of Natural and Man-made Disasters on Buildings</td>
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<td>FES 6916</td>
<td>Research for Master’s Report</td>
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<td>FES 6971</td>
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<td>ICM 5905</td>
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<td>ICM 6420</td>
<td>Commercial Management and Cost Control</td>
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<td>ICM 6642</td>
<td>Lean for Construction</td>
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<td>ICM 6680</td>
<td>Principles of International Sustainable Construction</td>
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<td>ICM 6682</td>
<td>Construction Ecology and Metabolism</td>
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<td>ICM 6684</td>
<td>High-Performance Green Building Delivery Systems</td>
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<td>Construction Human Resource Management</td>
<td>3</td>
</tr>
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<td>ICM 6716</td>
<td>Construction Productivity and Methods Improvement</td>
<td>3</td>
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<tr>
<td>ICM 6750</td>
<td>Managing Construction Information Technology</td>
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</tr>
<tr>
<td>ICM 6761</td>
<td>Advanced Planning, Scheduling, and Logistics</td>
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<td>ICM 6762</td>
<td>Construction Risk Management</td>
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<td>ICM 6770</td>
<td>Advanced Project Safety Management</td>
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<tr>
<td>ICM 6775</td>
<td>Manufactured Construction Processes</td>
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</table>
ICM 6905 Directed Independent Study in International Construction 1-3
ICM 6910 Supervised Research 1-3
ICM 6930 Construction Communication and Research 3
ICM 6934 International Construction Research 1-6

College of Design, Construction, and Planning Courses

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Student Learning Outcomes

Construction Management (MCM)

SLO 1 Apply Basic Statistics  BCN 6036: Exam; 80% of students earn 77% or higher

SLO 2 Create a literature review on a selected topic that encapsulates the latest research on the topic  Thesis Defense: 100% of students earn an average Rating of 3 or higher, and 80% of students will earn an average rating of 4 or higher, from their committee members as recorded on the Thesis Defense Assessment Rubric

SLO 3 Devise and apply research methods to solve problems and generate new knowledge  The Thesis Defense: 100% of students earn an average Rating of 3 or higher, and 80% of students will earn an average rating of 4 or higher, from their committee members as recorded on the Thesis Defense Assessment Rubric

SLO 4 Communicate effectively in writing  Animal Sciences: 100% of students earn an average Rating of 3 or higher, and 80% of students will earn an average rating of 4 or higher, from their committee members as recorded on the Thesis Defense Assessment Rubric

SLO 5 Communicate effectively in professional situations  Thesis Defense: 100% of students earn an average Rating of 3 or higher, and 80% of students will earn an average rating of 4 or higher, from their committee members as recorded on the Thesis Defense Assessment Rubric

Fire and Emergency Sciences

Program Information

The Master of Science in Fire and Emergency Sciences degree program focuses on Emergency Services/Disaster Management (ES/DM) and is designed for individuals who are seeking knowledge in emergency planning, hazard mitigation and preparedness, disaster response and recovery, and homeland security. The goal is to create broad experience that includes the many elements of current cases in ES/DM and emphasizes both the critical thinking and leadership skills necessary to advance in the field.

The M.S.F.E.S. degree provides post-professional advancement for the critical technical issues beyond the initial emergency science practices and administrative studies. Major research topics include interdisciplinary studies in material sciences, suppression systems, advanced planning and geographic systems, pre- and post-disaster mitigation planning, computer applications, and technological innovations.

The M.S.F.E.S. is an online distance education program. All courses are conveniently delivered utilizing a web-based e-Learning system. Students must complete 33 credits/11 FES classes in order to fulfill the degree requirements. The classes are selected with the FES Academic Advisor.

For more information, please see the program website: https://dcp.ufl.edu/rinker/academics/online/master-of-fire-and-emergency-sciences/.

Degrees Offered

Degrees Offered with a Major in Fire and Emergency Sciences

- Master of Science in Fire and Emergency Sciences
Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

## Courses

### Construction Management Departmental Courses

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Degrees Offered with a Major in International Construction Management

- Master of International Construction Management
  - without a concentration
  - concentration in Historic Preservation

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

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Student Learning Outcomes

Fire & Emergency Services (MSFES)

SLO 1 Assess complex communication technology systems, both current and emerging, for disaster management 80% of the students earn an 80% or higher

SLO 2 Manage the application of safety, health, and environmental regulations relevant to disaster management 80% of the students earn an 80% or higher

SLO 3 Assess leadership skills for disaster management 80% of students earn an 80% or higher

SLO 4 Organize human resources for disaster situation 80% of the students earn an 80% or higher

SLO 5 Formulate effective organizational management skills associated with disaster management 80% of the students earn an 80% or higher

SLO 6 Create verbal and written communication as it relates to disaster management 80% of the students earn an 80% or higher

International Construction Management

Program Information

The Master of International Construction Management (M.I.C.M.) is a graduate program delivered online, designed specifically for experienced industry professionals. M.I.C.M. was the first online graduate program in construction management and it is in the top tier of advanced educational programs serving the construction industry. The program allows 3-5 years of relevant professional construction industry experience to substitute for our undergraduate levelling courses, such as estimating, quantity surveying, project management, scheduling, and construction safety. The M.I.C.M. admissions process will examine each applicant's university transcripts and Graduate Record Examination (GRE) scores, resume, statement of purpose, and three letters of recommendation.

To earn the M.I.C.M. degree, students must successfully complete eleven ICM-prefix courses. Of these, only two are required courses: ICM 6930 (http://gradcatalog.ufl.edu/preview_program.php?catoid=12&poid=5019&tt3714) (Research Methods) and ICM 6934 (http://gradcatalog.ufl.edu/preview_program.php?catoid=12&poid=5019&tt5985) (Directed Research). The remaining nine courses are electives. Students select courses based on their priorities and interests. To complete the MICM degree, students should make plans to be on campus for one day during their last semester to present their ICM 6934 (http://gradcatalog.ufl.edu/preview_program.php?catoid=12&poid=5019&tt1583) research report to their committee.
College of Design, Construction, and Planning Courses

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<td>Construction Communication and Research</td>
<td>3</td>
</tr>
<tr>
<td>ICM 6934</td>
<td>International Construction Research</td>
<td>1-6</td>
</tr>
</tbody>
</table>

International Construction Management (MICM)

SLO 1 Identify rigorous problems in the construction management discipline
Research Paper Defense: 100% of students earn an average rating of 3 or higher, and 80% of students earn an average rating of 4 or higher, from their committee members on the ICM 6934 research paper and its oral presentation as recorded on the Report Defense Assessment Rubric

SLO 2 Create a literature review on a selected topic that encapsulates the latest research on the topic
Research Paper Defense: 100% of students earn an average rating of 3 or higher, and 80% of students earn an average rating of 4 or higher, from their committee members on the ICM 6934 research paper and its oral presentation as recorded on the Report Defense Assessment Rubric

SLO 3 Devise and apply research methods to solve problems and generate new knowledge
Research Paper Defense: 100% of students earn an average rating of 3 or higher, and 80% of students earn an average rating of 4 or higher, from their committee members on the ICM 6934 research paper and its oral presentation as recorded on the Report Defense Assessment Rubric

SLO 4 Communicate effectively in writing
Research Paper Defense: 100% of students earn an average rating of 3 or higher, and 80% of students earn an average rating of 4 or higher, from their committee members on the ICM 6934 research paper and its oral presentation as recorded on the Report Defense Assessment Rubric

SLO 5 Communicate effectively in professional situations
Research Paper Defense: 100% of students earn an average rating of 3 or higher, and 80% of students earn an average rating of 4 or higher, from their committee members on the ICM 6934 research paper and its oral presentation as recorded on the Report Defense Assessment Rubric

Sustainable Construction

Program Information

The Major in Sustainable Construction inside of the a Master of Science in Construction Management degree will prepare students to effectively contribute to the design and construction of a high performance built environment comprised of green, energy-efficient buildings, renewable energy systems, and efficient infrastructure. Its objectives are to address:

1. Issues of resource efficiency, waste, human health, ecological economics, ethics, environmental justice, and industrial ecology;
2. Alternative practices that can significantly reduce the environmental impacts of the built environment, and
3. Exploring past and present thinking by leading theorists and practitioners in this newly emerging discipline.
The resulting degree awarded upon successful completion of the program will be a Master of Science in Construction Management (thesis) with a Major in Sustainable Construction.

In addition to writing a sustainability themed thesis, students must complete the following coursework:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCN 6580</td>
<td>High-Performance Green Building Delivery Systems</td>
<td>3</td>
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<tr>
<td>BCN 6585</td>
<td>Sustainable Construction</td>
<td>3</td>
</tr>
<tr>
<td>BCN 6586</td>
<td>Construction Ecology and Metabolism</td>
<td>3</td>
</tr>
<tr>
<td>BCN 6641</td>
<td>Construction Value Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

**Degrees Offered**

**Degrees Offered with a Major in Sustainable Construction**

- Master of Science in Construction Management

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Construction Management Departmental Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>BCN 5470</td>
<td>Construction Methods Improvements</td>
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<td>BCN 5618C</td>
<td>Comprehensive Estimating</td>
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<td>BCN 5625</td>
<td>Construction Cost Analysis</td>
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<tr>
<td>BCN 5705C</td>
<td>Project Management for Construction</td>
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<td>BCN 5715</td>
<td>Advanced Construction Labor Problems</td>
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<td>BCN 5722</td>
<td>Advanced Construction Planning and Control</td>
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<td>BCN 5729</td>
<td>Design-Build Delivery Methods</td>
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<td>BCN 5737</td>
<td>Advanced Issues in Construction Safety and Health</td>
<td>3</td>
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<td>BCN 5776</td>
<td>International Construction Business Management</td>
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<td>BCN 5778</td>
<td>Facilities Operation and Maintenance</td>
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<td>BCN 5789C</td>
<td>Construction Project Delivery</td>
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<td>BCN 5874</td>
<td>Equipment and Methods for Heavy Construction</td>
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<td>BCN 5885</td>
<td>Methods and Management for Heavy Construction</td>
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<td>BCN 5905</td>
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<td>BCN 5957</td>
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<td>BCN 6036</td>
<td>Research Methods in Construction</td>
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<td>BCN 6558C</td>
<td>Building Integrated Renewable Energy Systems</td>
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<td>BCN 6583</td>
<td>Sustainable Housing</td>
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<td>BCN 6584C</td>
<td>Building Energy Modeling</td>
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<td>Construction Value Engineering</td>
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<td>BCN 6748</td>
<td>Construction Law</td>
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<td>BCN 6785</td>
<td>Construction Information Systems</td>
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<td>BCN 6905</td>
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<td>BCN 6933</td>
<td>Advanced Construction Management</td>
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<td>BCN 6940</td>
<td>Supervised Teaching</td>
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<td>BME 6585C</td>
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<td>FES 6705</td>
<td>Communications in Emergency Management</td>
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<td>FES 6724</td>
<td>Fire and Emergency Services Response Planning</td>
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<td>FES 6726</td>
<td>Hazard Mitigation and Preparedness</td>
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<tr>
<td>FES 6735</td>
<td>International Emergency/Disaster Management</td>
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<tr>
<td>FES 6736</td>
<td>Homeland Security and Emergency Management</td>
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<td>FES 6786</td>
<td>Research Methods in FES</td>
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<tr>
<td>FES 6806</td>
<td>Disaster Response and Recovery</td>
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<tr>
<td>FES 6826</td>
<td>Emergency Services - Disaster Planning</td>
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<tr>
<td>FES 6827</td>
<td>Business Continuity and Disaster Planning</td>
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<tr>
<td>FES 6836</td>
<td>Impacts of Natural and Man-made Disasters on Buildings</td>
<td>3</td>
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<tr>
<td>FES 6916</td>
<td>Research for Master's Report</td>
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<td>FES 6940</td>
<td>Practicum in FES</td>
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<td>FES 6971</td>
<td>Research for Master's Report</td>
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<tr>
<td>ICM 5905</td>
<td>Special Studies</td>
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<td>ICM 6420</td>
<td>Commercial Management and Cost Control</td>
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<td>ICM 6440</td>
<td>Construction Value Management</td>
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<td>ICM 6642</td>
<td>Lean for Construction</td>
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<td>ICM 6680</td>
<td>Principles of International Sustainable Construction</td>
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<td>ICM 6682</td>
<td>Construction Ecology and Metabolism</td>
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<td>ICM 6684</td>
<td>High-Performance Green Building Delivery Systems</td>
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<td>ICM 6710</td>
<td>Construction Human Resource Management</td>
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<tr>
<td>ICM 6716</td>
<td>Construction Productivity and Methods Improvement</td>
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<td>ICM 6750</td>
<td>Managing Construction Information Technology</td>
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<tr>
<td>ICM 6761</td>
<td>Advanced Planning, Scheduling, and Logistics</td>
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<td>ICM 6762</td>
<td>Construction Risk Management</td>
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<td>ICM 6770</td>
<td>Advanced Project Safety Management</td>
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<tr>
<td>ICM 6775</td>
<td>Manufactured Construction Processes</td>
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<td>ICM 6905</td>
<td>Directed Independent Study in International Construction</td>
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<td>ICM 6910</td>
<td>Supervised Research</td>
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<tr>
<td>ICM 6930</td>
<td>Construction Communication and Research</td>
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<td>ICM 6934</td>
<td>International Construction Research</td>
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### College of Design, Construction, and Planning Courses

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<td>DCP 6205</td>
<td>Ecological Issues in Sustainability and the Built Environment</td>
<td>3</td>
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<tr>
<td>DCP 6212</td>
<td>Sustainable Design Issues: Ecology, Architecture, and Planning</td>
<td>4</td>
</tr>
<tr>
<td>DCP 6218</td>
<td>Developing Sustainable Projects</td>
<td>3</td>
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<td>DCP 6301</td>
<td>Sustainable Planning and Design Studio</td>
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<td>DCP 6701</td>
<td>World Heritage Research and Stewardship</td>
<td>3</td>
</tr>
<tr>
<td>DCP 6710</td>
<td>History and Theory of Historic Preservation</td>
<td>3</td>
</tr>
<tr>
<td>DCP 6711</td>
<td>History of the Built Environment for Preservation Practice</td>
<td>3</td>
</tr>
</tbody>
</table>
support the third largest population in the US, the challenges of rapid growth within sensitive natural ecologies, fluctuating tourism, humid and hot climate, multiple urban centers, sprawling suburbs, dwindling agriculture, lack of mass transit, and extensive coastal hurricane threats requires integrative and collaborative design strategies for the future.

The School of Architecture is uniquely positioned to respond to these issues by deploying studio based design methodologies in collaboration with a new generation of experts in engineering, ecology, business, anthropology, energy, fine arts, medicine and construction. Within the University of Florida, the State's flagship research institution, a trove of researchers and faculty dedicated to academic excellence and interdisciplinary collaboration are focused on the demands of changing culture. The SoA is one of seven programs associated within the College of Design, Construction and Planning — Architecture, Landscape Architecture, Planning, Preservation, Sustainability and the Built Environment, Interior Design and Building Construction. SoA faculty and students, working independently and collaboratively across disciplines through teaching, research and practice, have garnered international, national, state and local design awards, publish regularly and secure national, state and local grant funding for research based service learning and design projects. This body of work poses theoretical, poetic, cultural and practical questions and suggests responses through the discipline of design.

The GISoA is focused on research-based design that explores critical issues of a changing culture — climate, energy, infrastructure, transportation and population growth/redistribution. Students are engaged in design as a collaborative and integrative methodology addressing both real and speculative projects through coordinated studios, seminars and workshops. To support this effort, nationally recognized award winning Architects from practice and the academy in the US and abroad collaborate with faculty and students in studio and intensive issue-oriented workshops strategically scheduled during the academic year.

**Student Learning Outcomes**

**M.E. Rinker Sr. School of Construction Management (MSCM) Sustainable Construction**

SLO 1 Identify contemporary problems in the construction management discipline
Thesis Defense: 100% of students earn an average Rating of 3 or higher, 80% of students will earn a 4 or higher, from their committee members as recorded on the Thesis Defense Assessment Rubric

SLO 2 Create a rigorous literature review on a selected topic
Thesis Defense: 100% of students earn an average Rating of 3 or higher, 80% of students will earn a 4 or higher, from their committee members as recorded on the Thesis Defense Assessment Rubric

SLO 3 Develop and apply research methods to solve problems and generate new knowledge
Thesis Defense: 100% of students earn an average Rating of 3 or higher, 80% of students will earn a 4 or higher, from their committee members as recorded on the Thesis Defense Assessment Rubric

SLO 4 Communicate effectively in writing
Thesis Defense: 100% of students earn an average Rating of 3, 80% of students will earn a 4 or higher, or higher from their committee members as recorded on the Thesis Defense Assessment Rubric

SLO 5 Communicate effectively in professional situations
Thesis Defense: 100% of students earn an average Rating of 3, 80% of students will earn a 4 or higher, or higher from their committee members as recorded on the Thesis Defense Assessment Rubric

**School of Architecture**

Director: Jason Alread, AIA, Leed AP
Graduate Coordinator: Bradley Walters

The School of Architecture recognizes design as a synthesis of thinking, analyzing and making — an iterative process that engages, issues of space, historical precedent, sustainability, ecology, urbanity, landscape, built-form, and construction toward innovation. As Florida will soon

**Majors**

- Architecture (p. 221)

**Faculty**

**Professor**

- Alread, Jason Scott
- Bosworth, Frank
- Hailey, Charles L.
- Kohen, Martha
- Perez-Mendez, Alfonso
- Zou, Hui

**Associate Professor**

- Baweja, Vandana
- Belton, Stephen Clair
- Carney, Jeffrey Andrew
- Clark, Nancy M.
- Cohen, Donna L.
- Gold, Martin Arnold
- Hofer, Adeline Van Nostrand
- Kuenstle, Michael Wayne
- Maze, John Marshall
in architecture, recognizes three types of degrees: the Bachelor of Architecture, the Master of Architecture, and the Doctor of Architecture. A program may be granted a 6-year, 3-year, or 2-year term of accreditation, depending on the extent of its conformance with established educational standards.

Doctor of Architecture and Master of Architecture degree programs may consist of a pre-professional undergraduate degree and a professional graduate degree that, when earned sequentially, constitute an accredited professional education. However, the pre-professional degree is not, by itself, recognized as an accredited degree.

The University of Florida School of Architecture offers the following NAAB-accredited degree programs:

- Master of Architecture (pre-professional degree + 52 graduate credits) Master of Architecture (professional degree + 30 graduate credits)
- Master of Architecture (professional degree + 52 graduate credits)
- Master of Architecture (professional degree + 30 graduate credits)
- Master of Architecture (professional degree + 54 undergraduate credits + 52 graduate credits)
- Master of Architecture (non-pre-professional degree + 54 undergraduate credits + 5 graduate credits)
- Master of Architecture (pre-professional degree + 54 undergraduate credits + 52 graduate credits): For those students who have a 4-year baccalaureate degree from an accredited architectural program, 2 years in residence (52 credits) are normally required to complete the Master of Architecture degree; notification of program length is part of the letter of acceptance and is determined by portfolio and transcript review. ARC 6241 Advanced Studio I (1-9 cr.), ARC 6355 Advanced Studio II (6 cr.), and ARC 6356 Advanced Studio III (6 cr.) are required of all graduate students in this track and are prerequisites for the required thesis or master's project. Course sequences in history and theory, technology, structures, and practice must also be completed.
- Master of Architecture (professional degree + 30 graduate credits): For students who have a baccalaureate degree with an architecture or related major (interior design, landscape architecture) and who have completed 4 or 6 architecture or design studies courses, three years of residence (83 credits, approximately) are normally required to complete the Master of Architecture degree; notification of program length is part of the letter of acceptance and is determined by portfolio and transcript review. ARC 4073 Core Studio 1 (6 cr.), ARC 4074 Core Studio 2 (6 cr.), ARC 4074 Core Studio 3 (6 cr.), ARC 4074 Core Studio 4 (6 cr.), ARC 6241 Advanced Studio I (1-9 cr.), ARC 6355 Advanced Studio II (6 cr.), and ARC 6356 Advanced Studio III (6 cr.) are required of all graduate students in this track and are prerequisites for the required thesis or master's project. (Undergraduate courses 3000 and 4000 level in the major do not count toward the minimum requirements for the graduate degree.) Course sequences in history and theory, materials and methods, technology, structures, and practice must be completed.
- Master of Architecture (non-pre-professional degree + 54 undergraduate credits + 52 graduate credits): For students with a baccalaureate degree in a nonrelated academic area and have completed fewer than 4 design studies courses, 4 years of residence (112 credits, approximately) are normally required to complete the Master of Architecture degree; notification of program length is part of the letter of acceptance and is determined by portfolio and transcript review. ARC 4071 Core Studio 1 (6 cr.), ARC 4072 Core Studio 2 (6 cr.), ARC 4073 Core Studio 3 (6 cr.), ARC 4074 Core Studio 4 (6 cr.), ARC 6241 Advanced Studio I (1-9 cr.), ARC 6355 Advanced Studio II (6 cr.), and ARC 6356 Advanced Studio III (6 cr.) are required of all graduate students in this track and are prerequisites for the required thesis or project. Undergraduate courses 3000 and 4000 level in the major do not count toward the 52-hour minimum requirements for the graduate degree. Course sequences in history and theory,
materials and methods, technology, structures, and practice must be completed.

- **Accredited 5-year professional base:** For students with a baccalaureate degree in architecture from an accredited 5-year professional degree program, a 1-year degree program is available. In these cases, a specialized curriculum is developed that complements the needs of the applicant. Minimum registration is 30 credits; however, the minimum may increase if transcript reviews show that further course work is needed to meet registration and curriculum requirements. ARC 6356 Advanced Studio III (6 cr.) is a prerequisite for the thesis or master’s project.

Most states require individuals intending to become architects to hold an accredited degree. The National Architectural Accrediting Board acknowledges two types of degrees: the Bachelor of Architecture (minimum 5 five years of study); and the Master of Architecture (minimum 3 years of study after an unrelated bachelor’s degree, or 2 years after a related pre-professional bachelor’s degree). These professional degrees educate those who aspire to registration and licensure to practice as architects.

**Student work:** The College may retain student work for the purpose of record, exhibition, or instruction.

**Master of Science in Architectural Studies:** The M.S.A.S. is a nonprofessional degree for advanced investigations in specialized areas of architectural history, architectural pedagogy, theory, technology, design, preservation, or practice. Students with a bachelor’s degree in any discipline from an accredited university are eligible to apply to this program; the proposed area of focus should be precisely defined in the application. This is a 3- to 4-semester program (32 hours minimum) that includes a thesis. (No more than 6 hours of ARC 6971 Research for Master’s Thesis (1-15 cr.) may be counted in the minimum credit hours for the degree.) Interdisciplinary study is encouraged. Concentrations and certificates are available in historic preservation, sustainable architecture, and sustainable design.

The School sponsors special curricula in architecture to enhance the academic program. **Preservation Institute: Caribbean, Preservation Institute: Nantucket, and Vicenza Institute of Architecture (Italy)** accepts students from the University of Florida, and also from academic circles throughout the United States and the world for year-round study. Any student in a graduate architecture program at the University of Florida may apply for one or more of these programs.

Requirements for the M.Arch., M.S.A.S., and Ph.D. degrees are described in the General Information section of this catalog.

The School also participates in a program granting an Interdisciplinary Concentration and Certificate in Sustainable Architecture. For more information, see the **Interdisciplinary Graduate Studies** section of this catalog.

**Applications:** All applications for fall term graduate admission (including official transcripts, GRE scores, and TOEFL scores, if necessary) must be received by the Office of the Registrar by January 15. In addition to satisfying University requirements for admission, applicants are required to submit to the Graduate Program Assistant, School of Architecture, 231 ARCH, Box 115702, the following: a portfolio of their creative work; a scholarly statement of intent and objectives; and three letters of recommendation. This material must be received by January 15 to be considered for admission in the next fall term. Students may apply after the January 15 deadline but will only be considered if spaces become available. (Updates of portfolios are accepted after January 15; however, applications will not be considered until they are complete.)

The School reserves the right to retain student work for purposes of record, exhibition, or instruction. Field trips are required of all students; students should plan to have adequate funds available. It may be necessary to assess studio fees to defray costs of base maps and other generally used materials.

**Degrees Offered**

**Degrees Offered with a Major in Architecture**

- **Master of Science in Architectural Studies**
  - without a concentration
  - concentration in Historic Preservation
  - concentration in Sustainable Architecture
  - concentration in Sustainable Design
  - concentration in Themed Environments Integration

- **Master of Architecture**
  - without a concentration
  - concentration in Historic Preservation
  - concentration in Sustainable Architecture
  - concentration in Sustainable Design

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

**Architecture Program Core Courses**

<table>
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<tr>
<th>Code</th>
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<tr>
<td>ARC 6512</td>
<td>Structural Modeling</td>
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<tr>
<td>ARC 6116</td>
<td>Drawing toward Architecture</td>
<td>1-2</td>
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<tr>
<td>ARC 6311C</td>
<td>Building Information Modeling</td>
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<tr>
<td>DCP 6218</td>
<td>Developing Sustainable Projects</td>
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<td>DCP 6710</td>
<td>History and Theory of Historic Preservation</td>
<td>3</td>
</tr>
<tr>
<td>DCP 6715</td>
<td>Preservation Building Technology</td>
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</tr>
<tr>
<td>DCP 6971</td>
<td>Research for Master’s Thesis</td>
<td>1-9</td>
</tr>
<tr>
<td>URP 6272</td>
<td>Urban Spatial Analysis</td>
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**School of Architecture Courses**

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<tr>
<td>ARC 5040</td>
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<td>ARC 5041</td>
<td>Design and Documentation of Themed Environments</td>
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<tr>
<td>ARC 5042</td>
<td>Fabrication and Execution for Themed Environments</td>
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<td>ARC 5043</td>
<td>Integration Practices for Built Environments</td>
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<tr>
<td>ARC 6044</td>
<td>Development and Operations for Themed Environments</td>
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<tr>
<td>ARC 6045C</td>
<td>Project Development Studio for Themed Environments</td>
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<tr>
<td>ARC 6116</td>
<td>Drawing toward Architecture</td>
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<tr>
<td>ARC 6212</td>
<td>Topics in Phenomena and Architecture</td>
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<tr>
<td>ARC 6228</td>
<td>Film and Architecture</td>
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<td>ARC 6241</td>
<td>Advanced Studio I</td>
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<td>ARC 6242</td>
<td>Research Methods</td>
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<td>ARC 6281</td>
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### College of Design, Construction, and Planning Courses

<table>
<thead>
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<tbody>
<tr>
<td>DCP 6205</td>
<td>Ecological Issues in Sustainability and the Built Environment</td>
<td>3</td>
</tr>
<tr>
<td>DCP 6212</td>
<td>Sustainable Design Issues: Ecology, Architecture, and Planning</td>
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<td>Developing Sustainable Projects</td>
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<td>Sustainable Planning and Design Studio</td>
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<td>World Heritage Research and Stewardship</td>
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<td>History and Theory of Historic Preservation</td>
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<td>History of the Built Environment for Preservation Practice</td>
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<td>Preservation Technology: Conserving Modern Buildings</td>
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<td>DCP 6713</td>
<td>Built Heritage Resources: Research, Documentation, and Conservation</td>
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<td>DCP 6715</td>
<td>Preservation Building Technology</td>
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<td>DCP 6716</td>
<td>Cultural Resource Management</td>
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<td>DCP 6730</td>
<td>Preservation Policy</td>
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<td>DCP 6905</td>
<td>Independent Study</td>
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<td>Special Topics in Design, Construction, and Planning</td>
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<td>DCP 6943</td>
<td>Practicum in Historic Preservation</td>
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<td>DCP 6971</td>
<td>Research for Master's Thesis</td>
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<td>DCP 7790</td>
<td>Doctoral Core I</td>
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<td>DCP 7794</td>
<td>Doctoral Seminar</td>
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<td>Advanced Design, Construction, and Planning Research</td>
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<td>Supervised Teaching</td>
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<td>DCP 7980</td>
<td>Research for Doctoral Dissertation</td>
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### Student Learning Outcomes

#### Architecture (MS)

**SLO 1  Knowledge**
Acquire, interpret and analyze information as it relates to the design process. Use critical thinking and specialized knowledge of architectural systems to identify and assess problems. Develop design responses in a competent and ethical manner.

**SLO 2  Skills**
Develop an area of focus and a self-directed inquiry. Work collaboratively toward integrative proposals.

**SLO 3  Professional Behavior**
Engage in the advancement of the discipline. Engage the economic, ethical, and aesthetic aspects of professional practice.

#### Master of Science in Architectural Studies

**SLO 1  Knowledge**
Acquire, interpret and analyze information as it relates to the design process. Use critical thinking and specialized knowledge of architectural systems to identify and assess problems. Develop design responses in a competent and ethical manner.

**SLO 2  Skills**
Develop an area of focus and a self-directed inquiry. Work collaboratively toward integrative proposals.

**SLO 3  Professional Behavior**
Engage in the advancement of the discipline. Engage the economic, ethical, and aesthetic aspects of professional practice.

### Urban and Regional Planning Department

**Director of School of Landscape Architecture and Planning:** Kristin Larsen  
**Chair:** Kristin Larsen  
**Graduate Coordinator:** Laura Dedenbach  
**Graduate Coordinator of Online Degree program:** Thomas Hawkins

The mission of the Department of Urban and Regional Planning is to educate the next generation of planning professionals to be good stewards of our built and natural environments, to conduct innovative research that improves quality of life for all, and to provide planning services to communities.

**Doctor of Philosophy:** The College offers an interdisciplinary program leading to the Doctor of Philosophy degree in Design, Construction, and Planning. Areas of specialization within this program include architecture, building construction, interior design, landscape architecture, and urban and regional planning. For information, please see the Design, Construction, and Planning (Ph.D.) program page in this catalog, or the DCP Ph.D. website: https://dcp.ufl.edu/urp/academics/ph-d/.

**Master of Urban and Regional Planning:** The Department of Urban and Regional Planning offers graduate work leading to the degree of Master...
of Urban and Regional Planning (M.U.R.P.). The fifty-two credit graduate degree program can be earned on campus or online. The Planning Accreditation Board has accredited the campus-based program; students typically complete the campus-based degree program in two academic years. The online program targets practicing professionals with its flexible scheduling and sequencing of classes. Students with a master’s degree in a related field may obtain approval from the Department to transfer up to 18 credit hours toward the 52-credit requirement. The department encourages students with any undergraduate degree who are interested in the field of planning to apply for admission.

The Department of Urban and Regional Planning and the Levin College of Law offer a joint degree program. The four-year program leads to a Juris Doctor and a Master of Urban and Regional Planning (https://www.law.ufl.edu/areas-of-study/degree-programs/joint-degree-programs/). Students may pursue Concurrent Degrees in Latin American Studies and in Transportation Engineering. Concurrent degrees allow the sharing of 9 credits between the two degrees. Areas of concentration with other programs in the Graduate School may be developed to meet the individual needs of students.

The department offers a combined undergraduate/graduate degree program with several UF departments and colleges including Sustainability and the Built Environment, Political Science, Forestry, and more. Please contact a College of Design, Construction and Planning Advisor and/or Graduate Coordinator for Urban and Regional Planning to learn more and for information about application and approval procedures.

In addition to coursework, the student is required to complete an internship with a public agency or private planning firm and to complete a master’s thesis or research project (in lieu of thesis) with faculty approval. The Department reserves the right to retain student work for purposes of record, exhibition, or instruction.

Complete descriptions of the requirements for the above-mentioned degrees are provided in the Graduate Degrees (p. 48) section of this catalog.

For more information, please see the program page below and our website: http://www.dcp.ufl.edu/urp (http://www.dcp.ufl.edu/urp/).

Majors

- Urban and Regional Planning (p. 224)

Faculty

Professor

- Larsen, Kristin Esther
- Peng, Zhong-Ren
- Steiner, Ruth Lorraine
- Zwick, Paul D.

Associate Professor

- Bejleri, Ilir
- Frank, Kathryn I.

Assistant Professor

- Alakshendra, Abhinav
- Wang, Yan

Other

- Dedenbach, Laura J.
- Hawkins, Wm Thomas
- Knowles, Harold S.
- Patten, Iris Elaine

Lecturer

- Black, Joel Elan
- Latimer, Stanley Steve

Associate Scholar

- Hylton, Morris

Assistant Scholar

- Widmer, Jocelyn M.

Affiliated Faculty

- Jones, Pierce H.
  Professor
- Kang, Seungbeom
  Assistant Professor
- Silver, Christopher
  Professor
- Tepe, Emre
  Assistant Professor

Urban and Regional Planning

Program Information

Please note that the Master of Arts in Urban and Regional Planning (M.A.U.R.P.) has been renamed to the Master of Urban and Regional Planning (M.U.R.P.) and is being phased out as of Fall 2014.

The Department of Urban and Regional Planning offers the degree of Master of Urban and Regional Planning (M.U.R.P.). The 52-credit graduate program is usually completed in two academic years. Students with a master’s degree in a related field may obtain approval from the Department to transfer up to 18 credit hours toward the 52-credit requirement. The Department encourages students with any undergraduate degree who are interested in the field of planning to apply for admission.

The M.U.R.P. degree is accredited by the Planning Accreditation Board, a joint undertaking of the American Institute of Certified Planners and the Association of Collegiate Schools of Planning, for having achieved the highest applicable standards for graduate education in the field of planning. Graduates of the Department are prepared to practice urban and regional planning. Complete descriptions of the requirements for the M.U.R.P. and Ph.D. degrees are provided in the General Information section of this catalog.

The Urban and Regional Planning curriculum is designed to provide a set of core studies and contextual projects that prepare the graduate for the practice of planning in public or private agencies at both national and international levels. The core studies include history and theory of planning; planning methods; and related studies in community and regional social, natural, and economic systems. Contextual projects include, among many subject areas, urban design, transportation,
regional planning, community redevelopment and preservation, housing, real estate, and economic development. Interstate field trips are required as part of the normal program curriculum. Students should plan to have adequate funds for field trips and for studio materials.

The program emphasizes planning, policy, and design for the built and natural environments. Areas of specialized knowledge include land use and transportation, urban design, housing, community and economic development, information technologies for planning, and environmental planning. Students are also encouraged to take advantage of the interdisciplinary faculty, course offerings, and other resources available in the College of Design, Construction, and Planning and throughout the University. The Department has several research centers: The Geo-facilities Planning and Information Center (GeoPlan), the Center for International Design and Planning (CIDP), the Center for Building Better Communities (CBBC), and the Center for Health and the Built Environment (CHBE).

For more information, please see our website: https://uflep-preview.courseleaf.com/graduate/colleges-departments/design-construction-planning/.

Degrees Offered

Degrees Offered with a Major in Urban and Regional Planning

- Master of Urban and Regional Planning
  - without a concentration
  - concentration in Geographic Information Systems
  - concentration in Historic Preservation
  - concentration in Sustainable Design
  - concentration in Tropical Conservation and Development
  - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Urban and Regional Planning Courses

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<td>URP 6276</td>
<td>Internet Geographic Information Systems</td>
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<td>URP 6277</td>
<td>Land Use Visioning and Analysis</td>
<td>3</td>
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<tr>
<td>URP 6610</td>
<td>International Development Planning</td>
<td>3</td>
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<td>URP 6711</td>
<td>Transportation and Land Use Coordination</td>
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</tr>
<tr>
<td>URP 6743</td>
<td>Affordable Housing Law</td>
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<td>URP 6855</td>
<td>Urban Form in Cities throughout the Americas</td>
<td>3</td>
</tr>
<tr>
<td>URP 6887</td>
<td>Advanced Defensible Space in Urban Design</td>
<td>3</td>
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Urban and Regional Planning Departmental Courses

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<tr>
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<tr>
<td>URP 6042</td>
<td>Urban Economy</td>
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<td>URP 6061</td>
<td>Planning Administration and Ethics</td>
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<td>URP 6100</td>
<td>Planning Theory and History</td>
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<td>URP 6131</td>
<td>Land Use Planning Law</td>
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<td>URP 6132</td>
<td>Growth Management Seminar</td>
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<td>URP 6203</td>
<td>Planning Research Design</td>
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<td>URP 6231</td>
<td>Quantitative Data Analysis for Planners</td>
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<tr>
<td>URP 6270</td>
<td>Introduction to Planning Information Systems</td>
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<td>URP 6271</td>
<td>Automation for Geospatial Modeling and Analysis</td>
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<td>URP 6272</td>
<td>Urban Spatial Analysis</td>
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<td>URP 6274</td>
<td>GPS for Planners: Introduction to Global Positioning System</td>
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<td>URP 6275</td>
<td>Intermediate Planning Information Systems</td>
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<td>URP 6276</td>
<td>Internet Geographic Information Systems</td>
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<tr>
<td>URP 6277</td>
<td>Land Use Visioning and Analysis</td>
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<td>URP 6278</td>
<td>Web Mapping and Visualization</td>
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<td>URP 6280</td>
<td>3D Geospatial Modeling and Visualization</td>
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<td>URP 6341</td>
<td>Urban Planning Project</td>
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<td>URP 6409</td>
<td>Sustainable Community Development</td>
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<td>URP 6421</td>
<td>Environmental Land Use Planning and Management</td>
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<td>URP 6424</td>
<td>Sustainable Urbanism in the Americas</td>
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<td>URP 6428</td>
<td>Advanced Environmental Planning</td>
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<td>URP 6429</td>
<td>Natural Resources Planning and Management</td>
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<td>URP 6445</td>
<td>Planning for Climate Change</td>
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<td>URP 6526</td>
<td>Health and the Built Environment</td>
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<td>URP 6541</td>
<td>Economic Development Planning</td>
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<td>URP 6542</td>
<td>Urban Land Economics</td>
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<td>URP 6603</td>
<td>Development Review</td>
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<td>International Development Planning</td>
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<td>URP 6711</td>
<td>Transportation and Land Use Coordination</td>
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<td>URP 6716</td>
<td>Transportation Policy and Planning</td>
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<td>URP 6743</td>
<td>Affordable Housing Law</td>
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<td>URP 6745</td>
<td>Housing, Public Policy, and Planning</td>
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<td>URP 6821</td>
<td>Transportation and Land-Use Modeling</td>
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<td>URP 6855</td>
<td>Urban Form in Cities throughout the Americas</td>
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<td>URP 6871</td>
<td>Planning and Design I</td>
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<td>URP 6872</td>
<td>Planning and Design II</td>
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<tr>
<td>URP 6880</td>
<td>Defensible Space and CPTED in Urban Design</td>
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<td>URP 6887</td>
<td>Advanced Defensible Space in Urban Design</td>
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<td>URP 6905</td>
<td>Exploration and Directed Study</td>
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<td>Supervised Research</td>
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<td>URP 6920</td>
<td>Colloquium</td>
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<td>URP 6979</td>
<td>Master's Research Project</td>
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College of Design, Construction, and Planning Courses

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<td>Ecological Issues in Sustainability and the Built Environment</td>
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<td>DCP 6212</td>
<td>Sustainable Design Issues: Ecology, Architecture, and Planning</td>
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<td>DCP 6218</td>
<td>Developing Sustainable Projects</td>
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<td>DCP 6301</td>
<td>Sustainable Planning and Design Studio</td>
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<td>DCP 6701</td>
<td>World Heritage Research and Stewardship</td>
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<td>DCP 6710</td>
<td>History and Theory of Historic Preservation</td>
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<td>DCP 6711</td>
<td>History of the Built Environment for Preservation Practice</td>
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<tr>
<td>DCP 6712</td>
<td>Preservation Technology: Conserving Modern Buildings</td>
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</table>
Construction, and Planning

Degrees Offered with a Major in Design, Construction, and Planning

- Doctor of Philosophy
  - without a concentration
  - concentration in Construction Management

- optional second concentration in Geographic Information Systems
- optional second concentration in Hydrologic Sciences
- concentration in Geographic Information Systems
- concentration in Historic Preservation
  - optional second concentration in Geographic Information Systems
- concentration in Interior Design
  - optional second concentration in Geographic Information Systems
- concentration in Landscape Architecture
  - optional second concentration in Geographic Information Systems
- concentration in Urban and Regional Planning
  - optional second concentration in Geographic Information Systems

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

#### Architecture Departmental Courses

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<td>ARC 5041</td>
<td>Design and Documentation of Themed Environments</td>
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<td>ARC 5042</td>
<td>Fabrication and Execution for Themed Environments</td>
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<td>ARC 5043</td>
<td>Integration Practices for Themed Environments</td>
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<td>ARC 6044</td>
<td>Development and Operations for Themed Environments</td>
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<td>ARC 6045C</td>
<td>Project Development Studio for Themed Environments</td>
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<td>ARC 6116</td>
<td>Drawing toward Architecture</td>
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<td>ARC 6212</td>
<td>Topics in Phenomena and Architecture</td>
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<td>ARC 6228</td>
<td>Film and Architecture</td>
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<td>ARC 6241</td>
<td>Advanced Studio I</td>
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<td>ARC 6242</td>
<td>Research Methods</td>
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<td>ARC 6281</td>
<td>Professional Practice</td>
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<td>ARC 6311C</td>
<td>Building Information Modeling</td>
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<tr>
<td>ARC 6355</td>
<td>Advanced Studio II</td>
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<td>ARC 6356</td>
<td>Advanced Studio III</td>
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<td>ARC 6357</td>
<td>Advanced Topics in Architectural Design</td>
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<tr>
<td>ARC 6399</td>
<td>Advanced Topics in Urban Design</td>
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<tr>
<td>ARC 6505</td>
<td>Architectural Structural Systems: Wood, Steel, and Concrete</td>
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<td>ARC 6512</td>
<td>Structural Modeling</td>
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<tr>
<td>ARC 6611</td>
<td>Advanced Topics in Architectural Technology</td>
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<tr>
<td>ARC 6621</td>
<td>Graduate Environmental Technology 2</td>
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<tr>
<td>ARC 6642</td>
<td>Architectural Acoustic Design Laboratory</td>
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<td>ARC 6643</td>
<td>Architectural Acoustics</td>
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<td>ARC 6670</td>
<td>Lighting Design Seminar</td>
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<td>ARC 6685</td>
<td>Life Safety, Sanitation, and Plumbing Systems</td>
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<td>ARC 6686</td>
<td>LEED for Sustainable Design and Construction</td>
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<td>ARC 6705</td>
<td>Graduate Architectural History 3</td>
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<td>ARC 6773</td>
<td>Strains of Modernism</td>
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<td>ARC 6793</td>
<td>Advanced Topics in Regional Architecture</td>
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<tr>
<td>ARC 6821</td>
<td>Preservation Problems and Processes</td>
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### Construction Management Departmental Courses

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<td>Construction Methods Improvements</td>
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<td>BCN 6518</td>
<td>Comprehensive Estimating</td>
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<td>BCN 6525</td>
<td>Construction Cost Analysis</td>
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<td>BCN 5705C</td>
<td>Project Management for Construction</td>
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<td>Advanced Construction Labor Problems</td>
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<td>BCN 5722</td>
<td>Advanced Construction Planning and Control</td>
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<td>BCN 5729</td>
<td>Design-Build Delivery Methods</td>
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<td>BCN 5737</td>
<td>Advanced Issues in Construction Safety and Health</td>
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<td>BCN 5776</td>
<td>International Construction Business Management</td>
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<tr>
<td>BCN 5778</td>
<td>Facilities Operation and Maintenance</td>
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<td>BCN 579C</td>
<td>Construction Project Delivery</td>
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<td>BCN 5874</td>
<td>Equipment and Methods for Heavy Construction</td>
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<td>BCN 5885</td>
<td>Methods and Management for Heavy Construction</td>
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<td>BCN 5905</td>
<td>Special Studies in Construction</td>
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<td>BCN 5949</td>
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### Historic Preservation

#### Degrees Offered
- Master of Historic Preservation
Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

### Architecture Departmental Courses

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### Construction Management Departmental Courses

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LAA 6750 Managing Construction Information Technology 3
LAA 6761 Advanced Planning, Scheduling, and Logistics 3
LAA 6762 Construction Risk Management 3
LAA 6770 Advanced Project Safety Management 3
LAA 6775 Manufactured Construction Processes 3
LAA 6905 Directed Independent Study in International Construction 1-3
LAA 6910 Supervised Research 1-3
LAA 6930 Construction Communication and Research 3
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**Interior Design Departmental Courses**

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College of Design, Construction, and Planning Courses

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1. Human Development and Organizational Studies in Education (p. 231);
2. Special Education, School Psychology and Early Childhood Studies (https://uf-preview.courseleaf.com/graduate/colleges-departments/education/special-education-psychology-early-childhood-studies/); and
3. School of Teaching and Learning (p. 254).

Follow these links for more information about UF’s College of Education graduate programs:
http://education.ufl.edu/admissions/graduate-programs/
https://education.ufl.edu/admissions/all-programs/

Departments
- Human Development and Organizational Studies in Education (p. 231)
  - Anatomical Sciences Education (http://catalog.ufl.edu/graduate/colleges-departments/education/anatomical-sciences-education/)
  - Counseling and Counselor Education (p. 232)
  - Educational Leadership (p. 235)
  - Higher Education Administration (p. 237)
  - Marriage and Family Counseling (p. 240)
  - Mental Health Counseling (p. 242)
  - Program Evaluation in Educational Environments (p. 245)
  - Research and Evaluation Methodology (p. 247)
  - School Counseling and Guidance (p. 250)
  - Student Personnel in Higher Education (p. 253)
- School of Teaching and Learning (p. 254)
  - Anatomical Sciences Education (http://catalog.ufl.edu/graduate/colleges-departments/education/teaching-learning/anatomical-sciences-education/)
  - Curriculum and Instruction (CCD) (p. 256)
  - Curriculum and Instruction (ISC) (p. 260)
  - Elementary Education (p. 264)
  - English Education (p. 269)
  - Mathematics Education (p. 273)
  - Reading Education (p. 278)
  - Science Education (p. 282)
  - Social Studies Education (p. 286)
- Special Education, School Psychology and Early Childhood Studies (p. 290)
  - Early Childhood Education (p. 291)
  - School Psychology (p. 292)
  - Special Education (p. 295)

College of Education

Dean: G. Good

Graduate study in education, allows individuals with bachelor's degrees in agriculture, business, education, engineering, mathematics, sciences, humanities, foreign languages, preprofessional studies and other fields to prepare for rewarding professional careers in education and related fields.

The College of Education offers 19 master’s or specialist programs, 12 doctoral programs, and a J.D./Ph.D. program with the College of Law through its three schools:

Student Learning Outcomes

Historic Preservation (MHP)

SLO 1 Knowledge
Identify, describe, and synthesize the substantive body of literature on a specialized topic within the discipline and field of Historic Preservation.

SLO 2 Skills
Identify, formulate, test, and analyze research questions in Historic Preservation.

SLO 3 Professional Behavior
Engage and work with members of a community and professionals in historic preservation and other allied disciplines.

Faculty
Complete faculty listings: Follow this link (http://gradschool.ufl.edu/GimsPublic/Acalog/Faculty.aspx).

Human Development and Organizational Studies in Education

Director: M. David Miller
Graduate Coordinator: Patricia Ashton
Programs leading to the Master of Arts in Education (M.A.E.), Master of Education (M.Ed.), Education Specialist (Ed.S.), Doctor of Education (Ed.D.), and Doctor of Philosophy (Ph.D.) degrees are offered through this school with programs in Counseling and Counselor Education, Educational Leadership, Higher Education Administration, Marriage and Family Counseling, Mental Health Counseling, Research and Evaluation Methodology, School Counseling and Guidance, and Student Personnel in Higher Education.

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

More information can be found at our website: http://education.ufl.edu/hdose (http://education.ufl.edu/hdose/).

Majors

- Anatomical Sciences Education (http://catalog.ufl.edu/graduate/colleges-departments/education/human-development-organizational-studies/anatomical-sciences-education/)
- Counseling and Counselor Education (p. 232)
- Educational Leadership (p. 235)
- Higher Education Administration (p. 237)
- Marriage and Family Counseling (p. 240)
- Mental Health Counseling (p. 242)
- Program Evaluation in Educational Environments (p. 245)
- Research and Evaluation Methodology (p. 247)
- School Counseling and Guidance (p. 250)
- Student Personnel in Higher Education (p. 253)

Faculty

Professor

- Behar-Horenstein, Linda Susan
- Bhattacharya, Kakali
- Frierson, Henry T.
- Good, Glenn E.
- Leite, Walter Lana
- Miller, David
- Wood, R C.

Associate Professor

- Curran, Frank C.
- Manley, Anne Corinne
- Smith, Sondra Lori
- Swank, Jacqueline
- Therriault, David James

Assistant Professor

- Bayne, Hannah B.
- Haynes-Thoby, Latoya
- Kramer, Dennis Allan
- McFarlin, Isaac
- Ortagus, Justin Charles
- Redding, Christopher Hyde
- Skinner, Benjamin Thomas
- Zhao, Pengfei

Clinical Assistant Professor

- Eldridge, Linda Burney
- Haynes, Clifford
- Lynch, Lindsay Byron
- Mawdsley, Helena Pan
- Mousa, Bruce E.
- Schuermann, Chastity Hope
- Seraphine, Anne Elizabeth
- Smith, Shon D.
- Super, John
- Tannen, Christina A.
- Woehler, Elliott S.

Clinical Associate Professor

- Searby, Linda Jane

Clinical Professor

- Peck Parrott, Kelli Deann

Scholar

- Puig, Ana

Assistant In

- Porter-Roberts, Julia D.

Affiliated Faculty

- Lenes, Emilie Ayn
  Clinical Assistant Professor
- Parrott, David Wayne
  Other
- Sixbey, Meggen B.
  Clinical Associate Professor

Counseling and Counselor Education Program Information

The doctoral program in Counseling and Counselor Education prepares students for careers in academia and advanced clinical and administrative positions. Our program aligns with the University of Florida mission to prepare the next generation of scholars and professional leaders. Thus, our doctoral program is a good fit for individuals who want to fulfill the roles of counselor educators – research, writing, teaching, service, securing external funding to support scholarship, assuming professional leadership positions, etc. The doctoral program is ideally suited for individuals with previously earned masters and at least two years of clinical experience. Doctoral students complete coursework, a doctoral clinical internship, participate in teaching and supervision, and conduct research leading to the completion of a dissertation. Students average 3 to 5 years to complete the doctorate, many of whom balance work and school commitments.
### Degrees Offered

**Degrees Offered with a Major in Counseling and Counselor Education**

- Doctor of Education
  - without a concentration
  - concentration in Marriage and Family Counseling
  - concentration in Mental Health Counseling
  - concentration in School Counseling and Guidance
- Doctor of Philosophy
  - without a concentration
  - concentration in Marriage and Family Counseling
  - concentration in Mental Health Counseling
  - concentration in School Counseling and Guidance

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

#### Human Development and Organizational Studies in Education Departmental Courses

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College of Education Courses

Student Learning Outcomes

Counseling & Counselor Education

SLO 1 Knowledge
Candidates will apply professional knowledge in each of the eight (CACREP) common core curricular areas and at least one specialty area within the counselor education context.

SLO 2 Skills
Candidates will apply proficiency in counseling, supervision, counselor education (teaching), and research associated with counselor preparation and training.

SLO 3 Professional Behavior
Candidates will apply professional behavior in the field of counselor education and supervision by engaging in: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional
organizations and credentialing bodies, and applications of ethical and legal considerations in professional counseling.

**Educational Leadership**

**Program Information**

Programs in Educational Leadership provide opportunities for professional educators and those who would like to be professional educators to receive quality coursework, mentorship, and degrees in educational administration, policy, and leadership. The programs provided are ideal for vice principals, principals, district directors and supervisors, assistant superintendents, school business managers, teachers aspiring to acquire administrative roles within the K-12 system and educational leaders of other organizations.

**Degrees Offered**

**Degrees Offered with a Major in Educational Leadership**

- Doctor of Education
  - without a concentration
  - concentration in Educational Policy
- Doctor of Philosophy
  - without a concentration
  - concentration in Educational Policy
- Master of Arts in Education
- Master of Education
- Specialist in Education

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

**Human Development and Organizational Studies in Education Departmental Courses**

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### College of Education Courses

**Student Learning Outcomes**

**Educational Leadership (PHD)**

**SLO 1 Knowledge**
Students will identify and describe the core curricular areas of educational leadership including: school finance and law, human resources, technology, data-driven decision-making, diversity, organizational theory, supervision, evaluation, and research.

SLO 2 Skills
Candidates will apply clarity of written and oral expression to advanced levels of skill in the core areas of educational leadership, evaluation and dissertation research.

SLO 3 Skills
Candidates will identify and explain competencies and skills of instructional leadership, operational leadership and school leadership to promote the success of all students.

SLO 4 Professional Behavior
Candidates will participate in professional organizations and will apply ethical behavior and professional conduct.

SLO 5 Professional Behavior
Candidates will promote the success of all students by understanding the larger political, social, economic, legal and cultural issues.

**Educational Leadership (edd)**

SLO 1 Knowledge
Candidates will identify and describe the core curricular areas of educational leadership including: school finance and law; human resources; technology; data-driven decision-making, diversity; organizational theory, leading change, educational policy, instructional leadership, program evaluation, supervision and strategic planning.

SLO 2 Skills
Candidates will apply clarity of written and oral expression to advanced levels of skill in the core areas of educational leadership, evaluation and dissertation research.

SLO 3 Skills
Candidates will identify and explain competencies and skills of instructional leadership, operational leadership, and school leadership to promote the success of all students and the improvement of teacher quality.

SLO 4 Professional Behavior
Candidates will apply ethical behavior, professional conduct, and communication.

SLO 5 Professional Behavior
Candidates will promote the success of all students by understanding the larger political, social, economic, legal and cultural issues.

**Educational Leadership (MEd)**

SLO 1 Knowledge
Candidates will identify and describe the core curricular areas of educational leadership including school finance, law, human resources, technology, data-driven decision-making, diversity, organizational theory, supervision & strategic planning.

SLO 2 Skills
Candidates will apply competencies and skills of instructional leadership, operational leadership and school leadership to promote the success of all students.

SLO 3 Professional Behavior
Candidates will apply ethical behavior, professional conduct, and communication.

SLO 4 Professional Behavior
Candidates will promote the success of all students by understanding the larger political, social, economic, legal and cultural issues.

**Higher Education Administration Program Information**

The Higher Education Administration program is one of the nation’s premier graduate programs for higher education administration and policy evaluation. Our emphasis remains on the role of research in evaluating policies, informing institutional effectiveness, and creating scholarship that connects both scholars and practitioners through a multidisciplinary approach. Focusing on both the two-year and four-year sectors, our nationally respected Higher Education Administration
Degrees Offered

Degrees Offered with a Major in Higher Education Administration

- Doctor of Education
  - without a concentration
  - concentration in Educational Policy
- Doctor of Philosophy
  - without a concentration
  - concentration in Educational Policy

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Human Development and Organizational Studies in Education Departmental Courses

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College of Education Courses

Student Learning Outcomes

Higher education administration (PhD)

SLO 1  Knowledge
* Identifies, describes, and explains the substantive body of literature related to leadership and governance, funding, the role of the government as well as issues pertaining to students, faculty, and administrators. * Describes and explains institutional contexts in higher education. * Describes and explains the functional aspects of higher education institutions including issues related to higher education administration. * Describes and explains the substantive body of literature related to leadership and governance, funding, the role of the government as well as issues pertaining to students, faculty, and administrators.

SLO 2  Skills
* Relate and apply major concepts and theories in the literature to specific higher education issues, cases, and settings. * To develop skills in higher education administration.
of analysis, synthesis, research, and communication (verbal and written) concerning issues and topics related to higher education * To write academically according to APA style and to other audiences effectively

SLO 3  Professional Behavior
* Displays ethical behaviors consistent with professional standards related to research and publishing and practice demonstrated through cultural sensitivity, awareness, and empathy * Abides to expectations and norms of the discipline and profession

Higher education administration (Edd)
SLO 1  Knowledge
* Identifies, describes, and explains the substantive body of literature related to higher education and the national, state, regional, and institutional contexts in higher education  * Describes and explains the institutional functioning of higher education institutions including issues related to leadership and governance, funding, the role of the government as well as issues pertaining to students, faculty, and administrators *Identifies and describes the major global and national trends affecting higher education  * Identifies and describes the most conventional types of qualitative and quantitative research methodologies applied to the study of higher education

SLO 2  Skills
* Relate and apply major concepts and theories in the literature to specific higher education issues, cases, and settings * To develop skills of analysis, synthesis, research, and communication (verbal and written) concerning issues and topics related to higher education * To write academically according to APA style and to other audiences effectively

SLO 3  Professional Behavior
* Displays ethical behaviors consistent with professional standards related to research and publishing and practice demonstrated through cultural sensitivity, awareness, and empathy Abides to expectations and norms of the discipline and profession

Marriage and Family Counseling
Program Information
The Marriage & Family Counseling/Therapy program is designed to equip students with the pre-professional competencies required for Registered Intern status and, after a minimum number of years of post-degree supervised clinical experience, for licensure in the State of Florida as Marriage and Family Counselors. The program emphasizes an ecosystemic approach to understanding human problems and generating solution opportunities to mutual concerns and problems.

Degrees Offered

Degrees Offered with a Major in Marriage and Family Counseling
* Master of Arts in Education
* Master of Education
* Specialist in Education

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

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College of Education Courses

Student Learning Outcomes

marriage & Family therapy (eds)

SLO 1 Knowledge
Candidates will apply professional knowledge to address a wide variety of issues in the context of relationships and families.

SLO 2 Skills
Candidates will apply ethical and legal standards in marriage, couple, and family counseling and select models or techniques appropriate to couples’ or families’ presenting problems in a practical setting.

SLO 3 Professional Behavior
Candidates will demonstrate professional behavior in marriage and family counseling by: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional organizations and credentialing bodies, and applications of ethical and legal considerations in professional counseling.

Marriage & Family Therapy (MAE)

SLO 1 Knowledge
Candidates will apply professional knowledge to address a wide variety of issues in the context of relationships and families.

SLO 2 Skills
Candidates will engage in marriage and family counseling skills by applying ethical and legal standards in marriage, couple, and family counseling and to select models or techniques appropriate to couples’ or families’ presenting problems.

SLO 3 Professional Behavior
Candidates will engage in professional behavior in marriage and family counseling by: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional organizations and credentialing bodies, and applications of ethical and legal considerations in professional counseling.

Marriage & Family Therapy (MEd)

SLO 1 Knowledge
Candidates will apply professional knowledge to address a wide variety of issues in the context of relationships and families.

SLO 2 Skills
Candidates will engage in marriage and family counseling skills by applying ethical and legal standards in marriage, couple, and family counseling and to select models or techniques appropriate to couples’ or families’ presenting problems.

SLO 3 Professional Behavior
Candidates will engage in professional behavior in marriage and family counseling by: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional organizations and credentialing bodies, and applications of ethical and legal considerations in professional counseling.

Mental Health Counseling

Program Information

The M.Ed./Ed.S. and M.AE./Ed.S. program in Mental Health Counseling is designed to equip students with the pre-professional competencies required for Registered Intern status and, after a minimum number of years of post-degree supervised clinical experience,

1. licensure in the State of Florida as Mental Health Counselors and
2. clinical membership in NBCC’s Academy of Certified Clinical Mental Health Counselors.

Additionally, some students elect the thesis option (M.A.E.) to complete their studies.

Degrees Offered

Degrees Offered with a Major in Mental Health Counseling

- Master of Arts in Education
- Master of Education
- Specialist in Education

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Human Development and Organizational Studies in Education Departmental Courses

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EDH 6006 The College Student 3
EDH 6040 Theory of College Student Development 3
EDH 6046 Diversity Issues in Higher Education 3
EDH 6051 Educational Outcomes of American Colleges and Universities 3
EDH 6053 The Community Junior College in America 3
EDH 6065 History of American Higher Education 3
EDH 6066 American Higher Education 3
EDH 6305 College and University Teaching 3
EDH 6360 Foundations and Functions of College Student Personnel 3
EDH 6361 Theories and Assessment of Higher Educational Environments 3
EDH 6503 Resource Development in Higher Education 3
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EDH 7948 Internship in Student Personnel 5
EDH 7979 Advanced Research 1-12
EDH 7980 Research for Doctoral Dissertation 1-15
College of Education Courses

Student Learning Outcomes

mental health counseling (eds)

SLO 1 Knowledge
Candidates will identify, explain, and defend professional knowledge to address a wide variety of circumstances within the clinical mental health counseling context.

SLO 2 Skills
Candidates demonstrate proficiency in counseling skills by applying principles and practices of diagnosis, treatment, referral, and prevention of mental and emotional disorders to initiate, maintain, and terminate counseling. Candidates also apply multicultural competencies to clinical mental health counseling involving case conceptualization, diagnosis, treatment, referral, and prevention of mental and emotional disorders.

SLO 3 Professional Behavior
Candidates will demonstrate professional behavior in mental health counseling by engaging in: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional organizations and credentialing bodies, and applications of ethical and legal considerations in professional counseling.

Mental Health Counseling (MAE)

SLO 1 Knowledge
Candidates will identify, explain, and defend professional knowledge to address a wide variety of circumstances within the clinical mental health counseling context.

SLO 2 Skills
Candidates demonstrate proficiency in counseling skills by applying principles and practices of diagnosis, treatment, referral, and prevention of mental and emotional disorders to initiate, maintain, and terminate counseling. Candidates also apply multicultural competencies to clinical mental health counseling involving case conceptualization, diagnosis, treatment, referral, and prevention of mental and emotional disorders.

SLO 3 Professional Behavior
Candidates will demonstrate professional behavior in mental health counseling by engaging in: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional organizations and credentialing bodies, and applications of ethical and legal considerations in professional counseling.
Mental Health Counseling (MEd)

SLO 1 Knowledge
Candidates will identify, explain, and defend professional knowledge to address a wide variety of circumstances within the clinical mental health counseling context.

SLO 2 Skills
Candidates demonstrate proficiency in counseling skills by applying principles and practices of diagnosis, treatment, referral, and prevention of mental and emotional disorders to initiate, maintain, and terminate counseling. Candidates also apply multicultural competencies to clinical mental health counseling involving case conceptualization, diagnosis, treatment, referral, and prevention of mental and emotional disorders.

SLO 3 Professional Behavior
Candidates will demonstrate professional behavior in mental health counseling by engaging in: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional organizations and credentialing bodies, and applications of ethical and legal considerations in professional counseling.

Program Evaluation in Educational Environments

Program Information
The goal of the Program Evaluation in Educational Environments is to prepare exemplary educational evaluators, who are able to apply state-of-the-art evaluation theory and tools to develop, improve, and assess programs, organizations, and policies. The coursework and learning experiences offered by this major are designed to train and empower evaluators to provide evaluation support for organizations and institutions, as they seek solutions to critical problems at local, national, and global levels. Because evaluation activity crosses disciplines, the evaluator is able to provide a unique and informed perspective to guide social change and innovations. The actions and recommendations of a program evaluator often trigger and foster positive reform in policies and programs in government, schools, business, health, and social agencies both locally, nationally, and internationally.

- Learn to evaluate educational and other social science programs, interpret educational data, develop evaluation assessment instruments, and use research methodologies and evaluation theory to plan, conduct, and complete a program evaluation.
- Find jobs in federal and state agencies, institutions of higher education, school districts, and for-profit and non-profit organizations. A number of program evaluators also choose to work as private consultants for school districts, government agencies, and private organizations.
- Complete a master’s degree (M.A.E.) in two years with classes focusing on program evaluation theory and tools, research methodology, and statistics and psychometrics as applied to educational program evaluation.
- Our students come from a variety of backgrounds, including psychology; education; sociology; political science; anthropology; agricultural, family, youth, and community sciences; and health education and performance.

Degrees Offered
Degrees Offered with a Major in Program Evaluation in Educational Environments
- Master of Arts in Education

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Human Development and Organizational Studies in Education Departmental Courses

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EDH 7225 Seminar: Curriculum in Higher Education 3
EDH 7405 The Law and Higher Education 3
EDH 7505 The Financing of Higher Education 3
EDH 7631 Administration of Instruction in Higher Education 3
EDH 7634 Student Affairs Administration in Higher Education 3
EDH 7635 Higher Education Administration 3
EDH 7636 Organizational Theory in Higher Education 3
EDH 7916 Contemporary Research on Higher Education 3
EDH 7942 Supervised Practice in Student Personnel in Higher Education 1
EDH 7948 Internship in Student Personnel 5
EDH 7979 Advanced Research 1-12
EDH 7980 Research for Doctoral Dissertation 1-15
EDH 7982 Research Proposal Development in Higher Education 3
EDP 6052 Cognitive Psychology Applied to Education 3
MHS 5005 Introduction to Counseling 3
MHS 6000 Assessment and Treatment of Family Violence 3
MHS 6020 Counseling in Community Settings 3
MHS 6061 Spiritual Issues in Multicultural Counseling 3
MHS 6071 Diagnosis and Treatment of Mental Disorders 3
MHS 6200 Assessment in Counseling 3
MHS 6340 Career Development 3
MHS 6401 Counseling Theories and Applications 3
MHS 6421 Play Counseling and Play Process with Children 3
MHS 6428 Multicultural Counseling 3
MHS 6430 Introduction to Family Counseling 3
MHS 6440 Marriage and Couples Counseling 3
MHS 6450 Substance Abuse Counseling 3
MHS 6466 Trauma and Crisis Intervention: Theory and Practice 3
MHS 6471 Sexuality and Mental Health 3
MHS 6480 Developmental Counseling Over the Life Span 3
MHS 6495 Counseling Lesbian, Gay, Bisexual, and Transgender Clients 3
MHS 6500 Group Counseling: Theories and Procedures 3
MHS 6705 Professional, Ethical, and Legal Issues in Marriage and Family Counseling 3
MHS 6720 Professional Identity and Ethics in Counseling 3
MHS 6735 Applied Research in Counseling 3
MHS 6831 Supervision for a Split Internship 3-6
MHS 6910 Supervised Research 1-5
MHS 6940 Supervised Teaching 0-5
MHS 6971 Research for Master’s Thesis 1-15
MHS 7407 Advanced Counseling Theories 3
MHS 7431 Advanced Family Counseling 4
MHS 7600 Consultation Procedures 3
MHS 7610 Counseling Supervision Theories and Practice 3
MHS 7730 Advanced Counseling Research 3
MHS 7740 Research in Counseling 3
MHS 7804 Group Supervision in Agency Counseling 3
College of Education Courses
Research and Evaluation Methodology

Program Information

The mission of the Research and Evaluation Methodology program is to generate, evaluate, apply and disseminate knowledge about educational research methodology, to prepare exemplary educational research methodologists, and to collaborate with others to provide methodology for the advancement of educational research. This mission aligns with College of Education's and University of Florida's missions because it supports the advancement of educational research. This mission aligns with the mission of the Research and Evaluation Methodology program to generate, evaluate, apply, and disseminate knowledge about educational research methodology.

- Learn to evaluate educational programs, analyze educational data, develop assessment instruments, and conduct research about the efficacy of research methodologies.
- Work as an educational researcher, an educational data analyst, or a psychometrician (an expert in testing and assessment).
- Find jobs in testing companies; research and evaluation companies; research centers; and assessment centers at universities, school districts, and state and federal agencies.
- Complete a master’s degree (M.A.E. or M.Ed.) in two years or a Ph.D. in four years with classes focusing on research methodology, statistics applied to education, program evaluation, and psychometrics.
- We admit students with some undergraduate research experience. Our students come from a variety of backgrounds, including psychology, sociology, statistics, mathematics, mathematics education, political science, marketing, economics, and engineering.

Degrees Offered

Degrees Offered with a Major in Research and Evaluation Methodology

- Doctor of Education
- Doctor of Philosophy
- Master of Arts in Education
- Master of Education

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Research and Evaluation Methodology Courses

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College of Education Courses

Student Learning Outcomes

Research & evaluation methodology (Phd)

SLO 1  Knowledge
Majors will identify, define, explain, and describe the concepts, methods and issues in educational measurement and assessment, evaluation, and research methodology.

SLO 2  Skills
Majors will formulate hypotheses, plan and design educational research studies, plan and design methodological research studies, analyze data, and report results at an advanced level.

SLO 3  Professional Behavior
Majors will participate in professional organizations, research presentations, or scholarly publications.

Research & evaluation methodology (edd)

SLO 1  Knowledge
Majors will identify, define, explain, and describe the concepts, methods and issues in educational measurement and assessment, evaluation, and research methodology.

SLO 2  Skills
Majors will formulate hypotheses, plan and design educational research studies, plan and design methodological research studies, analyze data, and report results at an advanced level.

SLO 3  Professional Behavior
Majors will participate in professional organizations, research presentations, or scholarly publications.
Research & Evaluation Methodology (MAE)

SLO 1 Knowledge
Majors will identify, define, explain, and describe the concepts, methods and issues in educational measurement and assessment, evaluation, and research methodology.

SLO 2 Skills
Majors will formulate hypotheses, planning and designing educational research studies, planning and designing methodological research studies, analyzing data, and reporting results.

SLO 3 Professional Behavior
Majors will present concepts in research methodology both orally and in writing.

Research & Evaluation Methodology (MEd)

SLO 1 Knowledge
Majors will identify, define, explain, and describe the concepts, methods and issues in educational measurement and assessment, evaluation, and research methodology.

SLO 2 Skills
Majors will formulate hypotheses, planning and designing educational research studies, analyzing data, and reporting results.

SLO 3 Professional Behavior
Majors will present concepts in research methodology both orally and in writing.

School Counseling and Guidance

Program Information
The M.Ed./Ed.S. and M.AE./Ed.S. program in School Counseling is designed to equip students with the pre-professional competencies required for Florida Department of Education Certification in School Counseling. The 72-credit hour program provides students with the specialized knowledge and skills required for placements as school counselors in public or private elementary, middle, or secondary schools.

Students enrolled in the School Counseling program, a state-approved and CAEP (Council for the Accreditation of Educator Preparation) and CACREP (Council for the Accreditation of Counseling and Related Educational Programs) accredited school counselor preparation program, must provide passing scores for all pertinent sections of the Florida Teacher Certification Examination (FTCE) including the General Knowledge test (math, English language skills, reading comprehension, and essay), the Professional Education examination, and the Subject Area Examination in Guidance and Counseling K-12 prior to graduation from the program. Questions about this requirement or any other certification related questions may be addressed to the College of Education Office of Student Services.

Degrees Offered

Degrees Offered with a Major in School Counseling and Guidance
- Doctor of Philosophy
- Master of Arts in Education
- Master of Education
- Specialist in Education

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Human Development and Organizational Studies in Education Departmental Courses

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credentialing bodies, and applications of ethical and legal considerations on these issues; (c) ethical standards of professional organizations and accreditation practices and standards, and the effects of public policy professional credentialing, including certification, licensure, and benefits, activities, services to members, and current issues; (b) by engaging in: (a) professional organizations, including membership

Candidates will demonstrate professional behavior in school counseling advocate for an appropriate school counselor identity and program.

SLO 3: Professional Behavior
Candidates will demonstrate professional behavior in school counseling by engaging in: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional organizations and credentialing bodies, and applications of ethical and legal considerations in professional counseling.

**School Counseling & Guidance (EdS)**

SLO 1: Knowledge
Candidates will identify, explain, and defend professional knowledge to address a wide variety of circumstances within the school counseling field.

SLO 2: Skills
Candidates demonstrate proficiency in school counseling skills by demonstrating the ability to apply and adhere to ethical and legal standards in school counseling and the ability to articulate, model, and advocate for an appropriate school counselor identity and program.

SLO 3: Professional Behavior
Candidates will demonstrate professional behavior in school counseling by engaging in: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional organizations and credentialing bodies, and applications of ethical and legal considerations in professional counseling.

**School Counseling & Guidance (MAE)**

SLO 1: Knowledge
Candidates will identify, explain, and defend professional knowledge to address a wide variety of circumstances within the school counseling field.

SLO 2: Skills
Candidates demonstrate proficiency in school counseling skills by demonstrating the ability to apply and adhere to ethical and legal standards in school counseling and the ability to articulate, model, and advocate for an appropriate school counselor identity and program.

SLO 3: Professional Behavior
Candidates will demonstrate professional behavior in school counseling by engaging in: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional organizations and credentialing bodies, and applications of ethical and legal considerations in professional counseling.

**School Counseling & Guidance (MEd)**

SLO 1: Knowledge
Candidates will identify, explain, and defend professional knowledge to address a wide variety of circumstances within the school counseling field.

SLO 2: Skills
Candidates demonstrate proficiency in school counseling skills by demonstrating the ability to apply and adhere to ethical and legal standards in school counseling and the ability to articulate, model, and advocate for an appropriate school counselor identity and program.

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Candidates will demonstrate professional behavior in school counseling by engaging in: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional organizations and credentialing bodies, and applications of ethical and legal considerations in professional counseling.

**College of Education Courses**

**Student Learning Outcomes**

**School Counseling & Guidance**

SLO 1: Knowledge
Candidates will identify, explain, and defend professional knowledge to address a wide variety of circumstances within the school counseling field.

SLO 2: Skills
Candidates demonstrate proficiency in school counseling skills by demonstrating the ability to apply and adhere to ethical and legal standards in school counseling and the ability to articulate, model, and advocate for an appropriate school counselor identity and program.

SLO 3: Professional Behavior
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Student Personnel in Higher Education

Program Information

The University of Florida Student Personnel in Higher Education
program is a master’s program designed to prepare students to enter
Student Affairs leadership positions in two- and four-year institutions
of higher education. The program integrates academic coursework with
practitioner-based experience. The SPHE master’s degree consists of 36
credit hours of core classes and 10 credit hours of supervised practicum
and internship experiences (total = 46 credit hours). Students enter the
graduate program in the fall semester as members of a cohort group.
The group provides support and builds a sense of community for the
students. All students are assigned a faculty advisor at the time of
admission.

The student affairs profession is increasingly diverse and is engaged
in a variety of activities and programs. The emphasis in UF’s master’s
degree program in SPHE is upon the promotion, design, and assessment
of student learning in a variety of campus and community settings.

Degrees Offered

Degrees Offered with a Major in Student Personnel in Higher Education

- Master of Arts in Education
- Master of Education

Requirements for these degrees are given in the Graduate Degrees (p. 48)
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**College of Education Courses**

**School of Teaching and Learning**

Director: Ester de Jong
Graduate Coordinator: Albert D. Ritzhaupt

The School of Teaching and Learning (http://education.ufl.edu/school-teaching-learning) offers face-to-face and online programs leading to the Master of Education (M.Ed., non-thesis), Master of Arts in Education (M.A.E., thesis or project in lieu of thesis), Specialist in Education (Ed.S.), Doctor of Education (Ed.D.), and Doctor of Philosophy (Ph.D.) degrees. Descriptions of the programs are linked below, and official requirements for these degrees are provided in the Graduate Degrees (p. 48) section of this catalog.

Students pursuing the Ph.D. degree in Curriculum & Instruction gain research and teaching experience in one of 10 areas of specialization:

• Curriculum, Teaching, & Teacher Education (CTTE);
• Educational Technology;
• English Education;
• ESOL/Bilingual Education;
• Language Arts, Reading, & Children’s Literature (LARC);
• Mathematics Education;
• Science & Environmental Education;
• Social Foundations of Education;
• Social Studies Education; and
• Statistics Education.

The Ed.D. degree is a professional practice doctorate with two specialization areas for students to pursue online: Curriculum, Teaching, & Teacher Education (CTTE) and Educational Technology. Various forms of financial support are available to Ph.D. students through fellowships, scholarships, research assistantships, and teaching assistantships.

Students aspiring to careers in teaching will be interested in the following programs. The nationally recognized ProTeach graduate program leads to the M.Ed. degree and state certification as a classroom teacher. Unified Elementary ProTeach admits undergraduates who complete the five-year program with a master’s degree. Secondary Proteach (English, Science, Social Studies) prepares teachers who have completed a bachelor’s degree in the discipline they will teach. Prospective elementary teachers who already hold a bachelor’s degree in a non-education field may want to consider the School’s SITE program (Site-based Implementation of Teacher Education).

The School of Teaching and Learning also offers graduate programs and specializations at the M.Ed., M.A.E, and Ed.S. degrees for students seeking to deepen their knowledge and to advance within their professions. These include Educational Technology, English Education, ESOL/bilingual Education, Language Arts, Reading & Children’s Literature (LARC), Literacy & the Arts, Mathematics Education, Media Literacy Education, Reading Education, Science Education, Social Foundations of Education, Social Studies Education and Teacher Leadership for School Improvement (TLSI).

Majors

• Anatomical Sciences Education (http://catalog.ufl.edu/graduate/colleges-departments/education/teaching-learning/anatomical-sciences-education/)
• Curriculum and Instruction (CCD) (p. 256)
• Curriculum and Instruction (ISC) (p. 260)
• Elementary Education (p. 264)

Facult y

Professor

• Adams, Thomaseria L.
• Bondy, Elizabeth
• Crippen, Kent J.
• Dana, Nancy L.
• Dana, Thomas M.
• Dawson, Kara Mariehopkins
• De Jong, Ester Johanna
• Fang, Zhihui
• Fu, Danling
• Terzian, Sevan G.
• Washington, Elizabeth Anne

Associate Professor

• Antonenko, Pavlo
• Brown, Julie Catherine
• Coady, Maria R.
• Israel, Maya
• Pringle, Rose Marie
• Ritzhaupt, Albert D.
• Schmidt, Matthew Martin

Assistant Professor

• Coleman King, Chonika Ceptember
• Kim, Dongho
• Kohnen, Angela Marie
• Pacheco, Mark B.
• Paolucci, Catherine Ann
• Xing, Wanli

Clinical Assistant Professor

• Jeter, Gage Ryan
• Lazarevic, Bojan

Clinical Associate Professor

• Adams, Alyson Joyce
• Kumar, Swapna

Affiliated Faculty

• Black, Erik Wade
Research Associate Professor
• Busey, Christopher L.
Assistant Professor
• Vesco, Vicki Ann
Clinical Assistant Professor
Curriculum and Instruction (CCD)

Program Information

The School of Teaching & Learning's doctoral program in Curriculum & Instruction cultivates proficient scholars, teachers, and other educational professionals through an academically rigorous curriculum that balances theoretical and applied knowledge.

The Ed.D. is viewed as a professional practice doctorate wherein graduate students acquire and produce expert knowledge of how theoretical and empirical academic research can be applied in ways that foster school improvement in various contexts. The Ed.D. degree prepares students to advance within their professions and is not designed to prepare for faculty careers in higher education. Ed.D. students pursue specializations in one of two areas: Curriculum, Teaching, & Teacher Education (CTTE) (https://education.ufl.edu/curriculum-teaching/edd/) and Educational Technology (https://education.ufl.edu/educational-technology/). Both specializations are offered to students online.

All doctoral students are required to complete successfully a minimum of 90 credits. Coursework includes research methodology and methods, educational curriculum and foundations, independent research, specialization seminars, and at least 12 credit hours of dissertation work. To earn their doctoral degree, all students must complete their coursework satisfactorily, pass written and oral qualifying examinations, and successfully complete and defend a dissertation.

For more information, please see our website: http://education.ufl.edu/school-teaching-learning/.

Degrees Offered

Degrees Offered with a Major in Curriculum and Instruction

- Doctor of Education
  - without a concentration
  - concentration in Educational Technology

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

School of Teaching and Learning

Departmental Courses

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<tr>
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<td>Role of School in Democratic Society</td>
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EDF 7934 Seminar in Educational Foundations 3
EDG 5666 Knowing and Learning in Secondary Schools 3
EDG 6017 Writing for Academic Purposes 3
EDG 6047 Teacher Leadership for Educational Change 3
EDG 6207 Transforming the Curriculum 3
EDG 6225 Global Studies Methods in K-12 Education 3
EDG 6226 Foundations of Research in Curriculum & Instruction 3
EDG 6305 Multiple Perspectives on Teaching and Learning 3
EDG 6348 Instructional Coaching for Enhanced Student Learning 3
EDG 6356 Teaching, Learning and Assessment 3
EDG 6378 Learning Science with Technology 3
EDG 6415 Culturally Responsive Classroom Management 3
EDG 6445 Meeting the Educational Needs of Students Living in Poverty 3
EDG 6664 Survey of Research on STEM Education 3
EDG 6905 Individual Work 1-6
EDG 6910 Supervised Research 1-5
EDG 6931 Special Topics 1-4
EDG 6940 Supervised Teaching 1-5
EDG 6953 TLSI Online Portfolio Preparation 1-3
EDG 6971 Research for Master's Thesis 1-15
EDG 6973 Project in Lieu of Thesis 1-9
EDG 7224 Critical Pedagogy 3
EDG 7252 Perspectives in Curriculum, Teaching, and Teacher Education 3
EDG 7303 Teacher Learning and Socialization in High Poverty Schools 3
EDG 7359 Professional Development and Teacher Learning 3
EDG 7941 Field Experience in Curriculum and Instruction 1-4
EDG 7979 Advanced Research 1-12
EDG 7980 Research for Doctoral Dissertation 1-15
EDG 7982 Practitioner Research: Theory & Practice 3
EME 5054 Foundations of Educational Technology 3
EME 5207 Designing Technology-Rich Curricula 3
EME 5403 Instructional Computing I 3
EME 5404 Instructional Computing II 3
EME 5405 Internet in K-12 Instruction 3
EME 5432 Integrating Technology into Social Science Classroom 3
EME 6059 Blended Learning Environments 3
EME 6065 Human-Computer Interaction and the Learner 3
EME 6066 Issues and Trends in Educational Technology Research 3
EME 6074 Mobile Technologies in Education 3
EME 6156 Games and Simulations for Teaching and Learning 3
EME 6208 Designing Integrated Media Environments I 3
EME 6209 Designing Integrated Media Environments II 3
EME 6235 Managing Educational Projects 3
EME 6236 Distance Education Leadership and Management 3
EME 6458 Distance Teaching and Learning 3
EME 6606 Advanced Instructional Design 3
EME 6609 Instructional Design 3
EME 6935 Seminar: Distance Education Issues and Applications 1
Instructions

Instructional Design

Classroom Literacy Assessment and Seminar in Reading Practices in Beginning Reading Instruction

Grades

Reading Instruction in the Intermediate Grades

Music Education Seminar

Mathematics Education Seminar

Inquiry in Mathematics Teaching

Understanding Regulated Learning and Mathematical Classroom Contexts that Support Self-

Problem Solving in School Mathematics

Secondary School Mathematics Practicum

Mathematical Learning

Using Formative Assessment to Improve Mathematical Learning

Secondary School Mathematics Practicum 3-6

Problem Solving in School Mathematics 3

Classroom Contexts that Support Self-Regulated Learning and Mathematical Understanding

Inquiry in Mathematics Teaching 3

Mathematics Education Seminar 3

Music Education Seminar 3

Reading in the Primary Grades 3

Reading in the Secondary School 3

Reading Instruction in the Intermediate Grades 3

Practices in Beginning Reading Instruction 3

Seminar in Reading 3-6

Classroom Literacy Assessment and Instruction 3

Code

EME 6945 Practicum in Educational Media and Instructional Design 3

EME 7345 Implementing Educational Technology Innovations (ETIs) 3

EME 7938 Seminar in Educational Media and Instructional Design 3

ESE 5426 Data-Driven Decision Making for Secondary Teachers 3

ESE 6344 Classroom Practices and Assessment in Secondary Education 3

ESE 6345 Effective Teaching and Classroom Management 3

ESE 6905 Individual Work 1-4

ESE 6939 Special Topics 3

ESE 6945 Student Teaching in Secondary School 3-9

FLE 6165 Bilingual-Bicultural Education 3

FLE 6167 Cross-Cultural Communication for Teachers 3

LAE 6298 Literacy & Language Instruction 3

LAE 6339 Curriculum, Methods, and Assessment in Secondary English Language Arts 3

LAE 6348 Teaching Multiliteracies 3

LAE 6365 Language Arts: Language and Composition 3

LAE 6366 Language Arts: Literature 3

LAE 6407 Early Childhood Children’s Literature 3

LAE 6446 Multicultural Literature for Children and Adolescents 3

LAE 6616 Seminar in Children's Literature 3

LAE 6861 Technology and Media Literacy 3

LAE 6865 Teaching Media Literacy with the Internet 3

LAE 6869 Teaching Digital Storytelling 3

LAE 6939 Literacy, Family, and Culture 3

LAE 6945 Practicum and Assessment for Teachers of Secondary School English 3

LAE 6946 Children’s Literature in Educational Settings 3

LAE 7006 Language Acquisition and Education 3

LAE 7519 Language and Inquiry 3

LAE 7934 Seminar in Composition Theory and Practice 3

LAE 7936 Seminar in English Language Arts 3

LAE 7938 Lit, Cult and Politics 3

MAE 5327 Middle School Mathematics Methods 3

MAE 5332 Secondary School Mathematics Methods and Assessment 3

MAE 5347 Teaching K-8 Mathematics for Understanding 3

MAE 5395 Multicultural Mathematics Methods 3

MAE 5396 Using Formative Assessment to Improve Mathematical Learning 3

MAE 5945 Secondary School Mathematics Practicum 3-6

MAE 6313 Classroom Contexts that Support Self-Regulated Learning and Mathematical Understanding 3

MAE 6916 Inquiry in Mathematics Teaching 3

MAE 7899 Mathematics Education Seminar 3

MUE 7938 Music Education Seminar 3

RED 5316 Reading in the Primary Grades 3

RED 5337 Reading in the Secondary School 3

RED 5355 Reading Instruction in the Intermediate Grades 3

RED 5399 Practices in Beginning Reading Instruction 3

RED 6346 Seminar in Reading 3-6

RED 6520 Classroom Literacy Assessment and Instruction 3

RED 6546C Diagnosis of Reading Difficulties 3

RED 6548C Remediation of Reading Difficulties 3

RED 6647 Trends in Reading 3

RED 6941 Practicum in Diagnosis and Remediation of Reading Difficulties 3

RED 7019 Foundations of Literacy 3

SCE 5140 Science Curriculum Development 3

SCE 5316 Inquiry-Based Science Teaching 3

SCE 5695 Diversity and Equity in Science Teaching 3

SCE 5765 Data-Driven Science Instruction 3

SCE 5825 Foundations of Science Teaching 3

SCE 6117 Science Education in the Elementary School 3

SCE 6246 Science Instruction in Informal Settings 3

SCE 6337 Secondary Science Methods and Assessment 3

SCE 6647 Global Studies Methods in Science Education 3

SCE 6947 Practicum in Secondary Science Teaching and Assessment 3

SSE 5945C Practicum in Secondary Social Studies Teaching and Assessment 3

SSE 6046 Perspectives in Social Studies Education 3

SSE 6117 Social Studies Education??Elementary School 3

SSE 6133 Secondary School Social Studies Methods and Assessment 3

SSE 6478 Global Studies Methods for Social Studies 3

TSL 5142 ESOL Curriculum, Methods, and Assessment 3

TSL 5325 Secondary ESOL Teaching Strategies 3

TSL 6145 Curriculum and Materials Development for ESOL K-12 3

TSL 6245 Language Principles for ESOL Teachers 3

TSL 6373 Methods of Teaching ESOL K-12 3

TSL 6440 Testing and Evaluation of ESOL 3

TSL 6700 Issues in ESOL for School Counselors and Psychologists 3

General Courses

Code

Title

Credits

EDG 6047 Teacher Leadership for Educational Change 3

EDG 6207 Transforming the Curriculum 3

EDG 6226 Foundations of Research in Curriculum & Instruction 3

EDG 6356 Teaching, Learning and Assessment 3

EDG 6905 Individual Work 1-6

EDG 6910 Supervised Research 1-5

EDG 6931 Special Topics 1-4

EDG 6940 Supervised Teaching 1-5

EDG 6971 Research for Master’s Thesis 1-15

EDG 6973 Project in Lieu of Thesis 1-9

EDG 7224 Critical Pedagogy 3

EDG 7252 Perspectives in Curriculum, Teaching, and Teacher Education 3

EDG 7303 Teacher Learning and Socialization in High Poverty Schools 3

EDG 7326

EDG 7941 Field Experience in Curriculum and Instruction 1-4

EDG 7979 Advanced Research 1-12

EDG 7980 Research for Doctoral Dissertation 1-15

EME 6076

EME 6156 Games and Simulations for Teaching and Learning 3
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<td>Multicultural Mathematics Methods</td>
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<td>Using Formative Assessment to Improve</td>
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<td>Mathematical Learning</td>
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<td>Language Arts: Language and Composition</td>
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<td>LAE 6407</td>
<td>Early Childhood Children's Literature</td>
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<td>LAE 6939</td>
<td>Literacy, Family, and Culture</td>
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<td>LAE 6945</td>
<td>Practicum and Assessment for Teachers of</td>
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<td>Secondary School English</td>
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### Educational Technology Courses

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<td>EDE 6225</td>
<td>Practices in Childhood Education</td>
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<td>EDE 6266</td>
<td>Teaching and Learning in Elementary Classrooms</td>
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<td>EDE 6325</td>
<td>Teacher Inquiry/Action Research</td>
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<td>Individual Work</td>
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<td>EDE 6948</td>
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<td>EDG 7982</td>
<td>Practitioner Research: Theory &amp; Practice</td>
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### ESOL/Bilingual Education Courses

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<td>Secondary ESOL Teaching Strategies</td>
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<td>TSL 6145</td>
<td>Curriculum and Materials Development for ESOL K-12</td>
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<td>TSL 6171</td>
<td>TESL I: Materials and Techniques</td>
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<td>TESL II: Materials for Special Purposes</td>
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<td>TSL 6245</td>
<td>Language Principles for ESOL Teachers</td>
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<td>Methods of Teaching ESOL K-12</td>
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<td>Testing and Evaluation of ESOL</td>
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<td>TSL 6700</td>
<td>Issues in ESOL for School Counselors and Psychologists</td>
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### Curriculum, Teaching, and Teacher Education Courses

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### Reading Education Courses

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<td>Reading in the Primary Grades</td>
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<td>Using Formative Assessment to Improve</td>
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<td>MAE 5347</td>
<td>Teaching K-8 Mathematics for Understanding</td>
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<td>Secondary School Mathematics Practicum</td>
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<td>MAE 6313</td>
<td>Problem Solving in School Mathematics</td>
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**Science Education Courses**

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<td>Inquiry-Based Science Teaching</td>
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<td>SCE 5825</td>
<td>Foundations of Science Teaching</td>
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<td>SCE 6117</td>
<td>Science Instruction in Informal Settings</td>
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<td>SCE 6337</td>
<td>Secondary Science Methods and Assessment</td>
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<td>Global Studies Methods in Science Education</td>
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**Secondary Education Courses**

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<td>ESE 6215</td>
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<td>ESE 6344</td>
<td>Classroom Practices and Assessment in Secondary Education</td>
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<td>Effective Teaching and Classroom Management</td>
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<td>Individual Work</td>
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<td>Special Topics</td>
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<td>Student Teaching in Secondary School</td>
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**Social Foundations of Education Courses**

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<td>History of Education</td>
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<td>Philosophical Foundations of Education</td>
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**Social Studies Education Courses**

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<td>SSE 5945C</td>
<td>Practicum in Secondary Social Studies Teaching and Assessment</td>
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</table>
The student will demonstrate their implementation of an inquiry stance to improving teaching and ongoing professional learning that can be shared with other professionals.

**Curriculum & Instruction (MAE)**

**SLO 1 Knowledge**
The student will explain and evaluate research-based knowledge of curriculum, teaching, and learning.

**SLO 2 Skills**
The student will apply knowledge to investigate a problem or question related to curriculum, teaching, and learning.

**SLO 3 Professional Behavior**
The student will present a written and an oral examination of a topic of investigation within the field of study.

**Curriculum & Instruction (MEd)**

**SLO 1 Knowledge**
The student will explain and evaluate their masterful use of research-based knowledge of general and specific subject area best practices in teaching and learning.

**SLO 2 Skills**
The student will use knowledge of teaching and learning to organize content for instruction, develop appropriate differentiated teaching practices, and evaluate the impact of instruction on student learning.

**SLO 3 Professional Behavior**
The student will collaborate with other professionals, reflect upon his or her own practice, and demonstrate a sense of efficacy and ethical practice.

**Curriculum and Instruction (ISC)**

**Program Information**
The School of Teaching & Learning’s graduate programs in Curriculum & Instruction cultivate proficient scholars, teachers, and other educational professionals through an academically rigorous curriculum that balances theoretical and applied knowledge.

The Ph.D. prepares graduate students to assume roles as faculty and other leaders in higher education. It is carefully designed to balance coursework, research projects, and teaching experiences for students to acquire the knowledge, dispositions, skills and abilities to become highly effective faculty and leaders in higher education. Program area faculty adhere to a comprehensive framework reflecting broad and multifaceted conceptions of scholarship: Application, Discovery, Integration and Teaching. Students engage in research, teaching, professional service, and professional practice projects that further their familiarity with these domains. An array of subject area specializations (https://education.ufl.edu/school-teaching-learning/admissions/doctoral-degrees-phil/) for all Ph.D. students in Curriculum & Instruction fosters their intellectual and professional growth in greater depth. These include: Curriculum Teaching & Teacher Education (CTTE) (https://education.ufl.edu/curriculum-teaching/phd/); Educational Technology (http://education.ufl.edu/educational-technology/on-campus-phd/); English Education (http://education.ufl.edu/english-education/degrees/); ESOL/Bilingual Education (https://education.ufl.edu/esol/degrees/#doctorate); Reading and Literacy Education (https://education.ufl.edu/reading-education/doctorate/); Mathematics Education (https://education.ufl.edu/math-education/doctorate/); Science Education (https://education.ufl.edu/science-education-doctor-of-philosophy/); Schools, Society and Culture (https://education.ufl.edu/social-foundations-education/); Social Studies Education (https://education.ufl.edu/social-studies-education/degrees/doctorate/); and Statistics Education (https://education.ufl.edu/statistics-education/). All doctoral students are required to complete successfully a minimum of 90 credits. Coursework includes research methodology and methods, educational curriculum and foundations, independent research, specialization seminars, and at least 12 credit hours of dissertation work. To earn their doctoral degree, all students must complete their coursework satisfactorily, pass written and oral qualifying examinations, and successfully complete and defend a dissertation.

The Master of Arts in Education (M.A.E.) in Curriculum & Instruction is designed to provide exposure to research and increase the practical knowledge of those interested in various aspects of Curriculum & Instruction. Specialization areas include: Educational Technology (http://education.ufl.edu/educational-technology/on-campus-phd/); ESOL/Bilingual Education (https://education.ufl.edu/esol/degrees/#doctorate); Reading and Literacy Education (https://education.ufl.edu/reading-education/doctorate/); Literacy & the Arts (https://education.ufl.edu/english-education/degrees/); Media Literacy Education (http://education.ufl.edu/english-education/specializations/media-literacy/); and Schools, Society and Culture (https://education.ufl.edu/social-foundations-education/). A thesis or final project in lieu of a thesis is required of all students. The LARC specialization is available both on-campus and online.

The Master of Education (M.Ed.) in Curriculum & Instruction is a professional degree designed to meet the needs of practicing and aspiring professionals to serve various functions in established and emerging educational activities. Specialization areas include: Educational Technology (http://education.ufl.edu/educational-technology/on-campus-phd/); ESOL/Bilingual Education (https://education.ufl.edu/esol/degrees/#doctorate); Schools, Society and Culture (https://education.ufl.edu/social-foundations-education/); and Teacher Leadership for School Improvement (TLSI) (https://education.ufl.edu/tlsi/). The Educational Technology and TLSI specializations are both available online.

The Specialist in Education (Ed.S.) in Curriculum & Instruction is a degree designed to meet the needs of practicing and aspiring professionals, who already hold a master’s degree in an appropriate field, to serve various functions in established and emerging educational activities. Specialization areas include: Educational Technology (http://education.ufl.edu/educational-technology/on-campus-phd/); ESOL/Bilingual Education (https://education.ufl.edu/esol/degrees/#doctorate); Reading and Literacy Education (https://education.ufl.edu/reading-education/doctorate/); Literacy & the Arts (https://education.ufl.edu/english-education/degrees/); Media Literacy Education (http://education.ufl.edu/english-education/specializations/media-literacy/); and Teacher Leadership for School Improvement (TLSI) (https://education.ufl.edu/tlsi/). The Educational Technology and TLSI specializations are both available online.

For more information, please see our website: http://education.ufl.edu/school-teaching-learning (http://education.ufl.edu/school-teaching-learning/).
Degrees Offered

Degrees Offered with a Major in Curriculum and Instruction

- Doctor of Philosophy
  - without a concentration
  - concentration in Educational Technology
- Master of Arts in Education
  - without a concentration
  - concentration in Educational Technology
- Master of Education
  - without a concentration
  - concentration in Educational Technology
- Specialist in Education
  - without a concentration
  - concentration in Educational Technology

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

School of Teaching and Learning

Departmental Courses

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**General Courses**

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**Curriculum, Teaching, and Teacher Education Courses**

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### Language and Literacy Education Courses

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<td>Using Formative Assessment to Improve Mathematical Learning</td>
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<td>Diagnosis of Reading Difficulties</td>
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SCE 6246 Science Instruction in Informal Settings 3
SCE 6337 Secondary Science Methods and Assessment 3
SCE 6647 Global Studies Methods in Science Education 3
SCE 6947 Practicum in Secondary Science Teaching and Assessment 3

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Social Foundations of Education Courses

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Teacher Leadership for School Improvement Courses

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College of Education Courses

Student Learning Outcomes

curriculum and instruction (edd)

SLO 1 Knowledge

The student will explain and evaluate their conceptual and practical competence and critical stances in theory, pedagogy, and research.

SLO 2 Skills

The student will present results of research about resolving context-based problems of practice in written and oral format.

SLO 3 Professional Behavior

The student will disseminate and/or demonstrate professional knowledge in formal and informal settings about best curricular and pedagogical practices.

curriculum and instruction (eds)

SLO 1 Knowledge

The student will explain and evaluate their breadth of knowledge of content, methods, and contexts of schooling and education.

SLO 2 Skills

The student will utilize expertise developed in an area of specialization to pursue an original and significant inquiry or research question.

SLO 3 Professional Behavior

The student will demonstrate their implementation of an inquiry stance to improving teaching and on-going professional learning that can be shared with other professionals.

curriculum and instruction (PHD)

SLO 1 Knowledge

The student will master scholarly breadth of research about teaching and learning and neighboring academic fields.

SLO 2 Knowledge

The student will apply expertise of an original and significant question and issue in education.

SLO 3 Skills

The student will apply clarity of written and oral expression in the qualifying examination and the dissertation.

SLO 4 Professional Behavior

The student will address professional audiences through membership in professional organizations, research presentations, and/or scholarly publications.

Elementary Education

Program Information

The School of Teaching & Learning offers the Master of Education (M.Ed.) and Master of Arts in Education (M.A.E.) degrees in Elementary Education. More information about the requirements for these degrees can be found in the Graduate Degrees (p. 48) section of this catalog.

Master of Education (M.Ed.)

The School of Teaching & Learning offers two distinct programs for preparing and certifying elementary school teachers: the Unified Elementary Professional Teacher (UEP) Graduate Program and the Alternative Certification in Elementary Education (SITE) Program.

The Unified Elementary Professional Teacher (UEP) Graduate Program

UEP is a 5-year elementary teacher preparation program that culminates in a Master’s Degree in Education (M.Ed.). Students enter the program
in the junior year of their undergraduate education. After successful completion of two years of undergraduate work in the program, students apply to graduate school and if accepted, complete a three-semester graduate year comprised of rigorous academic coursework and a yearlong internship in an elementary classroom.

The master's year is designed to deepen students' content knowledge while enhancing their pedagogical knowledge and instructional skills. It is a year for serious teacher preparation yielding highly effective graduates able to positively impact K-6 student learning from their first year of teaching, particularly elementary students who have shown patterns of underachievement including students with disabilities, students whose first language is not English, and students living in poverty. Master's students who successfully complete the program are eligible for Professional Teacher Certification in Florida (K-6) as well as the English for Speakers Of Other Languages (ESOL) Endorsement (K-12) and the Florida Reading Endorsement (K-12).

Prerequisites: Students who expect to do graduate work in the Unified Elementary ProTeach program must first have successfully completed the undergraduate portion of the 5-year program earning a Bachelor’s of Arts Degree in Education (B.A.E). A GPA of 3.0 is required for entry into the graduate portion of the program as well as an acceptable Graduate Record Examination (GRE) score, and three letters of recommendation.

For more information, please see our website: http://education.ufl.edu/elementary-education/proteach (http://education.ufl.edu/elementary-education/proteach/).

Alternative Certification in Elementary Education (SITE) Program
The SITE program at the University of Florida is a state-designated Educator Preparation Institute (EPI) created to attract talented college graduates and career path changers with non-education majors to the elementary classroom. The yearlong teacher-residency program provides an alternative, accelerated pathway to teaching experience and certification for prospective teachers who possess an undergraduate degree outside of education. The clinical internship combines supervised classroom teaching and formal study, with successful completion leading to a master's (M.Ed.) degree in Elementary Education and national certification through the Council for the Accreditation of Educator Preparation (CAEP).

Many students come to the program with degrees or professional experience in fields such as accounting, business, English, family studies, history, journalism, nursing and psychology. Selection for entry into this full-time internship requires a 3.0 or higher undergraduate GPA; successful scores on the GRE; a stellar essay/statement of purpose; three professional letters of recommendation; and a Statement of Status of Eligibility from the Florida Department of Education.

Interns complete 39 credit hours of study and classroom teaching over three semesters, all under the supervision of a school-based mentor and a university coach. The mentor teacher and intern teach side-by-side throughout the entire school year, while the UF coach makes regular classroom visits to problem-solve, observe and reflect on teaching skills, and provide individualized support. Along with their planning, teaching and coursework responsibilities, the interns become familiar with the school improvement goals and new programs initiated at their host schools. SITE coursework is taught by UF education professors and teachers in Alachua County elementary schools who all have proven expertise in K-12 teaching.

Prospective teachers who complete the SITE Program are eligible to apply for a professional educator's certificate from the Florida Department of Education. Graduates wishing to teach in states other than Florida should contact the Department of Education in their state of choice for certification requirements there.

For additional information about the program please visit: http://education.ufl.edu/site (http://education.ufl.edu/site/).

Degrees Offered

Degrees Offered with a Major in Elementary Education
• Master of Arts in Education
• Master of Education

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses
School of Teaching and Learning
Departmental Courses

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<td>Individual Work</td>
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<td>EDE 7047</td>
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<tr>
<td>EDG 6356</td>
<td>Teaching, Learning and Assessment</td>
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<td>EDG 7224</td>
<td>Critical Pedagogy</td>
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<td>EDG 7252</td>
<td>Perspectives in Curriculum, Teaching, and Teacher Education</td>
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<td>EDG 7303</td>
<td>Teacher Learning and Socialization in High Poverty Schools</td>
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<td>EDG 7982</td>
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## Educational Technology Courses

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<td>EME 5054</td>
<td>Foundations of Educational Technology</td>
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<td>EME 5207</td>
<td>Designing Technology-Rich Curricula</td>
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</tr>
<tr>
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<td>EME 5403</td>
<td>Instruction Computing I</td>
<td>3</td>
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<tr>
<td>EME 5404</td>
<td>Instruction Computing II</td>
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</tr>
<tr>
<td>EME 5405</td>
<td>Internet in K-12 Instruction</td>
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<tr>
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<td>EME 5432</td>
<td>Integrating Technology into Social Science</td>
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<tr>
<td>EME 6066</td>
<td>Issues and Trends in Educational Technology Research</td>
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<td>EME 6208</td>
<td>Designing Integrated Media Environments I</td>
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<tr>
<td>EME 6209</td>
<td>Designing Integrated Media Environments II</td>
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<tr>
<td>EME 6458</td>
<td>Distance Teaching and Learning</td>
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<td>EME 6602</td>
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<td>EME 6606</td>
<td>Advanced Instruction Design</td>
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<td>EME 6935</td>
<td>Seminar: Distance Education Issues and Applications</td>
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<tr>
<td>EME 6945</td>
<td>Practicum in Educational Media and Instructional Design</td>
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<tr>
<td>EME 7938</td>
<td>Seminar in Educational Media and Instructional Design</td>
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## ESOL/Bilingual Education Courses

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<tbody>
<tr>
<td>FLE 6165</td>
<td>Bilingual-Bicultural Education</td>
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<tr>
<td>FLE 6167</td>
<td>Cross-Cultural Communication for Teachers</td>
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<tr>
<td>FLE 6636</td>
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<td>FLE 6946</td>
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<tr>
<td>TSL 5142</td>
<td>ESOL Curriculum, Methods, and Assessment</td>
<td>3</td>
</tr>
<tr>
<td>TSL 5325</td>
<td>Secondary ESOL Teaching Strategies</td>
<td>3</td>
</tr>
<tr>
<td>TSL 6145</td>
<td>Curriculum and Materials Development for ESOL K-12</td>
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<tr>
<td>TSL 6171</td>
<td>TESL I: Materials and Techniques</td>
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<td>TSL 6172</td>
<td>TESL II: Materials for Special Purposes</td>
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<tr>
<td>TSL 6245</td>
<td>Language Principles for ESOL Teachers</td>
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<tr>
<td>TSL 6373</td>
<td>Methods of Teaching ESOL K-12</td>
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<tr>
<td>TSL 6440</td>
<td>Testing and Evaluation of ESOL</td>
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<tr>
<td>TSL 6700</td>
<td>Issues in ESOL for School Counselors and Psychologists</td>
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## Language and Literacy Education Courses

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<td>LAE 6298</td>
<td>Literacy &amp; Language Instruction</td>
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<tr>
<td>LAE 6339</td>
<td>Curriculum, Methods, and Assessment in Secondary English Language Arts</td>
<td>3</td>
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<tr>
<td>LAE 6348</td>
<td>Teaching Multiliteracies</td>
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<tr>
<td>LAE 6365</td>
<td>Language Arts: Language and Composition</td>
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<tr>
<td>LAE 6366</td>
<td>Language Arts: Literature</td>
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<tr>
<td>LAE 6407</td>
<td>Early Childhood Children’s Literature</td>
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<tr>
<td>LAE 6446</td>
<td>Multicultural Literature for Children and Adolescents</td>
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</table>
### Elementary Education (MAE)

#### Student Learning Outcomes

**SLO 1 Knowledge**

The student will master research-based knowledge of teaching and learning in elementary education.

---

### Mathematics Education Courses

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<td>MAE 5327</td>
<td>Middle School Mathematics Methods</td>
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<tr>
<td>MAE 5332</td>
<td>Secondary School Mathematics Methods and Assessment</td>
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<tr>
<td>MAE 5395</td>
<td>Multicultural Mathematics Methods</td>
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<tr>
<td>MAE 5396</td>
<td>Using Formative Assessment to Improve Mathematical Learning</td>
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<tr>
<td>MAE 5347</td>
<td>Teaching K-8 Mathematics for Understanding</td>
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<tr>
<td>MAE 5945</td>
<td>Secondary School Mathematics Practicum</td>
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<td>MAE 6313</td>
<td>Problem Solving in School Mathematics</td>
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<td>MAE 6641</td>
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<tr>
<td>MAE 7899</td>
<td>Mathematics Education Seminar</td>
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### Reading Education Courses

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<td>RED 5046</td>
<td>Reading in the Primary Grades</td>
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<td>RED 5316</td>
<td>Reading in the Secondary School</td>
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<tr>
<td>RED 5337</td>
<td>Reading Instruction in the Intermediate Grades</td>
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<td>RED 5355</td>
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<td>RED 5399</td>
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<td>RED 6520</td>
<td>Classroom Literacy Assessment and Instruction</td>
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<tr>
<td>RED 6546C</td>
<td>Diagnosis of Reading Difficulties</td>
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<td>RED 6548C</td>
<td>Remediation of Reading Difficulties</td>
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<td>RED 6647</td>
<td>Trends in Reading</td>
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<td>RED 7019</td>
<td>Foundations of Literacy</td>
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### Science Education Courses

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<tr>
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<td>Science Curriculum Development</td>
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<td>SCE 5316</td>
<td>Inquiry-Based Science Teaching</td>
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<td>SCE 5825</td>
<td>Foundations of Science Teaching</td>
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<td>SCE 5695</td>
<td>Diversity and Equity in Science Teaching</td>
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<td>SCE 5765</td>
<td>Data-Driven Science Instruction</td>
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<td>SCE 6117</td>
<td>Science Education in the Elementary School</td>
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<td>SCE 6246</td>
<td>Science Instruction in Informal Settings</td>
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<td>SCE 6337</td>
<td>Secondary Science Methods and Assessment</td>
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<td>SCE 6647</td>
<td>Global Studies Methods in Science Education</td>
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<tr>
<td>SCE 6947</td>
<td>Practicum in Secondary Science Teaching and Assessment</td>
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### Secondary Education Courses

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<td>EDM 6235</td>
<td>History of Education</td>
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<td>ESE 6215</td>
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<td>ESE 6344</td>
<td>Classroom Practices and Assessment in Secondary Education</td>
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<td>ESE 6345</td>
<td>Effective Teaching and Classroom Management</td>
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<td>ESE 6905</td>
<td>Individual Work</td>
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<td>ESE 6939</td>
<td>Special Topics</td>
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<td>ESE 6945</td>
<td>Student Teaching in Secondary School</td>
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### Social Foundations of Education Courses

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<td>EDF 6520</td>
<td>History of Education</td>
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<td>EDF 6544</td>
<td>Philosophical Foundations of Education</td>
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<tr>
<td>EDF 6606</td>
<td>Education and American Culture</td>
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<td>EDF 7934</td>
<td>Seminar in Educational Foundations</td>
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### Social Studies Education Courses

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<td>SSE 6133</td>
<td>Secondary School Social Studies Methods and Assessment</td>
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<td>SSE 6478</td>
<td>Global Studies Methods for Social Studies</td>
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### Teacher Leadership for School Improvement Courses

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<tr>
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<td>Teacher Inquiry/Action Research</td>
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<td>EDE 6407</td>
<td>Teacher Leadership for Educational Change</td>
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<tr>
<td>EDE 6207</td>
<td>Transforming the Curriculum</td>
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<td>EDE 6415</td>
<td>Culturally Responsive Classroom Management</td>
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<tr>
<td>EDG 6953</td>
<td>TLEI Online Portfolio Preparation</td>
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</table>

### College of Education Courses

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SLO 2  Knowledge
The student will critique teaching practices based on knowledge of the developmental and socio-cultural context of the learner.

SLO 3  Skills
The student will investigate a problem or question within the field of elementary education.

SLO 4  Professional Behavior  The student will present a written and oral presentation and defense of a topic of investigation in elementary education that demonstrates critical thinking and effective communication skills.

Elementary Education (MEd)
SLO 1 Knowledge
The student will master research-based knowledge of best practices of teaching and learning in elementary education.

SLO 2  Skills
The student will use knowledge of teaching and learning to organize instruction, develop and apply appropriate inclusive teaching practices for elementary education, evaluate the impact of instruction on student learning, and create a positive learning environment.

SLO 3  Professional Behavior
The student will collaborate with other professionals, reflect upon and research his or her own practice, and demonstrate a sense of efficacy and ethical practice.

English Education Program Information

English Language Arts K-12
The School of Teaching & Learning offers the Master of Education (M.Ed.) and Master of Arts in Education (M.A.E.) degrees in English Education. More information about the requirements for these degrees can be found in the Graduate Degrees (p. 48) section of this catalog.

The English Language Arts K-12 (https://education.ufl.edu/english-education/) program is focused on teaching the skills of literacy and the subject of English (literature, writing, and the study of texts). Two masters degrees are offered in English Education: a Masters of Education (M.Ed.) and a Masters of Art in Education (M.A.E.). Students may also earn a Ed.S. or Ph.D. in English Language Arts K-12. Students interested in second language learning and teaching, bilingualism, and multiculturalism might consider applying to the Advanced Studies in in ESOL Education/ Bilingual Education program (https://education.ufl.edu/esol/degrees/).

Teacher Certification and the M.Ed. (ProTeach) Students seeking certification as English Language Arts teachers in Florida should enroll in English ProTeach (https://education.ufl.edu/elementary-education/proteach/). Students in this program have an undergraduate degree or coursework in English. During the program they examine processes for teaching texts and composition in secondary schools. Program graduates are eligible for a Florida Professional Teaching Certificate and for ESOL Endorsement. Students who successfully complete the ProTeach program are eligible for Professional Certification and are certified as "highly-qualified" teachers and seek employment as English Language Arts teachers in grades 6-12 classrooms. English ProTeach (https://education.ufl.edu/elementary-education/proteach/) is a CAEP (http://caepnet.org/) approved program. Graduates may be eligible for certification in other states and are advised to investigate that possibility if they are not planning to teach in Florida. Please visit this website for additional information about the teacher certification and the M.Ed. (ProTeach): https://education.ufl.edu/elementary-education/proteach/

Masters of Education (M.Ed.). Masters of Education students specializing in English language arts focus on teaching. They learn research-based classroom practices and develop understandings of how to support and enhance students’ literacy. The M.Ed. is a non-thesis degree, and students complete a minimum of 36 hours. Students may elect a specialization area, such as Literacy and the Arts (https://education.ufl.edu/english-education/degrees/) or Media Literacy Education (http://education.ufl.edu/english-education/specializations/media-literacy/).

Masters of Art in Education (M.A.E). Students earning the M.A.E with a focus on English language arts learn research-based classroom practices and theories of learning that support language and literacy development. They acquire an understanding of the literacy practices that define English language arts and develop facility in promoting those practices. They also consider how current issues in education intersect with literacy. Students may elect a specialization area such as Literacy and the Arts (https://education.ufl.edu/english-education/degrees/) or Media Literacy Education (http://education.ufl.edu/english-education/specializations/media-literacy/) (MLE courses are available online) as well as other areas of special interest. The M.A.E degree requires a thesis or project. Students confer with a faculty advisor to design a course of study focused on literacy development that supports their professional goals. The Master of Arts in Education with a focus on English Language Arts/literacy studies includes 30 hours of coursework and the completion of a 6-hour research or teaching project in collaboration with a faculty committee.

Educational Specialist Degree (Ed.S.). Students earning an Ed.S. in Curriculum and Instruction with a focus on English Language Arts/literacy studies become familiar with theories of learning, the history of literacy studies, and current research in the discipline. They become familiar with Boyer’s dimensions of scholarship and focus particularly on the scholarship of teaching and on the scholarship of integration by examining the role that those stances can play in promoting literacy development in praxis. Students work with a faculty member to design a course of study that meets their needs and professional goals and that fulfills the requirements of the UF Graduate School, the College of Education, and the School of Teaching and Learning. Students may elect to focus on teacher education and professional development, critical literacy, multicultural literature, critical pedagogy, adolescent literacy, media literacy education, language acquisition and inquiry, literacy and the arts, or other areas of personal and professional interest.

The Doctor of Philosophy Degree (Ph.D.). The Ph.D. is the highest degree any university confers. Students who enter the doctoral program in Curriculum & Instruction with a specialization in English Education work with a faculty advisor to develop scholarship in language and literacy and to engage in professional research. Students meet with a faculty advisor and form a doctoral committee to develop a course of study that reflects their interests and professional goals. Students who earn the doctorate must meet all requirements of the UF Graduate School and the College of Education. They must also meet the requirements of the School of Teaching and Learning with a focus on four core areas of knowledge:

- Theoretical and Historical Foundations of Education,
- Learning Theories,
• Research Methods, and
• Pedagogical Principles.

These areas provide doctoral students with the knowledge, skills and abilities to create and promote new knowledge and understandings about teaching and learning and to use innovative, evidence-based practice and theory to work with diverse learners across varied contexts. Additionally, English Education Ph.D. students develop deep insights into literacy events and practices and the many forms and functions embedded in the multiple sign systems humans use to make sense of their worlds and to express their understandings. Upon completion of coursework, students must take and pass a qualifying exam. As doctoral candidates, they embark upon dissertation research to complete a scholarly, theoretical, and research-based study that makes an original contribution to the literature in the field and culminates in the Ph.D. degree.

For more information, please visit the English Language Arts K-12 website (https://education.ufl.edu/english-education/).

### Degrees Offered

#### Degrees Offered with a Major in English Education

- Master of Arts in Education
- Master of Education

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

#### School of Teaching and Learning

##### Departmental Courses

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<td>EDE 6225</td>
<td>Practices in Childhood Education</td>
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</tr>
<tr>
<td>EDE 6226</td>
<td>Teaching and Learning in Elementary Classrooms</td>
<td>3</td>
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<tr>
<td>EDE 6325</td>
<td>Teacher Inquiry/Action Research</td>
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<td>1-5</td>
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<td>EDE 6948</td>
<td>Internship in Elementary Schools</td>
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<tr>
<td>EDE 7047</td>
<td>Issues in Teacher Education</td>
<td>3</td>
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<tr>
<td>EDF 5552</td>
<td>Role of School in Democratic Society</td>
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<td>EDF 6520</td>
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<td>EDF 6616</td>
<td>Education and American Culture</td>
<td>3</td>
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<td>EDF 6812</td>
<td>Comparative Education</td>
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For more information, please visit the English Language Arts K-12 website (https://education.ufl.edu/english-education/).
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**General Courses**

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**Curriculum, Teaching, and Teacher Education Courses**

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### Secondary Education Courses

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### Social Foundations of Education Courses

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<td>History of Education</td>
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### Social Studies Education Courses

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### Teacher Leadership for School Improvement Courses

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<td>Teacher Inquiry/Action Research</td>
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<td>EDG 6047</td>
<td>Teacher Leadership for Educational Change</td>
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<td>Transforming the Curriculum</td>
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### College of Education Courses

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<td>Culturally Responsive Classroom Management</td>
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<td>EDG 6953</td>
<td>TLSI Online Portfolio Preparation</td>
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### Student Learning Outcomes

#### English Education (MAE)

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<thead>
<tr>
<th>SLO 1</th>
<th>Knowledge</th>
<th>The student will master research-based knowledge of English Education best practices of teaching and learning</th>
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<tbody>
<tr>
<td>SLO 2</td>
<td>Skills</td>
<td>The student will apply knowledge to investigate a significant problem or original question within the field of English Education</td>
</tr>
<tr>
<td>SLO 3</td>
<td>Professional Behavior</td>
<td>The student will complete a written thesis or project and an oral presentation of a topic of investigation within English Education</td>
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#### English Education (MEd)

<table>
<thead>
<tr>
<th>SLO 1</th>
<th>Knowledge</th>
<th>The student will master research-based knowledge of general and specific subject area best practices of teaching and learning</th>
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</thead>
<tbody>
<tr>
<td>SLO 2</td>
<td>Skills</td>
<td>The student will use knowledge of teaching and learning to organize content for instruction, develop and apply appropriate inclusive teaching practices, evaluate the impact of instruction on student learning, and create a positive learning environment</td>
</tr>
<tr>
<td>SLO 3</td>
<td>Professional Behavior</td>
<td>The student will collaborate with other professionals, reflect upon his or her own practice, and demonstrate a sense of efficacy and ethical practice</td>
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</tbody>
</table>

#### Mathematics Education

### Program Information

The School of Teaching & Learning offers the Master of Education (M.Ed.) and Master of Arts in Education (M.A.E.) degrees in Mathematics Education. More information about the requirements for these degrees can be found in the Graduate Degrees (p. 48) section of this catalog.

The Master of Education (M.Ed.) for Mathematics Education program is designed for individuals interested in teaching mathematics in a middle or high school. This program leads to eligibility for professional certification for teaching mathematics to students in grades 6-12. It typically attracts students who received a bachelor's degree in mathematics or another STEM-related discipline and are seeking to teach middle or high school mathematics. Our faculty will work with students to tailor their program to fit particular needs and specific career goals whether that involves becoming a professor at a research university, a faculty member that primarily teaches future teachers, a specialist for mathematics education at the district level, or last, but certainly not least, a classroom teacher.

Minimum admission requirements include:

- B.A. or B.S. degree in a STEM or related field
- 2.7 overall GPA and 3.0 upper-division undergraduate GPA
• Must have successfully completed Calculus 1 and 2 prior to admission.
• Acceptable GRE scores
• Completed all other admissions requirements

It is also recommended that applicants have passed the Florida Teacher Certification Exam (FTCE) Subject Area test (for Mathematics grades 6-12) and to have completed MAP 2302 Elementary Differential Equations (3 cr.).

Please visit this website for additional information about the M.Ed. degree program in Mathematics Education: https://education.ufl.edu/math-education/masters/.

The Master of Arts in Education (M.A.E.) in Mathematics Education program is designed for persons interested in gaining expertise in mathematics education and strengthening their background in mathematics. Students in this program typically take a minimum of 9 credit hours in mathematics at the graduate level. This program of study requires a thesis or project-in-lieu of thesis and does not lead to initial teacher certification.

What kind of students typically are enrolled in the M.A.E. in mathematics education program?

• Practicing teachers who want to strengthen their abilities to teach mathematics in a variety of instructional settings.
• Individuals who plan to teach at the community college level. Requirements to teach at the community college level vary depending on the individual campus. Typically, individuals must have a minimum of 18 credits in graduate mathematics. Candidates are encouraged to consult the community college where they desire employment for the exact employment requirements.
• Experienced teachers who have the eventual goal of earning a doctorate in mathematics education enabling them to work in a teacher education/mathematics education program at an institution of higher education.

Admission Requirements:

B.A. or B.S. in mathematics, mathematics education, or related field; 2.7 overall GPA and 3.0 upper division GPA; GRE; and completing all other general admission requirements

Graduation Requirements:

3.0 GPA (overall and in major); completion of course requirements; thesis or project-in-lieu of thesis

What might a program of study look like in the M.A.E. in mathematics education?

The program of study form is customized to address the unique needs of each student and is developed in consultation with a mathematics education advisor. There are several categories of requirements for the completion of the M.A.E. in mathematics education including: a mathematics methods core, mathematics education seminar, curriculum & instruction, mathematics content knowledge, cognate/electives, and a thesis or project in lieu of thesis.

Please visit this website for additional information about the M.A.E. degree program in Mathematics Education: https://education.ufl.edu/math-education/masters/.

**Degrees Offered with a Major in Mathematics Education**

- Master of Arts in Education
- Master of Education

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

**School of Teaching and Learning**

**Departmental Courses**

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<tr>
<th>Code</th>
<th>Title</th>
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<td>EDE 6225</td>
<td>Practices in Childhood Education</td>
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<tr>
<td>EDE 6266</td>
<td>Teaching and Learning in Elementary Classrooms</td>
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<tr>
<td>EDE 6325</td>
<td>Teacher Inquiry/Action Research</td>
<td>3</td>
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<tr>
<td>EDE 6905</td>
<td>Individual Work</td>
<td>1-5</td>
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<tr>
<td>EDE 6948</td>
<td>Internship in Elementary Schools</td>
<td>3-12</td>
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<tr>
<td>EDE 7047</td>
<td>Issues in Teacher Education</td>
<td>3</td>
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<tr>
<td>EDF 5552</td>
<td>Role of School in Democratic Society</td>
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<td>EDG 5666</td>
<td>Knowing and Learning in Secondary Schools</td>
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<td>EDG 6017</td>
<td>Writing for Academic Purposes</td>
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<td>Teacher Leadership for Educational Change</td>
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<td>Transforming the Curriculum</td>
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<td>EDG 6225</td>
<td>Global Studies Methods in K-12 Education</td>
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<td>EDG 6226</td>
<td>Foundations of Research in Curriculum &amp; Instruction</td>
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<td>EDG 6305</td>
<td>Multiple Perspectives on Teaching and Learning</td>
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<td>EDG 6348</td>
<td>Instructional Coaching for Enhanced Student Learning</td>
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<td>Teaching, Learning and Assessment</td>
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<td>Learning Science with Technology</td>
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<td>Culturally Responsive Classroom Management</td>
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<td>EDG 6445</td>
<td>Meeting the Educational Needs of Students Living in Poverty</td>
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<td>Survey of Research on STEM Education</td>
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<td>Instructional Computing II</td>
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<td>Cross-Cultural Communication for Teachers</td>
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<td>Literacy &amp; Language Instruction</td>
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<td>Curriculum, Methods, and Assessment in Secondary English Language Arts</td>
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<td>Teaching Multiliteracies</td>
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<td>Multicultural Literature for Children and Adolescents</td>
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<td>Teaching Digital Storytelling</td>
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<td>Literacy, Family, and Culture</td>
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<td>Language Acquisition and Education</td>
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<td>Language and Inquiry</td>
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<td>LAE 7938</td>
<td>Lit, Cult and Politics</td>
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<td>MAE 5327</td>
<td>Middle School Mathematics Methods</td>
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<td>MAE 5347</td>
<td>Teaching K-8 Mathematics for Understanding</td>
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<td>MAE 5395</td>
<td>Multicultural Mathematics Methods</td>
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<tr>
<td>MAE 5396</td>
<td>Using Formative Assessment to Improve Mathematical Learning</td>
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<td>Secondary School Mathematics Practicum</td>
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<td>MAE 6313</td>
<td>Problem Solving in School Mathematics</td>
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<tr>
<td>MAE 6349</td>
<td>Classroom Contexts that Support Self-Regulated Learning and Mathematical Understanding</td>
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<td>MAE 6916</td>
<td>Inquiry in Mathematics Teaching</td>
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<td>Mathematics Education Seminar</td>
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### General Courses

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### Curriculum, Teaching, and Teacher Education Courses

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### ESOL/Bilingual Education Courses

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<td>TESL II: Materials for Special Purposes</td>
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<td>Language Principles for ESOL Teachers</td>
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<td>Early Childhood Children’s Literature</td>
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<td>Multicultural Literature for Children and Adolescents</td>
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<td>Seminar in Children’s Literature</td>
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### Mathematics Education Courses

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<td>Multicultural Mathematics Methods</td>
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<td>MAE 5396</td>
<td>Using Formative Assessment to Improve Mathematical Learning</td>
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<td>Teaching K-8 Mathematics for Understanding</td>
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<td>Diagnosis of Reading Difficulties</td>
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### Social Foundations of Education Courses

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### Social Studies Education Courses

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### Teacher Leadership for School Improvement Courses

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### College of Education Courses

#### Student Learning Outcomes

##### Mathematics Education (MAE)

**SLO 1** Knowledge
The student will identify, describe, and explain current research on teaching and learning of mathematics

**SLO 2** Skills
The student will investigate a significant problem or original question within the field of study.

**SLO 3** Professional Behavior

The students will critically evaluate their own effectiveness to plan future lessons and improve the teaching of all students over time.

**Mathematics Education (MEd)**

**SLO 1 Knowledge**
The student will identify, describe, and explain research on teaching and learning of mathematics.

**SLO 2 Skills**
The student will create, select and implement: (1) specific learning goals, (2) appropriate teaching methods and instructional materials, and (3) evaluation strategies aligned with goals, using knowledge of subject matter, learners and classroom management.

**SLO 3 Professional Behavior**
The student will collaborate with other professionals, such as peers and mentor teachers, to reflect upon his or her mathematics teaching. Students will communicate high expectations for all PK-12 students.

**Reading Education**

**Program Information**
The School of Teaching & Learning offers the Master of Education (M.Ed.) and Master of Arts in Education (M.A.E.) degrees in Reading Education. More information about the requirements for these degrees can be found in the Graduate Degrees (p. 48) section of this catalog.

The **Master of Education (M.Ed.) in Reading Education** is for prospective teachers eligible for teacher certification and practicing teachers who desire to update themselves on the latest research and practice in reading/literacy instruction and to obtain K-12 reading certification. This is a non-thesis degree requiring completion of a minimum of 36 credit hours of coursework. Students learn evidence-based classroom practices and develop knowledge, skills, and strategies for supporting the literacy growth of PreK-12 students. The program is accredited by the Council for the Accreditation of Educator Preparation (CAEP). The curriculum is focused on the knowledge and methods teachers need to effectively promote literacy learning and academic achievement for all PreK-12 students. Teachers will not only gain expertise in addressing reading/writing difficulties but also learn how to support students’ growth as learners who can decode, use, and create many different kinds of texts, such as textbooks, primary source documents, literature and media.

Students can pursue the reading MEd degree **fully online, fully on campus, or partly online and partly on campus**.

Students interested in obtaining a Florida K-12 reading certification should:

- Submit transcripts to the Florida Department of Education for course count content analysis.
- Take and receive passing scores on the Florida Teacher Certification Exam (FTCE) for Reading K-12. You can find information about the exam from the Florida Department of Education at [http://www.fldoe.org](http://www.fldoe.org).

Graduates of the program may be eligible for reading certification in other states and are advised to investigate that possibility if they do not plan to teach in the state of Florida.

Please visit this program area website to learn more about the M.Ed. degree in Reading Education: [https://education.ufl.edu/reading-education/masters/](https://education.ufl.edu/reading-education/masters/).

**Degrees Offered**

**Degrees Offered with a Major in Reading Education**

- Master of Arts in Education
- Master of Education

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

**School of Teaching and Learning**

**Departmental Courses**

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### General Courses

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### Curriculum, Teaching, and Teacher Education Courses

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<td>Testing and Evaluation of ESOL</td>
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### Language and Literacy Education Courses

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<td>Multicultural Literature for Children and Adolescents</td>
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LAE 6455 Seminar in Children's Literature 3
LAE 6616 Technology and Media Literacy 3
LAE 6635 Technology and Media Literacy 3
LAE 6645 Teaching Media Literacy with the Internet 3
LAE 6661 Teaching Digital Storytelling 3
LAE 6693 Literacy, Family, and Culture 3
LAE 6945 Practicum and Assessment for Teachers of Secondary School English 3
LAE 6946 Children's Literature in Educational Settings 3
LAE 7006 Language Acquisition and Education 3
LAE 7519 Language and Inquiry 3
LAE 7934 Seminar in Composition Theory and Practice 3
LAE 7936 Seminar in English Language Arts 3

Mathematics Education Courses

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<td>Multicultural Mathematics Methods</td>
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<td>Using Formative Assessment to Improve Mathematical Learning</td>
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<td>Teaching K-8 Mathematics for Understanding</td>
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<td>Problem Solving in School Mathematics</td>
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Reading Education Courses

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<td>RED 6520</td>
<td>Classroom Literacy Assessment and Instruction</td>
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<td>RED 6546C</td>
<td>Diagnosis of Reading Difficulties</td>
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<td>RED 6548C</td>
<td>Remediation of Reading Difficulties</td>
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<td>Trends in Reading</td>
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Science Education Courses

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<td>Foundations of Science Teaching</td>
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<td>SCE 5695</td>
<td>Diversity and Equity in Science Teaching</td>
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<td>SCE 6246</td>
<td>Science Instruction in Informal Settings</td>
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<td>SCE 6337</td>
<td>Secondary Science Methods and Assessment</td>
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<td>SCE 6647</td>
<td>Global Studies Methods in Science Education</td>
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<td>Special Topics</td>
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<td>Student Teaching in Secondary School</td>
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Social Foundations of Education Courses

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Social Studies Education Courses

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<td>Perspectives in Social Studies Education</td>
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Teacher Leadership for School Improvement Courses

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<td>Teacher Leadership for Educational Change</td>
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<td>EDG 6207</td>
<td>Transforming the Curriculum</td>
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<td>EDG 6415</td>
<td>Culturally Responsive Classroom Management</td>
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<tr>
<td>EDG 6953</td>
<td>TLI Online Portfolio Preparation</td>
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College of Education Courses

Student Learning Outcomes

Reading Education (MAE)

SLO 1: Knowledge
The student identifies, describes, and explains general and subject-specific best practices in Reading Education.
SLO 2   Skills
The student investigates a significant problem or an original question within the field of Reading Education.

SLO 3   Professional Behavior
The student describes and defends a thorough and valid understanding of the formal body of knowledge and area of inquiry within the field of Reading Education.

**Reading Education (MEd)**

**SLO 1**   Knowledge
The student identifies, describes, and explains best practices in Reading Education.

**SLO 2**   Skills
The student organizes instruction, develops and applies appropriate reading instructional practices, and evaluates the impact of instruction on student learning.

**SLO 3**   Professional Behavior
The student will collaborate with other professionals, reflect upon his or her own practice, and apply and ethical practices.

**Science Education**

**Program Information**
The Science Education master's degrees programs focus on theory and research-based best practices in formal and informal science teaching and learning at all age levels (preK-adult). Two types of master's degrees in Science Education are offered: a Master of Arts in Education (M.A.E. degree) and a Master of Education (M.Ed.) degree. More information about the requirements for these degrees can be found in the Graduate Degrees (p. 48) section of this catalog.

**Certificate Program**
Beginning in Summer 2018 we will be offering an online program that leads to Florida Teacher Professional Certification (middle and high school) at the post-baccalaureate level. This certificate program is an approved Florida Department of Education Educator Preparation Institute (EPI). Our program is:

- Interdisciplinary
- Completed in 2 semesters
- Strong subject-area preparation with 1 semester of supervised student teaching
- Is completed entirely online, allowing you to complete your student teaching in your local area
- Can transfer directly and become the first half of an online Master’s degree, an M.A.E. in Science Education

This 18-credit certification program is fully approved by the Florida Department of Education and leads to eligibility for Professional Educator certification in Florida. Students from out of state are welcome to apply. Be sure you understand the implications for your own state’s teaching certification requirements.

**Master of Arts in Education**
The M.A.E. in science education offers two options: thesis or project-in-lieu of thesis. Upon admission, M.A.E. students work closely with a faculty advisor to design a program of study tailored to their professional needs and goals. Students who have completed the Certificate Program may use all 18 of those credits towards the M. A. E. Students can complete science education M.A.E. programs as either part-time or full-time students. This program is also appropriate for individuals who are interested in adding to their science content background with graduate level coursework while preparing to teach at the community college level. [https://education.ufl.edu/science-education/master-of-arts/](https://education.ufl.edu/science-education/master-of-arts/).

**Thesis Option**
The thesis option is designed for experienced preK-adult formal or informal science educators interested in pursuing advanced degrees with a strong research focus. Most students completing the M.A.E. thesis option continue on to pursue doctoral degrees in science education. Thirty credits of graduate level coursework and six credits of supervised research culminating in a thesis are required.

**Non-Thesis Option**
The non-thesis option is primarily designed for experienced preK-adult formal or informal science educators interested in improving their own professional practice while also earning a graduate degree. A minimum of 36 total graduate credits is required for the non-thesis M.A.E. degree along with an action research project that is usually job-embedded.

For more detailed information about the Science programs and faculty, as well as various certificate programs please visit our website: [http://education.ufl.edu/science-education](http://education.ufl.edu/science-education).

**Master of Education**
The science education M.Ed. degree (known as “ProTeach”) is a state-approved and nationally-accredited middle and high school initial teacher preparation program. Three tracks are offered (biology, chemistry, and physics), all of which fulfill the course and field experience requirements for professional teacher certification to teach grades 6-12 science in the State of Florida. No thesis or project is required for the M.Ed. degree.

The ProTeach M.Ed. program uses a professional cohort model in which students complete 39 credits of graduate level education coursework in a full-time Fall, Spring, Summer sequence. A bachelor’s degree (or equivalent of a bachelor's degree) in one of the three areas of science certification is a pre-requisite/co-requisite for completion of the program. Additional information outlining the program of study for the science ProTeach block is available at this link: [https://education.ufl.edu/science-education/certificate/](https://education.ufl.edu/science-education/certificate/).

**Degrees Offered with a Major in Science Education**

- Master of Arts in Education
- Master of Education

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.
## School of Teaching and Learning

### Departmental Courses

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<td>Practices in Childhood Education</td>
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<td>EDE 6266</td>
<td>Teaching and Learning in Elementary Classrooms</td>
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<td>Teacher Inquiry/Action Research</td>
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<td>EDE 6948</td>
<td>Internship in Elementary Schools</td>
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<td>EDE 7047</td>
<td>Issues in Teacher Education</td>
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<td>Role of School in Democratic Society</td>
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<td>Knowing and Learning in Secondary Schools</td>
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<td>Writing for Academic Purposes</td>
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<td>Global Studies Methods in K-12 Education</td>
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<td>Multiple Perspectives on Teaching and Learning</td>
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<td>Instructional Coaching for Enhanced Student Learning</td>
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<td>Teaching, Learning and Assessment</td>
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<td>Learning Science with Technology</td>
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<td>Culturally Responsive Classroom Management</td>
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<td>Human-Computer Interaction and the Learner</td>
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<td>Issues and Trends in Educational Technology Research</td>
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<td>Literacy &amp; Language Instruction</td>
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### Curriculum, Teaching, and Teacher Education Courses

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<td>EDG 6953</td>
<td>TLSI Online Portfolio Preparation</td>
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</table>

College of Education Courses

Student Learning Outcomes

Science Education (MAE)

SLO 1  Knowledge
The student will identify and describe general and subject-area specific area best practices in teaching and learning in Science Education.

SLO 2  Skills
The student will investigate a significant problem or original question within his/her specific field of Science Education.

SLO 3  Professional Behavior
The student will apply knowledge of science content and pedagogy to complete a written thesis or project and an oral presentation of research that focuses on a significant problem or original question in Science Education.

Science Education (MEd)

SLO 1  Knowledge
The student will investigate, identify, describe, and explain best practices in science teaching and learning.

SLO 2  Skills
The student will organize content for instruction, develop and implement appropriate inclusive teaching practices, evaluate the impact of instruction on student learning, and create a positive learning environment.

SLO 3  Professional Behavior
The student will collaborate with other professionals, reflect upon his or her own professional practice, and demonstrate a sense of efficacy and ethical practice.

Social Studies Education

Program Information

The School of Teaching & Learning offers Master of Education (M.Ed.) and Master of Arts in Education (M.A.E.) degrees in Social Studies Education. More information about the requirements for these degrees can be found in the Graduate Degrees (p. 48) section of this catalog.

The Social Studies Education ProTeach program culminates in the M.Ed. degree. It is an initial certification program for students with no prior teaching experience, and it confers Professional Certification in Broad Fields Social Science, grades 6-12. This is a state-approved and nationally accredited program that enrolls students in a cohort structure that begins each fall. Students typically complete the program within 12 months and may only begin in the fall term. Please visit this website for more information about this M.Ed. program: https://education.ufl.edu/school-teaching-learning/admissions/master-arts-education-admissions/.

The M.A.E. degree in Social Studies Education does not confer certification and is geared for practicing teachers who want to advance their Social Studies expertise. In addition to their coursework, students are required to complete a thesis or culminating project in lieu of a thesis. Please visit this website for more information about this M.A.E. program: https://education.ufl.edu/social-studies-education/degrees/mae-online/.

For more information, please see our website: http://education.ufl.edu/social-studies-education (http://education.ufl.edu/social-studies-education/).

Degrees Offered

Degrees Offered with a Major in Social Studies Education

• Master of Arts in Education
• Master of Education

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

School of Teaching and Learning

Departmental Courses

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graduate 287

EDE 6905 Individual Work 1-5
EDE 6948 Internship in Elementary Schools 3-12
EDE 7047 Issues in Teacher Education 3
EDF 5552 Role of School in Democratic Society 3
EDF 6520 History of Education 3
EDF 6544 Philosophical Foundations of Education 3
EDF 6616 Education and American Culture 3
EDF 6812 Comparative Education 3
EDF 7934 Seminar in Educational Foundations 3
EDG 5666 Knowing and Learning in Secondary Schools 3
EDG 6017 Writing for Academic Purposes 3
EDG 6047 Teacher Leadership for Educational Change 3
EDG 6207 Transforming the Curriculum 3
EDG 6225 Global Studies Methods in K-12 Education 3
EDG 6226 Foundations of Research in Curriculum & Instruction 3
EDG 6305 Multiple Perspectives on Teaching and Learning 3
EDG 6348 Instructional Coaching for Enhanced Student Learning 3
EDG 6356 Teaching, Learning and Assessment 3
EDG 6378 Learning Science with Technology 3
EDG 6415 Culturally Responsive Classroom Management 3
EDG 6445 Meeting the Educational Needs of Students Living in Poverty 3
EDG 6664 Survey of Research on STEM Education 3
EDG 6905 Individual Work 1-6
EDG 6910 Supervised Research 1-5
EDG 6931 Special Topics 1-4
EDG 6940 Supervised Teaching 1-5
EDG 6953 TLSI Online Portfolio Preparation 1-3
EDG 6971 Research for Master's Thesis 1-15
EDG 6973 Project in Lieu of Thesis 1-9
EDG 7224 Critical Pedagogy 3
EDG 7252 Perspectives in Curriculum, Teaching, and Teacher Education 3
EDG 7303 Teacher Learning and Socialization in High Poverty Schools 3
EDG 7359 Professional Development and Teacher Learning 3
EDG 7941 Field Experience in Curriculum and Instruction 1-4
EDG 7979 Advanced Research 1-12
EDG 7980 Research for Doctoral Dissertation 1-15
EDG 7982 Practitioner Research: Theory & Practice 3
EME 5054 Foundations of Educational Technology 3
EME 5207 Designing Technology-Rich Curricula 3
EME 5403 Instructional Computing I 3
EME 5404 Instructional Computing II 3
EME 5405 Internet in K-12 Instruction 3
EME 5432 Integrating Technology into Social Science Classroom 3
EME 6059 Blended Learning Environments 3
EME 6065 Human-Computer Interaction and the Learner 3
EME 6066 Issues and Trends in Educational Technology Research 3
EME 6074 Mobile Technologies in Education 3
EME 6156 Games and Simulations for Teaching and Learning 3
EME 6208 Designing Integrated Media Environments I 3
EME 6209 Designing Integrated Media Environments II 3
EME 6235 Managing Educational Projects 3
EME 6236 Distance Education Leadership and Management 3
EME 6458 Distance Teaching and Learning 3
EME 6606 Advanced Instructional Design 3
EME 6609 Instructional Design 3
EME 6935 Seminar: Distance Education Issues and Applications 1
EME 6945 Practicum in Educational Media and Instructional Design 3
EME 7345 Implementing Educational Technology Innovations (ETIs) 3
EME 7938 Seminar in Educational Media and Instructional Design 3
ESE 5426 Data-Driven Decision Making for Secondary Teachers 3
ESE 6344 Classroom Practices and Assessment in Secondary Education 3
ESE 6345 Effective Teaching and Classroom Management 3
ESE 6905 Individual Work 1-4
ESE 6939 Special Topics 3
ESE 6945 Student Teaching in Secondary School 3-9
FLE 6165 Bilingual-Bicultural Education 3
FLE 6167 Cross-Cultural Communication for Teachers 3
LAE 6298 Literacy & Language Instruction 3
LAE 6339 Curriculum, Methods, and Assessment in Secondary English Language Arts 3
LAE 6348 Teaching Multiliteracies 3
LAE 6365 Language Arts: Language and Composition 3
LAE 6366 Language Arts: Literature 3
LAE 6407 Early Childhood Children's Literature 3
LAE 6446 Multicultural Literature for Children and Adolescents 3
LAE 6616 Seminar in Children's Literature 3
LAE 6861 Technology and Media Literacy 3
LAE 6865 Teaching Media Literacy with the Internet 3
LAE 6869 Teaching Digital Storytelling 3
LAE 6939 Literacy, Family, and Culture 3
LAE 6945 Practicum and Assessment for Teachers of Secondary School English 3
LAE 6946 Children's Literature in Educational Settings 3
LAE 7006 Language Acquisition and Education 3
LAE 7519 Language and Inquiry 3
LAE 7934 Seminar in Composition Theory and Practice 3
LAE 7936 Seminar in English Language Arts 3
LAE 7938 Lit, Cult and Politics 3
MAE 5327 Middle School Mathematics Methods 3
MAE 5332 Secondary School Mathematics Methods and Assessment 3
MAE 5347 Teaching K-8 Mathematics for Understanding 3
MAE 5395 Multicultural Mathematics Methods 3
MAE 5396 Using Formative Assessment to Improve Mathematical Learning 3
MAE 5945 Secondary School Mathematics Practicum 3-6
MAE 6313 Problem Solving in School Mathematics 3
MAE 6349 Classroom Contexts that Support Self-Regulated Learning and Mathematical Understanding 3
MAE 6916 Inquiry in Mathematics Teaching 3
MAE 7899 Mathematics Education Seminar 3
MUE 7938 Music Education Seminar 3
### General Courses

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### Curriculum, Teaching, and Teacher Education Courses

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<td>EME 6066</td>
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EME 7938 Seminar in Educational Media and Instructional Design 3

MAE 6615 Bilingual-Bicultural Education 3
MAE 6617 Cross-Cultural Communication for Teachers 3
MAE 6636
MAE 6637
MAE 6946
TSL 5142 ESOL Curriculum, Methods, and Assessment 3
TSL 5325 Secondary ESOL Teaching Strategies 3
TSL 6145 Curriculum and Materials Development for ESOL K-12 3
TSL 6171 TESL I: Materials and Techniques 3
TSL 6172 TESL II: Materials for Special Purposes 3
TSL 6245 Language Principles for ESOL Teachers 3
TSL 6373 Methods of Teaching ESOL K-12 3
TSL 6440 Testing and Evaluation of ESOL 3
TSL 6700 Issues in ESOL for School Counselors and Psychologists 3

LAE 6298 Literary Language Instruction 3
LAE 6339 Curriculum, Methods, and Assessment in Secondary English Language Arts 3
LAE 6348 Teaching Multiliteracies 3
LAE 6365 Language Arts: Language and Composition 3
LAE 6366 Language Arts: Literature 3
LAE 6407 Early Childhood Children’s Literature 3
LAE 6446 Multicultural Literature for Children and Adolescents 3
LAE 6455
LAE 6616 Seminar in Children’s Literature 3
LAE 6635
LAE 6714
LAE 6861 Technology and Media Literacy 3
LAE 6865 Teaching Media Literacy with the Internet 3
LAE 6869 Teaching Digital Storytelling 3
LAE 6939 Literacy, Family, and Culture 3
LAE 6945 Practicum and Assessment for Teachers of Secondary School English 3
LAE 6946 Children’s Literature in Educational Settings 3
LAE 7006 Language Acquisition and Education 3
LAE 7519 Language and Inquiry 3
LAE 7934 Seminar in Composition Theory and Practice 3
LAE 7936 Seminar in English Language Arts 3

MAE 5327 Middle School Mathematics Methods 3
MAE 5332 Secondary School Mathematics Methods and Assessment 3
MAE 5395 Multicultural Mathematics Methods 3
MAE 5396 Using Formative Assessment to Improve Mathematical Learning 3
MAE 5347 Teaching K-8 Mathematics for Understanding 3
MAE 5945 Secondary School Mathematics Practicum 3-6
MAE 6313 Problem Solving in School Mathematics 3
MAE 6615

MAE 6641 Mathematics Education Seminar 3

RED 5046 Reading in the Primary Grades 3
RED 5316 Reading in the Secondary School 3
RED 5337 Reading Instruction in the Intermediate Grades 3
RED 5355 Practices in Beginning Reading Instruction 3
RED 6346 Seminar in Reading 3-6
RED 6520 Classroom Literacy Assessment and Instruction 3
RED 6546C Diagnosis of Reading Difficulties 3
RED 6548C Remediation of Reading Difficulties 3
RED 6647 Trends in Reading 3
RED 6941 Practicum in Diagnosis and Remediation of Reading Difficulties 3
RED 7019 Foundations of Literacy 3
RED 7817

SCE 5140 Science Curriculum Development 3
SCE 5316 Inquiry-Based Science Teaching 3
SCE 5825 Foundations of Science Teaching 3
SCE 5965 Diversity and Equity in Science Teaching 3
SCE 5765 Data-Driven Science Instruction 3
SCE 6045
SCE 6117 Science Education in the Elementary School 3
SCE 6246 Science Instruction in Informal Settings 3
SCE 6337 Secondary Science Methods and Assessment 3
SCE 6647 Global Studies Methods in Science Education 3
SCE 6947 Practicum in Secondary Science Teaching and Assessment 3

EDM 6005
EDM 6235

ESE 6215
ESE 6344 Classroom Practices and Assessment in Secondary Education 3
ESE 6345 Effective Teaching and Classroom Management 3
ESE 6905 Individual Work 1-4
ESE 6939 Special Topics 3
ESE 6945 Student Teaching in Secondary School 3-9

EDF 5552 Role of School in Democratic Society 3
EDF 6520 History of Education 3
EDF 6544 Philosophical Foundations of Education 3
EDF 6606
EDF 6616 Education and American Culture 3
EDF 6630
EDF 6812 Comparative Education 3
EDF 6820
Special Education, School Psychology and Early Childhood Studies Department

Director: Holly Lane

The School of Special Education, School Psychology, and Early Childhood Studies offers online and face-to-face programs leading to the Master of Education (M.Ed., non-thesis), Master of Arts in Education (M.A.E., thesis), Specialist in Education (Ed.S.), Doctor of Education (Ed.D.), and Doctor of Philosophy (Ph.D.) degrees. Complete descriptions of the requirements for these degrees are provided in the General Information section of this catalog.

The School offers graduate study and research experience in 3 areas of specialization: Special Education; School Psychology; and Early Childhood Studies. Programs are accredited by the Florida Department of Education and approved by the National Council for Accreditation of Teacher Education (NCATE). The School Psychology program is approved by the NCATE and the National Association of School Psychologists (NASP). The Ph.D. program in School Psychology is accredited by the American Psychological Association (APA).

For more information, please visit https://education.ufl.edu/special-education/.

Majors

- Early Childhood Education (p. 291)
- School Psychology (p. 292)
- Special Education (p. 295)

Faculty

Professor

- Brownell, Mary T.
- Crockett, Jean B.
- Griffin, Cynthia Carlson
- Kemple, Kristen Mary
- Kranzler, John H.
- McLean, Mary Elizabeth
- McLeskey, James Lee
- Smith, Stephen W.
- Snyder, Patricia
- Waldron, Nancy L.

Associate Professor

- Brojomohun-Gagnon, Joseph Calvin
- Lane, Holly Barnes
- Mccray, Erica Djuan
- Reichow, Brian
- Smith-Bonahue, Tina M.

Assistant Professor

- Gage, Nicholas A.
- Splett, Joni Denise Williams
Clinical Assistant Professor
• Chapman, Lindsey Anne
• MacSuga-Gage, Ashley
• Schmidt, Carla T.

Distinguished Professor
• Sindelar, Paul T.

Clinical Associate Professor
• Cox, Penny R.

Scholar
• Beaulieu, Diana Joyce

Research Professor
• Pullen, Paige Cullen

Associate Scholar
• Colon, Elayne P.

Assistant Scholar
• Corbett, Nancy Long

Affiliated Faculty
• Conroy, Maureen Almaz
Professor
• Hayes, Lynda F.
Professor
• Lombardino, Linda J.
Professor
• Nelson, Melanie McDiarmid
Clinical Associate Professor
• Olsen, Brian
Clinical Assistant Professor

Early Childhood Education

Degrees Offered

Degrees Offered with a Major in Early Childhood Education
• Master of Arts in Education
• Master of Education

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Early Childhood Education Courses

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<td>Early Childhood Education: Background and Concepts</td>
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Special Education, School Psychology and Early Childhood Studies Departmental Courses

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<td>Teaching and Managing Behavior for Student Learning</td>
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College of Education Courses

Student Learning Outcomes

**Early Childhood Education (MAE)**

**SLO 1 Knowledge**
Apply advanced levels of knowledge in the following core areas: a) curriculum and instruction; b) child development and assessment; c) family, diversity, and community relations; and d) transition and public policy.

**SLO 2 Skills**
Apply advanced levels of skill in the following core areas: a) curriculum and instruction; b) child development and assessment; c) family, diversity, and community relations; and d) transition and public policy.

**SLO 3 Professional Behavior**
Displays ethical behavior, cultural sensitivity, and appropriate professional conduct & communication.

**Early Childhood Education (MEd)**

**SLO 1 Knowledge**
Candidates completing the M.Ed. as part of the Unified Early Childhood Teacher Education Program will know and apply early childhood concepts, principles, and teaching theory.

**SLO 2 Skills**
Candidates will learn and apply effective planning and implementation of classroom-based assessment and instruction.

**SLO 3 Professional Behavior**
Candidates will display ethical behavior and appropriate professional conduct & communication.

**SLO 4 Professional Behavior**
Candidates will know and apply cultural sensitivity and teamwork.

School Psychology

**Degrees Offered**

**Degrees Offered with a Major in School Psychology**

- Doctor of Education
- Doctor of Philosophy
  - concentration in Early Childhood Studies
  - concentration in Wildlife Forensic Sciences and Conservation
- Master of Arts in Education
- Master of Education
- Specialist in Education

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.
# School Psychology Courses

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# Special Education, School Psychology and Early Childhood Studies Departmental Courses

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Candidates will design, implement, and evaluate an empirically validated intervention to demonstrate proficiency in using psychological assessment results.

SLO 3  Skills
Candidates will present orally and in writing the results and applications of their research and scholarship.

SLO 4  Professional Behavior
Candidates will display professional behaviors and attitudes consistent with School Psychology professional standards and ethical principles including: effective communication and interpersonal skills, respect for diversity and individual differences, and responsive to supervisory feedback.

School psychology (PHD)

SLO 1  Knowledge
Candidates will identify knowledge of core school psychology content areas including: psychological foundations, assessment, consultation, academic and behavioral interventions, counseling, professional and ethical standards.

SLO 2  Skills
Candidates will design, implement, and evaluate an empirically validated intervention to demonstrate proficiency in using psychological assessment results.

SLO 3  Skills
Candidates will present orally and in writing the results and applications of their research and scholarship to demonstrate research proficiency.

SLO 4  Professional Behavior
Candidates will display professional behaviors and attitudes consistent with School Psychology professional standards and ethical principles including: effective communication and interpersonal skills, respect for diversity and individual differences, and responsive to supervisory feedback.

School psychology (MAE)

SLO 1  Knowledge
Candidates will identify knowledge of core school psychology content areas including: psychological foundations, assessment, consultation, academic and behavioral interventions, counseling, professional and ethical standards.

SLO 2  Skills
Candidates will design, implement, and evaluate an empirically validated intervention to demonstrate proficiency in using psychological assessment.

SLO 3  Professional Behavior
Candidates will display professional behaviors and attitudes consistent with School Psychology professional standards and ethical principles including: effective communication and interpersonal skills, respect for diversity and individual differences, and responsive to supervisory feedback.

School psychology (edd)

SLO 1  Knowledge
Candidates will identify knowledge of core school psychology content areas including: psychological foundations, assessment, consultation, academic and behavioral interventions, counseling, professional and ethical standards.

SLO 2  Skills
Candidates will design, implement, and evaluate an empirically validated intervention to demonstrate proficiency in using psychological assessment results.

SLO 3  Professional Behavior
Candidates will display professional behaviors and attitudes consistent with School Psychology professional standards and ethical principles including: effective communication and interpersonal skills, respect for diversity and individual differences, and responsive to supervisory feedback.

Special Education

Degrees Offered

Degrees Offered with a Major in Special Education

- Doctor of Education
- Doctor of Philosophy
  - concentration in Early Childhood Studies
  - concentration in Wildlife Forensic Sciences and Conservation
- Master of Arts in Education
- Master of Education
- Specialist in Education

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Special Education Courses

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Special Education, School Psychology and Early Childhood Studies Departmental Courses

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College of Education Courses

Student Learning Outcomes

Special Education (PhD)

SLO 1  Knowledge
Candidates will apply advanced levels of knowledge in the following core areas: (a) trends and issues in Special Education and their relationship to practice, policy, and research; (b) acquisition, organization, and interpretation of information about research in Special Education; c) identification of research questions and methodology emanating from different knowledge paradigms; and, (d) critique of Special Education research and practice from various knowledge paradigms.

SLO 2  Skills
Candidates will attain the technical knowledge and skills to become independent scholars capable of conducting research and evaluating educational programs, products, and practices.

SLO 3  Professional Behavior
Candidates will give a presentation to other professionals or submit a paper for publication based on a research project.

Special education (ed)

SLO 1  Knowledge
Candidates will apply advanced levels of knowledge in the following core areas: (a) trends and issues in Special Education and their relationship to practice, policy, and research; (b) acquisition, organization, and interpretation of information about research in Special Education; c) identification of research questions and methodology emanating from different knowledge paradigms; and, (d) critique of Special Education research and practice from various knowledge paradigms.

SLO 2  Skills
Candidates will attain the technical knowledge and skills to become independent scholars capable of conducting research and evaluating educational programs, products, and practices.

SLO 3  Professional Behavior
Candidates will give a presentation to other professionals or submit a paper for publication based on a research project.

Special education (eds)

SLO 1  Knowledge
Program participants will identify and apply effective academic and behavioral interventions for students with disabilities and other learning differences.

SLO 2  Knowledge
Program participants will identify and discuss an area of study within the field of special education (e.g. reading; transition; behavior).
SLO 3  Skills
Program participants will use a variety of techniques/tools to determine academic and behavioral needs of students with disabilities and other learning differences.

SLO 4  Skills
Program participants will use professional literature to discuss current issues in special education.

SLO 5  Professional Behavior
Program participants will demonstrate leadership and professional growth through involvement in collaborative (e.g., consultation; coteaching), participatory (e.g., attending professional conferences), and/or leadership activities (e.g., conducting school/district level inservice, conference presentations, mentoring a new teacher).

Special Education (MAE)

SLO 1  Knowledge
Program participants will identify and apply effective academic and behavioral interventions for students with disabilities and other learning differences.

SLO 2  Skills
Program participants will use a variety of techniques/tools to determine academic and behavioral needs of students with disabilities and other learning differences.

SLO 4  Professional Behavior
Program participants will use data to monitor progress and make decisions regarding academic and behavioral programs and instruction for students with disabilities and other learning differences.

Special Education (MEd)

SLO 1  Knowledge
Program participants will identify and apply effective academic and behavioral interventions for students with disabilities and other learning differences.

SLO 2  Skills
Program participants will use a variety of techniques/tools to determine academic and behavioral needs of students with disabilities and other learning differences.

SLO 4  Professional Behavior
Program participants will use data to monitor progress and make decisions regarding academic and behavioral programs and instruction for students with disabilities and other learning differences.

Herbert Wertheim College of Engineering

Dean: C. Abernathy

The Herbert Wertheim College of Engineering is organized into a number of departments focusing on today’s most pressing engineering questions. There is an interdisciplinary culture at the core of Gator Engineering, and researchers regularly collaborate with colleagues in departments and colleges beyond their own.

For more information, please see our website: http://www.eng.ufl.edu

Departments

- Agricultural and Biological Engineering (p. 297)
- Agricultural and Biological Engineering (Engineering) (p. 298)
- Chemical Engineering (p. 301)
- Chemical Engineering (p. 302)
- Civil and Coastal Engineering (p. 304)
- Civil Engineering (p. 305)
- Coastal and Oceanographic Engineering (p. 307)
- Computer and Information Science and Engineering (p. 309)
- Computer Engineering (p. 311)
- Computer Science (Engineering) (p. 312)
- Digital Arts and Sciences (Engineering) (p. 313)
- Human-Centered Computing (p. 314)
- Electrical and Computer Engineering (p. 315)
- Electrical and Computer Engineering (p. 316)
- Engineering Education (http://catalog.ufl.edu/graduate/colleges-departments/engineering/graduate/colleges-departments/engineering/engineering-education/)
- Environmental Engineering Sciences (p. 319)
- Environmental Engineering Sciences (p. 320)
- Industrial and Systems Engineering (p. 323)
- Industrial and Systems Engineering (p. 324)
- J. Crayton Pruitt Family Biomedical Engineering (p. 326)
- Biomedical Engineering (p. 327)
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- Materials Science and Engineering (p. 330)
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- Mechanical and Aerospace Engineering (p. 334)
- Aerospace Engineering (p. 335)
- Mechanical Engineering (p. 337)
- Nuclear and Radiological Engineering (p. 339)

Faculty

Complete faculty listings: Follow this link (http://gradschool.ufl.edu/GimsPublic/Acatalog/Faculty.aspx).

Agricultural and Biological Engineering Department

Chair: Dorota Z. Haman
Graduate Coordinator: Greg Kiker

The degrees of Master of Science, Master of Engineering and Doctor of Philosophy are offered with graduate programs in agricultural and biological engineering through the College of Engineering. Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

A combined B.S./M.S. program allows up to 12 graduate credits to be double-counted toward fulfillment of both degrees. Contact the graduate coordinator for qualifications and details.

The Master of Science, Master of Engineering, and Doctor of Philosophy degrees are offered in the following areas of research:

Agricultural production engineering includes development and application of precision agriculture concepts and tools, weather and climate risk in agriculture, decision support systems, food security,
pesticide application, post-harvest operations, robotics and other machine systems and environmental control systems. Applications to space biology are included in cooperation with NASA at Kennedy Space Center.

**Biological engineering** includes biocomplexity analysis, ecological modeling, risk and decision analysis, bioprocess design, plant biotechnology, process microbiology, food process engineering, environmental biotechnology, bioreactors, and packaging science.

**Information systems** includes development and application of GIS and remote sensing, communications, mathematical modeling, data solutions and expert systems techniques to biological and agricultural systems.

**Land and water resources** includes soil-water-plant relations, irrigation, water quality, watershed hydrology, BMP and TMDL studies, hydrologic modeling, ecological restoration, environmental fate and transport of nanoparticles, waste management, and water reuse.

Students also may choose to participate in interdisciplinary concentrations in hydrologic sciences, geographic information sciences, particle science and technology, and interdisciplinary ecology.

For more information about the program, please visit the program link below and the graduate studies pages on the departmental website at http://www.abe.ufl.edu.

**Majors**
- Agricultural and Biological Engineering (Engineering) (p. 298)

**Faculty**

**Professor**
- Asseng, Senthold
- Burks, Thomas Francis
- Dukes, Michael D.
- Fraisse, Clyde William
- Gao, Bin
- Graham, Wendy Dimbero
- Hoogenboom, Gerrit
- Huffaker, Ray G.
- Jones, Pierce H.
- Judge, Jasmeet
- Kiker, Gregory A.
- Lee, Won Suk
- Migliaccio, Kati White
- Mukhtar, Saqib
- Munoz-Carpena, Rafael
- Shukla, Sanjay
- Welt, Bruce Ari

**Associate Professor**
- Bliznyuk, Nikolay A.
- Correll, Melanie J.
- Martinez, Christopher J.
- McLamore, Eric
- Muneeproakul, Rachata
- Pullamanappallil, P C.
- Tong, Zhaohui

**Assistant Professor**
- Ampatzidis, Ioannis
- Bayabil, Haimanote Kebede
- Bean, Eban Zachary
- Gorucu, Serap
- Guzman Gutierrez, Sandra Milena
- Her, Young Gu
- Martin-Ryals, Ana D.
- Sharma, Vivek
- Singh, Aditya
- Watson, Jonathan A.
- Yu, Ziwen
- Zhang, Ying

**Research Professor**
- Palm, Cheryl A.

**Senior Lecturer**
- Leary, James Daniel
- Porter, Wendell A.

**Affiliated Faculty**
- Schueler, John Kenneth

**Professor**

**Program Information**

The degrees of Master of Science, Master of Engineering, and Doctor of Philosophy are offered with graduate programs in agricultural and biological engineering through the College of Engineering. Students must have an undergraduate or graduate degree in Engineering or meet specific articulation requirements in order to pursue an advanced degree in engineering.

For students without an engineering degree, The Master of Science and Doctor of Philosophy degrees in agricultural and biological engineering are offered in the areas of agricultural operations management and applied science through the College of Agricultural and Life Sciences. Students must have a degree in a related field or meet specific articulation requirements in order to pursue an advanced degree in engineering.

A combined B.S./M.S. or B.S./M.E. for Engineering students program allows up to 12 graduate credits to be double-counted toward fulfillment of both degrees. Contact the graduate coordinator for qualifications and details. A 30-credit, nonthesis master’s degree program is also available to students interested in completing the requirements in 1 year.

The Master of Science, Master of Engineering, and Doctor of Philosophy (Engineering) degrees are offered in the following areas of research:

Agricultural production engineering includes development and application of precision agriculture concepts and tools, weather and
climate risk in agriculture, decision support systems, food security, pesticide application, post-harvest operations robotics and other machine systems and environmental control systems. Applications to space biology are included in cooperation with NASA at Kennedy Space Center.

Biological engineering includes biocomplexity analysis, ecological modeling, risk and decision analysis, bioprocess design, plant biotechnology, process microbiology, food process engineering, environmental biotechnology, bioreactors, and packaging science.

Information systems includes development and application of GIS and remote sensing, communications, mathematical modeling, data solutions, and expert systems techniques to biological and agricultural systems.

Land and water resources includes soil-water-plant relations, irrigation, water quality, watershed hydrology, BMP and TMDL studies, hydrologic modeling, ecological restoration, environmental fate and transport of nanoparticles, waste management, and water reuse.

Students also may choose to participate in interdisciplinary concentrations in hydrologic sciences, geographic information sciences, particle science and technology, and interdisciplinary ecology.

The Master of Science and Doctor of Philosophy (CALS) in the agricultural operations management area of specialization provide for scientific training and research in technical agricultural management. Typical plans of study focus on advanced training in environmental systems management, production systems management, construction and process management and technical sales management.

In addition, for students with basic science degrees, the Master of Science and Doctor of Philosophy programs with a specialization in applied sciences through the College of Agricultural and Life Sciences provides advanced training in problem-solving capabilities, interdisciplinary research, and methods for applying science to real-world problems and issues. Typical emphasis is on:

1. the use of engineering methods and approaches, such as mathematical modeling, optimization, and information technologies, in application of science to problems of various spatial and temporal scales; and
2. an interdisciplinary experience in research at the doctoral level.

The requirements for a master’s degree normally take 2 years to complete. The length of time required for the Doctor of Philosophy degree depends partly on the research topic, but normally takes 3 to 4 years.

Additional information can also be found on the graduate studies pages on the department website at www.abe.ufl.edu (http://www.abe.ufl.edu).

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

#### Agricultural and Biological Engineering Courses

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<td>ABE 5015</td>
<td>Empirical Models of Crop Growth and Yield Response</td>
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<tr>
<td>ABE 5038</td>
<td>Recent Developments and Applications in Biosensors</td>
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<tr>
<td>ABE 5152</td>
<td>Fluid Power Circuits and Control</td>
<td>3</td>
</tr>
<tr>
<td>ABE 5332</td>
<td>Advanced Agricultural Structures</td>
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</tr>
<tr>
<td>ABE 5442</td>
<td>Advanced Agricultural Process Engineering</td>
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<tr>
<td>ABE 5643C</td>
<td>Biological Systems Modeling</td>
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<tr>
<td>ABE 5646</td>
<td>Biological and Agricultural Systems Simulation</td>
<td>3</td>
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<tr>
<td>ABE 5653</td>
<td>Rheology and Mechanics of Agricultural and Biological Materials</td>
<td>3</td>
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<tr>
<td>ABE 5663</td>
<td>Advanced Applied Microbial Biotechnology</td>
<td>3</td>
</tr>
<tr>
<td>ABE 5707C</td>
<td>Agricultural Waste Management</td>
<td>3</td>
</tr>
<tr>
<td>ABE 5815C</td>
<td>Food and Bioprocess Engineering Design</td>
<td>3</td>
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<tr>
<td>ABE 5936</td>
<td>Writing Grant Proposals for Scholarships and Fellowships</td>
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<tr>
<td>ABE 6005</td>
<td>Applied Control for Automation and Robots</td>
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<tr>
<td>ABE 6031</td>
<td>Instrumentation in Agricultural Engineering Research</td>
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<tr>
<td>ABE 6035</td>
<td>Advanced Remote Sensing: Science and Sensors</td>
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<td>ABE 6037C</td>
<td>Remote Sensing in Hydrology</td>
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<td>ABE 6252</td>
<td>Advanced Soil and Water Management Engineering</td>
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<td>ABE 6254</td>
<td>Simulation of Agricultural Watershed Systems</td>
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<tr>
<td>ABE 6265</td>
<td>Vadose Zone Modeling</td>
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<td>ABE 6266</td>
<td>Nanotechnology in Water Research</td>
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<tr>
<td>ABE 6615</td>
<td>Advanced Heat and Mass Transfer in Biological Systems</td>
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<td>ABE 6644</td>
<td>Agricultural Decision Systems</td>
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<tr>
<td>ABE 6645C</td>
<td>Computer Simulation of Crop Growth and Management Responses</td>
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<td>ABE 6654C</td>
<td>Advanced Bio-Based Products from Renewable Resources</td>
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<tr>
<td>ABE 6816</td>
<td>Food and Bioprocess Sterilization</td>
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<td>ABE 6905</td>
<td>Individual Work in Agricultural and Biological Engineering</td>
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<td>ABE 6910</td>
<td>Supervised Research</td>
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<tr>
<td>ABE 6931</td>
<td>Seminar</td>
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### Agricultural and Biological Engineering

#### Departmental Courses

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<td>Control Methods in SmartAg Systems</td>
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<td>ABE 5015</td>
<td>Empirical Models of Crop Growth and Yield Response</td>
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<tr>
<td>ABE 503Q</td>
<td>Recent Developments and Applications in Biosensors</td>
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<tr>
<td>ABE 5152</td>
<td>Fluid Power Circuits and Control</td>
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<td>ABE 5332</td>
<td>Advanced Agricultural Structures</td>
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<td>ABE 5643C</td>
<td>Biological Systems Modeling</td>
<td>3</td>
</tr>
<tr>
<td>ABE 5646</td>
<td>Biological and Agricultural Systems Simulation</td>
<td>3</td>
</tr>
<tr>
<td>ABE 5648</td>
<td>Modeling Coupled Natural-Human Systems</td>
<td>3</td>
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<tr>
<td>ABE 5653</td>
<td>Rheology and Mechanics of Agricultural and Biological Materials</td>
<td>3</td>
</tr>
<tr>
<td>ABE 5663</td>
<td>Advanced Applied Microbial Biotechnology</td>
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</tr>
<tr>
<td>ABE 6005</td>
<td>Applied Control for Automation and Robots</td>
<td>3</td>
</tr>
<tr>
<td>ABE 6017C</td>
<td>Stochastic Modeling in Ecology and Hydrology</td>
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<td>ABE 6031</td>
<td>Instrumentation in Agricultural Engineering Research</td>
<td>3</td>
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<td>Advanced Bio-Based Products from Renewable Resources</td>
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<td>ABE 6816</td>
<td>Food and Bioprocess Sterilization</td>
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<td>ABE 6840</td>
<td>Data Diagnostics</td>
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<td>ABE 6931</td>
<td>Seminar</td>
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<td>ABE 6932</td>
<td>Special Topics in Agricultural Operations Management</td>
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<td>CWR 6536</td>
<td>Stochastic Subsurface Hydrology</td>
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<td>EGN 5913</td>
<td>Engineering Graduate Research</td>
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<td>EGS 6900</td>
<td>Principles of Engineering Practice</td>
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### College of Engineering Courses

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<th>Credits</th>
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<tbody>
<tr>
<td>EEE 5354L</td>
<td>Semiconductor Device Fabrication Laboratory</td>
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<tr>
<td>EGN 5010L</td>
<td>NRF Training Lab</td>
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<tr>
<td>EGN 5949</td>
<td>Practicum/Internship/Cooperative Work Experience</td>
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<tr>
<td>EGN 6615</td>
<td>Entrepreneurship for Engineers</td>
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<tr>
<td>EGN 6642</td>
<td>Engineering Innovation</td>
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<td>Special Topics</td>
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<td>EGS 6628</td>
<td>Applied Engineering Project Management</td>
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<td>EGS 6629</td>
<td>Advanced Engineering Leadership</td>
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<td>EMA 6581</td>
<td>Polymeric Biomaterials</td>
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<tr>
<td>ESI 6581</td>
<td>Principles of Engineering Practice</td>
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</tr>
</tbody>
</table>
Student Learning Outcomes

Agricultural & Biological Engineering (PHD)

SLO 1  Knowledge
Employ mathematics, science and engineering principles to solve problems in the discipline of Agricultural and Biological Engineering.

SLO 2  Skills
Apply, analyze, and synthesize content knowledge to plan and conduct scholarly activities that make original contributions to the knowledge base in the field of study by identifying components or processes of agricultural and/or biological systems to meet desired needs within realistic economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability constraints.

SLO 3  Professional Behavior
Display ethical behavior, cultural sensitivity, teamwork, professional conduct and effective communication.

Agricultural & biological engineering (MS and ME)

SLO 1  Knowledge
Identifies, describes, explains, and applies the mathematics, science and engineering principles of the discipline of Agricultural and Biological Engineering.

SLO 2  Skills
Apply, analyze, and synthesize content knowledge to solve problems by identifying components or processes of agricultural and/or biological systems to meet desired needs within realistic economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability constraints.

SLO 3  Professional Behavior
Display ethical behavior, cultural sensitivity, teamwork, professional conduct and effective communication.

Chemical Engineering Department

Chair: Carlos Rinaldi
Graduate Coordinator: Kirk Ziegler
Master Students Coordinator: Yilder Tseng

The Chemical Engineering Department offers the degrees of Doctor of Philosophy, Master of Science (thesis and non-thesis options), and Master of Engineering in Chemical Engineering. Minimum requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

The Ph.D., M.E., and M.S. degrees in chemical engineering require course work in three core areas:

- The chemical engineering basis area, consisting of three core courses in the mathematical, the molecular, and the continuum bases of chemical engineering
- The chemical engineering science and systems area, consisting of a selection of courses in such areas as transport phenomena, electrochemical engineering, thermodynamics, kinetics, reaction engineering, process control, separation processes, and heat and mass transfer

- The research specialty area, consisting of courses designed to build depth in a field of specialization. Courses may be from other academic units, or may be chemical engineering courses such as colloid science, corrosion, polymer science, advanced materials, and biochemical engineering.

For more information, please see the program page below and our website: http://che.ufl.edu/apply-to-chem (http://che.ufl.edu/apply-to-chem/).

Majors

- Chemical Engineering (p. 302)

Faculty

Professor

- Angerhofer, Alexander
- Bowers, Clifford Russell
- Bruner, Steven Douglas
- Cao, Yunwei Charles
- Castellano, Ronald K.
- Colina, Coray Mariu
- Fanucci, Gail E.
- Guo, Zhongwu
- Harris, Michael
- McElwee-White, Lisa Ann
- Richardson, David E.
- Roitberg, Adrian E.
- Seidel, Daniel
- Stanton, John F.
- Stewart, Jon Dale
- Sumerlin, Brent S.
- Talham, Daniel R.
- Veige, Adam S.
- Wagener, Kenneth B.
- Yost, Richard A.

Associate Professor

- Aponick, Aaron
- Brucat, Philip J.
- Butcher, Rebecca Ann
- Horenstein, Nicole Alana
- Kleiman, Valeria Dana
- Loesgen, Sandra
- Miller, Stephen Albert
- Murray, Leslie Justin
- Polfer, Nicolas Camille
- Savin, Daniel Andrew
- Toth, Anna F.
- Wei, Wei

Assistant Professor

- Eddy, Matthew T.
- Grenning, Alexander James
Program Information

The Chemical Engineering Department offers the degrees of Doctor of Philosophy, Master of Science (thesis and non-thesis options), and Master of Engineering in Chemical Engineering. Minimum requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Master of Science Degree – Thesis Option

Completion of the program is possible in 16 months, and its usual duration ranges from 16 to 24 months. The principal requirements for the M.S. degree are 30 semester hours and a research thesis approved by the student's supervisory committee. These credits include:

- Twelve graduate semester hours in the basis of chemical engineering courses (Mathematical Basis, Continuum Basis, Molecular Basis, and Chemical and Bio Lab). Molecular Basis can be replaced with an Elective for students on Applied Track.
- Six credits of Chemical Engineering Science courses, including at least one course in reaction engineering, bioengineering, or kinetics.
- Up to six semester hours of supervised research.

Students must submit a final thesis and pass an oral thesis-defense examination.

Master of Science Degree – Non-Thesis Option

This program is designed for completion in 12 months, although some students prefer longer durations. The M.S.-Non-Thesis provides an opportunity to develop an in-depth knowledge of chemical engineering fundamentals, to emphasize a specific specialization area, and to acquire basic experience in research or industrial practice through a short internship. The principal requirements are 30 credits of courses including an option for 7 credits of research work in a laboratory or of work in an industrial internship. The core course requirements for this program are identical to that for the M.S.-Thesis. A final thesis document is not required but a written report on a project, internship or a contemporary Chemical Engineering topic is required for graduation.

All new students for the M.S. program are admitted to the non-thesis option at the time of admission, and some are converted to the thesis option upon approval by the Research Advisor and the Director of Graduate Programs.

Master of Engineering Degree

A student with a B.S. degree in biology, chemistry, physics, mathematics, or another branch of engineering may obtain a graduate degree in Chemical Engineering by meeting the necessary academic requirements and taking selected undergraduate courses. Students intending to obtain a professionally oriented M.E. degree would normally complete their undergraduate requirements in 1-2 semesters. The graduate course requirements of 30 credits of coursework require another 3-4 semesters. The M.E. students can apply for conversion to the M.S.-NT or M.S.-Thesis program after satisfactory completion of the undergraduate courses.

Ph.D. Degree

The Ph.D. degree plan is primarily a research program. The granting of the degree is based essentially on general proficiency and distinctive attainments in Chemical Engineering and particularly on the demonstrated ability to conduct an independent investigation as exhibited in the doctoral dissertation. Briefly, the formal requirements for the Ph.D. degree are:

- Maintaining a GPA of 3.0 or higher with B- or higher in all Basis courses.
- Successful completion of written and oral examinations for advancement to candidacy. The written examination is comprised of the candidate's objectives and achievements towards his/her doctoral dissertation. The oral examination is based on the written part and related areas. The oral section also includes the Qualifying Examination to test the student's breadth of knowledge in Chemical Engineering fundamentals.
- Preparing a dissertation based on original research.
- Passing the final examination based on the dissertation.
- The graduation requirements include 90 credits including at least 30 credits in coursework. Details and minor changes in any of these requirements will be given upon the student's arrival.

The department offers a combined bachelor’s/master’s degree program. Contact graduate coordinator for information.

For more information, please see our website: https://www.che.ufl.edu/apply-to-che/#1518393029582-95412685-f4f2.
Degrees Offered with a Major in Chemical Engineering

- Doctor of Philosophy
- Master of Engineering
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Chemical Engineering Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tr>
<td>BME 6221</td>
<td>Biomolecular Cell Mechanics</td>
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<td>BME 6322</td>
<td>Dynamics of Cellular Processes</td>
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<td>BME 6644</td>
<td>Pharmacokinetics</td>
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<tr>
<td>ECH 5938</td>
<td>Topics in Colloid Science</td>
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<td>Thermodynamics of Reaction and Phase Equilibria</td>
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<tr>
<td>ECH 6270</td>
<td>Continuum Basis of Chemical Engineering</td>
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<td>ECH 6272</td>
<td>Molecular Basis of Chemical Engineering</td>
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<td>ECH 6285</td>
<td>Transport Phenomena</td>
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<td>ECH 6326</td>
<td>Computer Control of Processes</td>
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<td>ECH 6506</td>
<td>Chemical Engineering Kinetics</td>
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<td>ECH 6526</td>
<td>Reactor Design and Optimization</td>
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<td>ECH 6709</td>
<td>Electrochemical Engineering Fundamentals and Design</td>
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<td>Interfacial Phenomena I</td>
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<td>Interfacial Phenomena II</td>
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<td>ECH 6843</td>
<td>Experimental Basis of Chemical Engineering</td>
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<td>ECH 6851</td>
<td>Impedance Spectroscopy</td>
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<td>ECH 6910</td>
<td>Supervised Research</td>
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<td>ECH 6937</td>
<td>Topics in Chemical Engineering I</td>
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<td>ECH 6939</td>
<td>Topics in Chemical Engineering III</td>
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<td>ECH 6940</td>
<td>Supervised Teaching</td>
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<td>ECH 6971</td>
<td>Research for Master’s Thesis</td>
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<td>ECH 7938</td>
<td>Advanced Special Chemical Engineering I</td>
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<td>Advanced Research</td>
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<td>Research for Doctoral Dissertation</td>
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College of Engineering Courses

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<th>Code</th>
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<tbody>
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<td>EEE 5354L</td>
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<td>NRF Training Lab</td>
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<td>Engineering Graduate Research</td>
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<td>Special Topics</td>
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<td>EGs 6101</td>
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<td>Fundamentals of Engineering Project Management</td>
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<td>EMA 6581</td>
<td>Polymeric Biomaterials</td>
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<td>ESI 6900</td>
<td>Principles of Engineering Practice</td>
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Chemical Engineering Departmental Courses

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<th>Credits</th>
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<td>BME 6221</td>
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<td>BME 6322</td>
<td>Dynamics of Cellular Processes</td>
<td>3</td>
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<td>BME 6644</td>
<td>Pharmacokinetics</td>
<td>3</td>
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<td>CHM 5275</td>
<td>The Organic Chemistry of Polymers</td>
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<td>CHM 5511</td>
<td>Physical Chemistry of Polymers</td>
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<td>ECH 5938</td>
<td>Topics in Colloid Science</td>
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<td>ECH 6126</td>
<td>Thermodynamics of Reaction and Phase Equilibria</td>
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<tr>
<td>ECH 6285</td>
<td>Transport Phenomena</td>
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Student Learning Outcomes

Chemical engineering (phd)

SLO 1 Knowledge
a. Ability to identify a problem  
   b. Ability to formulate a problem  
   c. Ability to solve engineering problems  
   d. Ability to critically read engineering literature

SLO 2 Skills
Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice at an advanced level

SLO 3 Professional Behavior
Civil and Coastal Engineering Department

Chair: K. Hatfield
Graduate Coordinator: Dennis Hiltunen

The Department of Civil and Coastal Engineering offers two distinct graduate programs: civil engineering and coastal and oceanographic engineering. All degrees except the Ph.D. are available in a thesis or nonthesis option.

Civil and Coastal Engineering degree programs include areas of specialization in; Coastal & Oceanographic Engineering, Coastal Ecosystem Dynamics, Geosystems Engineering, Materials & Pavements, Public Works, Structural Engineering, Sustainable Construction Engineering, Transportation Engineering and Water Systems.

Minor or supporting work is encouraged from a variety of related or allied fields of study. Ph.D. students are required to take a preliminary examination. Requirements for the M.S., M.E., and Ph.D. degrees are given in the Graduate Degrees (p. 48) section of this catalog.

For information about our Graduate Admissions process and deadlines, please go to https://www.essie.ufl.edu/student_resources/admissions/graduate/.

Majors

- Civil Engineering (p. 305)
- Coastal and Oceanographic Engineering (p. 307)

Faculty

Professor

- Consolazio, Gary R.
- Elefteriadou, Ageliki
- Gurley, Kurtis R.
- Hamilton, Homer Robert
- Hatfield, Kirk
- Hiltunen, Dennis R.
- Krauthammer, Theodor
- Masters, Forrest J.
- McVay, Michael C.
- Najafi, Fazil T.
- Roque, Reynaldo
- Schmertmann, John H.
- Sheremet, Alexandru Aurica
- Tia, Mang
- Valle-Levinson, Arnoldo
- Washburn, Scott Stuart
- Yin, Yafeng

Associate Professor

- Bridge, Jennifer Anne
- Du, Jing
- Du, Lili
- Phillips, Brian M.
- Prevatt, David
- Riding, Kyle Austin
- Simmons, Denise R.
- Slinn, Donald Nicholas
- Srinivasan, Sivaramakrishnan
- Tran, Khiem T.

Assistant Professor

- Canestrelli, Alberto
- Olabarrieta Lizaro, Maitane
- Song, Xiaoyu
- Tebaldi, Gabriele
- Thieke, Robert J.
- Yu, Xiao
- Zhao, Xilei

Other

- Agarwal, Nithin K.
- Guo, Rui
- Resio, Donald

Assistant Engineer

- Davidson, Michael T.
- Mohseni, Ana Paula

Research Assistant Scientist

- Davis, Justin R.
- Newman, Mark A.
- Zou, Jian

Research Assistant Professor

- Astarlioglu, Serdar
- Ferraro, Christopher Charles
- Wasman, Scott Joseph

Affiliated Faculty

- Barnes, Grenville
- Dewitt, Bon A.
- Associate Professor
- Gilbert, Juan Eugene
Civil Engineering

Program Information

The civil engineering program is offered through the Department of Civil and Coastal Engineering with the following degrees:

- Doctor of Philosophy
- Master of Engineering
- Master of Science

The master's degree in civil engineering is also offered through the Electronic Delivery of Graduate Engineering (EDGE) program, which is a distance learning program delivered either via streaming video or DVD directly to the students. Subject to approval by the supervisory committee, graduate-level courses taken through the College of Engineering (EGN), Departments of Environmental Engineering Sciences, Geological Sciences, and Mechanical and Aerospace Engineering are considered as major credit.

For courses taken through the Department of Civil and Coastal Engineering, credit hours graded S/U will not count toward graduation except for:

- 6 hours of CGN 6971 Research for Master’s Thesis (1-15 cr.) or EOC 6971 Research for Master’s Thesis (1-15 cr.) for thesis students
- 3 hours of CGN 6974 Master of Engineering or Engineer Degree Report (1-6 cr.) for students working on the M.E. report
- CGN 7979 Advanced Research (1-12 cr.) or EOC 7979 Advanced Research (1-12 cr.)
- CGN 7980 Research for Doctoral Dissertation (1-15 cr.) or EOC 7980 Research for Doctoral Dissertation (1-15 cr.)

The department offers a combined bachelor's/master's degree program for current UF undergraduate students who intend to complete a graduate degree at UF. Please contact the undergraduate coordinator for information.

Degrees Offered

Degrees Offered with a Major in Civil Engineering

- Doctor of Philosophy
  - without a concentration
  - concentration in Geographic Information Systems
  - concentration in Hydrologic Sciences
  - concentration in Wetland Sciences
- Master of Engineering
  - without a concentration
  - concentration in Geographic Information Systems
  - concentration in Hydrologic Sciences
  - concentration in Structural Engineering
  - concentration in Wetland Sciences
- Master of Science
  - without a concentration
  - concentration in Geographic Information Systems
  - concentration in Hydrologic Sciences
  - concentration in Structural Engineering
  - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Course Requirements for Civil and Coastal Engineering

Hydrology / Water Resources Shared Courses

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<td>CGN 6905</td>
<td>Special Problems in Civil Engineering</td>
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<tr>
<td>CWR 5125</td>
<td>Groundwater Flow I</td>
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<td>CWR 5127</td>
<td>Evaluation of Groundwater Quality</td>
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<td>CWR 5235</td>
<td>Open Channel Hydraulics</td>
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<td>CWR 6115</td>
<td>Surface Hydrology</td>
<td>3</td>
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<td>CWR 6126</td>
<td>Variable-Density Groundwater Flow</td>
<td>3</td>
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<td>CWR 6525</td>
<td>Groundwater Flow II</td>
<td>3</td>
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<tr>
<td>CWR 6537</td>
<td>Contaminant Subsurface Hydrology</td>
<td>3</td>
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<tr>
<td>EGM 5816</td>
<td>Intermediate Fluid Dynamics</td>
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<tr>
<td>ENV 5518</td>
<td>Field Methods in Environmental Hydrology</td>
<td>3</td>
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<td>ENV 5565</td>
<td>Hydraulic Systems Design</td>
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<tr>
<td>ENV 6052</td>
<td>Immiscible Fluids in Porous Media</td>
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<td>ENV 6441</td>
<td>Water Resources Planning and Management</td>
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<td>ENV 6508</td>
<td>Wetland Hydrology</td>
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<td>ENV 6932</td>
<td>Special Problems in Environmental Engineering</td>
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Civil and Coastal Engineering Departmental Courses

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<td>CCE 5035</td>
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<td>CCE 5405</td>
<td>Construction Equipment and Procedures</td>
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<td>CCE 6016</td>
<td>Advanced Engineering Cost Estimating</td>
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<td>CCE 6037</td>
<td>Civil Engineering Operations I</td>
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<tr>
<td>CEG 5105</td>
<td>Geotechnical Engineer</td>
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<td>CEG 5114</td>
<td>Advanced Geotechnical Aspects of Landfill Design</td>
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<td>CEG 5115</td>
<td>Foundation Design</td>
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<td>CEG 5205C</td>
<td>Insitu Measurement of Soil Properties</td>
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<td>CEG 6015</td>
<td>Advanced Soil Mechanics</td>
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<td>CEG 6117</td>
<td>Advanced Deep Foundation Design</td>
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<td>CEG 6405</td>
<td>Seepage in Soils</td>
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<td>CEG 6505</td>
<td>Numerical Methods of Geomechanics</td>
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<td>CEG 6515</td>
<td>Earth Retaining Systems and Slope Stability</td>
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<td>CES 5010</td>
<td>Probabilistic and Stochastic Methods in Civil Engineering</td>
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<td>Finite Elements in Civil Engineering</td>
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<td>CES 5325</td>
<td>Design of Highway Bridges</td>
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<td>CES 5506</td>
<td>Topics in Steel Design</td>
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<td>CES 5507</td>
<td>Behavior of Steel Structures</td>
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<td>CES 5715</td>
<td>Prestressed Concrete</td>
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<td>CES 5801</td>
<td>Design and Construction in Timber</td>
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<td>CES 5835</td>
<td>Design of Reinforced Masonry Structures</td>
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<td>CES 6106</td>
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<td>Structural Dynamics</td>
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<td>CES 6551</td>
<td>Design of Folded Plates and Shells</td>
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College of Engineering Courses

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<th>Code</th>
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<tr>
<td>ESI 6900</td>
<td>Principles of Engineering Practice</td>
<td>1-4</td>
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Student Learning Outcomes

Civil Engineering (phd)

SLO 1 Knowledge
An ability to critically read engineering literature in the student's graduate program area (Civil Engineering Materials, Water Resources, Geotechnical Engineering, Construction, Structures, and Transportation); and an ability to identify, formulate new solutions to engineering problems in the student's program area.

SLO 2 Skills
An ability to develop new techniques, skills, and modern engineering tools necessary for engineering practice at an advanced level in the students program area (Civil Engineering Materials, Water Resources, Geotechnical Engineering, Construction, Structures, and Transportation).

SLO 3 Professional Behavior
Effectively communicate technical knowledge and information.

Civil Engineering (ME & MS)

SLO 1 Knowledge
An ability to identify, formulate and solve engineering problems in the student’s program area. (Civil Engineering Materials, Water Resources, Geotechnical Engineering, Construction, Structures, and Transportation)

SLO 2  Skills  An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice at an advanced level in the student’s program area (Civil Engineering Materials, Water Resources, Geotechnical Engineering, Construction, Structures, and Transportation)

SLO 3  Professional Behavior  Effectively communicate technical knowledge and information

Coastal and Oceanographic Engineering
Program Information
The coastal and oceanographic engineering program is offered through the Department of Civil and Coastal Engineering with the following degrees: Master of Engineering, Master of Science, and Doctor of Philosophy degree. Subject to approval by the supervisory committee, graduate-level courses taken through the College of Engineering (EGN), the Departments of Environmental Engineering Sciences, Geological Sciences, and Mechanical and Aerospace Engineering are considered as major credit.

For courses taken through the Department of Civil and Coastal Engineering, credit hours graded S/U will not count toward graduation except for:

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- 3 hours of CGN 6974 Master of Engineering or Engineer Degree Report (1-6 cr.) for students working on the M.E. report
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- CGN 7980 Research for Doctoral Dissertation (1-15 cr.) or EOC 7980 Research for Doctoral Dissertation (1-15 cr.)

The department offers a combined bachelor’s/master’s degree program for current UF undergraduate students who intend to complete a graduate degree at UF. Please contact the undergraduate coordinator for information.

Degrees Offered

Degrees Offered with a Major in Coastal and Oceanographic Engineering

- Doctor of Philosophy
- Master of Engineering
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses
Coastal and Oceanographic Engineering Courses

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<tr>
<th>Code</th>
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<td>EOC 5860</td>
<td>Port and Harbor Engineering</td>
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<td>EOC 6196</td>
<td>Littoral Processes</td>
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<td>EOC 6430</td>
<td>Coastal Structures</td>
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<td>EOC 6850</td>
<td>Numerical Simulation Techniques in Coastal and Ocean Engineering</td>
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<td>Individual Study in Coastal and Oceanographic Engineering</td>
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<td>Advanced Topics in Coastal and Oceanographic Engineering</td>
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<td>OCP 6050</td>
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<td>OCP 6168</td>
<td>Data Analysis Techniques for Coastal and Ocean Engineers</td>
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<td>OCP 6295</td>
<td>Estuarine and Shelf Hydrodynamics I</td>
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<td>OCP 6297</td>
<td>Coastal and Estuarine Sediment Transport</td>
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<td>OCP 6298</td>
<td>Coastal Sediment Transport Processes</td>
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Civil and Coastal Engineering Departmental Courses

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<td>Construction Equipment and Procedures</td>
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<td>CCE 6016</td>
<td>Advanced Engineering Cost Estimating</td>
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<td>Foundation Design</td>
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<td>CEG 5205C</td>
<td>In situ Measurement of Soil Properties</td>
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<td>Numerical Methods of Geomechanics</td>
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<td>Earth Retaining Systems and Slope Stability</td>
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<td>CES 5010</td>
<td>Probabilistic and Stochastic Methods in Civil Engineering</td>
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<td>Finite Elements in Civil Engineering</td>
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<td>Design of Highway Bridges</td>
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<td>CES 5606</td>
<td>Topics in Steel Design</td>
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<td>Behavior of Steel Structures</td>
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<td>CES 5715</td>
<td>Prestressed Concrete</td>
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<td>CES 5801</td>
<td>Design and Construction in Timber</td>
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<td>CES 5835</td>
<td>Design of Reinforced Masonry Structures</td>
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<td>Design of Temporary Structures</td>
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Ces 6585 Wind Engineering 3
Ces 6588 Protective Structures 3
Ces 6590 Impact Engineering 3
Ces 6591 Applied Protective Structures 3
Ces 6592 Retrofit Protective Structures 3
Ces 6593 Advanced Protective Structures 3
Ces 6706 Advanced Reinforced Concrete 3
Cgn 5125 Legal Aspects of Civil Engineering 3
Cgn 5315 Civil Engineering Systems 3
Cgn 5605 Public Works Planning 3
Cgn 5606 Public Works Management 3
Cgn 5715 Experimentation and Instrumentation in Civil Engineering Materials Research 3
Cgn 6150 Engineering Project Management 3
Cgn 6155 Civil Engineering Practice I 3
Cgn 6156 Construction Engineering II 3
Cgn 6505 Properties, Design and Control of Concrete 3
Cgn 6506 Bituminous Materials 3
Cgn 6525 Sustainable Materials 3
Cgn 6905 Special Problems in Civil Engineering 1-6
Cgn 6910 Supervised Research 1-5
Cgn 6936 Civil Engineering Graduate Seminar 1
Cgn 6940 Supervised Teaching 1-5
Cgn 6971 Research for Master’s Thesis 1-15
Cgn 6974 Master of Engineering or Engineer Degree Report 1-6
Cgn 7979 Advanced Research 1-12
Cgn 7980 Research for Doctoral Dissertation 1-15
Cwr 5125 Groundwater Flow I 3
Cwr 5127 Evaluation of Groundwater Quality 3
Cwr 5235 Open Channel Hydraulics 3
Cwr 6115 Surface Hydrology 3
Cwr 6116 Advanced Surface Hydrology 3
Cwr 6126 Variable-Density Groundwater Flow 3
Cwr 6240 Mixing and Transport in Turbulent Flow 3
Cwr 6252 Groundwater Flow II 3
Cwr 6336 Stochastic Subsurface Hydrology 3
Cwr 6337 Contaminant Subsurface Hydrology 3
Egn 5816 Intermediate Fluid Dynamics 3
Egn 5949 Practicum/Internship/Cooperative Work Experience 1-6
Egn 6640 Entrepreneurship for Engineers 3
Egn 6642 Engineering Innovation 3
Egn 6913 Engineering Graduate Research 0-3
Egn 6933 Special Topics 1-3
Egn 6937 Engineering Fellowship Preparation 0-1
Egs 6039 Engineering Leadership 3
Egs 6101 Divergent Thinking 3
Egs 6626 Fundamentals of Engineering Project Management 3
Egs 6628 Applied Engineering Project Management 3
Egs 6681 Advanced Engineering Leadership 3
Ema 6581 Polymeric Biomaterials 3
Esi 6900 Principles of Engineering Practice 1-4

College of Engineering Courses

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<td>Practicum/Internship/Cooperative Work Experience</td>
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<td>Entrepreneurship for Engineers</td>
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<td>Engineering Graduate Research</td>
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<td>Special Topics</td>
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<td>Engineering Fellowship Preparation</td>
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<td>Divergent Thinking</td>
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<td>Egs 6626</td>
<td>Fundamentals of Engineering Project Management</td>
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<td>Esi 6900</td>
<td>Principles of Engineering Practice</td>
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Student Learning Outcomes

Coastal & Oceanographic Engineering (phd)

Slo 1 Knowledge
An ability to critically read engineering literature in Coastal and Oceanographic Engineering and an ability to identify, formulate new solutions to engineering problems in Coastal and Oceanographic Engineering.

Slo 2 Skills
An ability to develop new techniques, skills, and modern engineering tools necessary for engineering practice at an advanced level in Coastal and Oceanographic Engineering.

Slo 3 Professional Behavior
Effectively communicate technical knowledge and information.

Coastal & Oceanographic Engineering (ME & MS)

Slo 1 Knowledge
An ability to identify, formulate and solve engineering problems in Coastal and Oceanographic Engineering

SLO 2 Skills
An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice at an advanced level in Coastal and Oceanographic Engineering

SLO 3 Professional Behavior
Effectively communicate technical knowledge and information

Computer and Information Science and Engineering Department

Chair: Juan Gilbert, The Banks Preeminence Chair in Engineering
Graduate Coordinator: Ahmed Helmy

The Department of Computer and Information Science and Engineering is concerned with the theory, design, development, and application of computer systems and information processing techniques. The mission of the CISE Department is to educate undergraduate and graduate majors as well as the broader campus community in the fundamental concepts of the computing discipline, to create and disseminate computing knowledge and technology, and to use our expertise in computing to help society solve problems.

The Department of Computer and Information Science and Engineering (CISE) offers

• Ph.D. degree in computer engineering through the College of Engineering
• Master of Engineering degree in computer engineering through the College of Engineering
• Master of Science degree in computer engineering through the College of Engineering
• Ph.D. degree in computer science through the College of Engineering
• Ph.D. degree in human-centered computing through the College of Engineering
• Master of Science degree in computer science through the College of Engineering
• Master of Science degree in digital arts and sciences through the College of Engineering
• Master of Science degree in computer science through the College of Liberal Arts and Sciences

The department also offers a combined bachelor’s/master’s degree program. Contact the Department’s Student Services Center for information.

The CISE Department has six broad areas of specialization:

• Computer systems: computer architecture, distributed systems, networks and communication, operating systems, performance evaluation, security, mobile computing, software engineering, programming languages, multimedia systems, and web technologies
• Database and information systems: database management systems, database design, database theory and implementation, data mining, database machines, parallel and distributed databases, digital libraries, E-services and commerce, medical, and bio-informatics
• High-performance computing/applied algorithms: design and analysis of algorithms, data structures, parallel and distributed computing, medical algorithms, numerical methods, computational complexity, and applied computational geometry
• Computer graphics, modeling, and art: modeling methodology, simulation, virtual reality, aesthetic computing, computer arts, animation, real-time rendering, medical modeling, digital media, and musical acoustics
• Intelligent systems and computer vision: artificial intelligence, machine learning, visualization, image analysis and processing, pattern recognition, signal processing, biomedical imaging, and image databases
• Computer networks and security: wired and wireless networks, network routing and protocols, and QoS.

Applications for admission must be approved by both the Department and the college in which the student wishes to enroll. Applicants should have a strong computer science background.

All master’s students must satisfy a core requirement by completing the appropriate number of core courses as specified by their degree program. According to Graduate School rule, students must maintain a 3.0 overall GPA, as well as a cumulative 3.0 GPA for all courses taken from CISE, to graduate. Students can select a thesis or non-thesis option for the master’s degree. Digital Arts and Sciences students must choose either thesis or project in lieu of thesis. All options require a minimum of 30 credit hours. The thesis degree requires:

• A minimum of 6 credit hours must be taken in CIS 6971 Research for Master’s Thesis (1-15 cr.).
• Specific degree requirements can be found at: https://www.cise.ufl.edu/academics/grad (https://www.cise.ufl.edu/academics/grad/)

The non-thesis option requires:

• Each non-thesis master’s student is required to pass a comprehensive examination.
• Specific degree requirements can be found at: https://www.cise.ufl.edu/academics/grad (https://www.cise.ufl.edu/academics/grad/)

The Digital Arts and Sciences project in lieu of thesis option requires 6 credit hours of project/performance credits.

To demonstrate breadth and proficiency, Ph.D. students who major in Computer Engineering or Computer Science must take 4 required core courses obtaining a 3.4 GPA in 3 of the 4 required core courses, with no more than one of the core courses receiving a letter grade below B, to be eligible to take the Ph.D. qualifying examinations.

To demonstrate breadth and proficiency, Ph.D. students who major in Human-Centered Computing must take 3 required core courses obtaining a 3.4 GPA in 2 of the 3 required core courses, with no more than one of the core courses receiving a letter grade below B, to be eligible to take the Ph.D. qualifying examinations.

Ph.D. students are required to take a minimum of 90 credit hours. Of these, at least 36 hours must be graduate-level CISE course work excluding individual study and research credits. A minimum of 3 hours must be taken in CIS 7980 Research for Doctoral Dissertation (1-15 cr.). A maximum of 30 credits may be awarded toward the Ph.D. degree from an appropriate master’s degree.

The Database Systems Research and Development Center, the Software Engineering Research Center, the Center for Computer Vision and
Visualization Center, and a number of other campus research centers provide opportunities for students enrolled in the program.

**Human Centered Computing (HCC) Ph.D.**

The degree is focused on the design, construction, and evaluation of computational technologies as they relate to the human condition and impacts on society in general. The purpose of the HCC PhD degree is to train a new generation of computing researchers/developers that design, implement, and evaluate computing systems and technologies in real world, or applied, contexts.

HCC PhD degrees exist because the expertise required for this degree does not fit in traditional Computer Science (CS) or Computer Engineering (CE) PhD programs. CS & CE PhD programs have requirements for computer systems and theory.

For more information, please see the program pages below, or visit our website: http://www.cise.ufl.edu

**Majors**

- Computer Engineering (p. 311)
- Computer Science (Engineering) (p. 312)
- Digital Arts and Sciences (Engineering) (p. 313)
- Human-Centered Computing (p. 314)

**Faculty**

**Professor**

- Chen, Shigang
- Dorr, Bonnie
- Gader, Paul D.
- Gilbert, Juan Eugene
- Helal, Abdelsalam Ali
- Helmy, Ahmed Abdelghaffar
- Kahveci, Tamer
- Lok, Benjamin
- Mishra, Prabhat Kumar
- Peters, Jorg
- Ranka, Sanjay
- Schneider, Markus Paul
- Thai, My Tra
- Traynor, Patrick
- Vemuri, Baba C.

**Associate Professor**

- Banerjee, Arunava
- Bermudez, Manuel E.
- Boyer, Kristy
- Butler, Kevin
- Dobra, Alin Viorel
- Entezari, Alireza
- Kavalan, Jonathan C L
- Peir, Jiakwong
- Rangarajan, Anand
- Sanders, Beverly A.
- Shrimpton, Thomas
- Sitharam, Meera
- Ungor, Alper
- Wang, Zhe
- Williams, Byron Joseph
- Wilson, Joseph N.
- Woodard, Damon
- Xia, Ye

**Assistant Professor**

- Anthony, Lisa
- Bindschaedler, Vincent Christophe
- Boucher, Christina A.
- Chuyew Yee, Sharon Lynn
- Gardner-McCune, Christina
- Huang, Kejun
- Jain, Eakta
- McMullen, Kyla
- Newman, Richard E.
- Ragan, Eric D.
- Ruiz, Jaime
- Thebaut, Stephen M.
- Toler-Franklin, Corey Theresa

**Distinguished Professor**

- Sahni, Sartaj Kumar

**Associate Scientist**

- Schmalz, Mark S.

**Senior Lecturer**

- Zhang, Rong

**Affiliated Faculty**

- Fortes, Jose A.
- Glenn, Alina Zare
- Michailidis, George
- Oliveira, Daniela
- Rashidi, Parisa
- Wu, Dapeng
- Yang, Lin
- Yavuz, Tuba
Computer Engineering

Program Information

The Department of Computer and Information Science and Engineering offers the Master of Science and the Doctor of Philosophy degrees in Computer Engineering through the College of Engineering. Minimum requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

The department offers graduate study and research in Algorithms, Computer Vision, Databases, Graphics and Modeling, Machine Learning, Networks, and Systems, with active labs in Bioinformatics; Computational Science and Intelligence; Vision, Graphics and Medical Imaging; Database Systems Research and Development; Data Science Research; Mobile and Pervasive Computing; Human-Centered Computing; and Cybersecurity.

Specific degree requirements and options may be found here: http://cise.ufl.edu/grad.

Instructions for application for admission may be found here: http://cise.ufl.edu/admissions/graduate.

Degrees Offered

Degrees Offered with a Major in Computer Engineering

- Doctor of Philosophy
- Master of Engineering
- Master of Science
  - without a concentration
  - concentration in Digital Arts and Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Computer and Information Science and Engineering Departmental Courses

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<td>CAP 5108</td>
<td>Research Methods for Human-Centered Computing</td>
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<td>CAP 5416</td>
<td>Computer Vision</td>
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<td>Artificial Intelligence Concepts</td>
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<td>CAP 5710</td>
<td>Computer Graphics</td>
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<td>CAP 5711</td>
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<td>CAP 6137</td>
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<td>CAP 6769</td>
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<td>Software Specification</td>
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<td>Introduction to Cryptology</td>
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<td>Individual Study</td>
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<td>CNT 6885</td>
<td>Distributed Multimedia Systems</td>
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<td>COP 5536</td>
<td>Advanced Data Structures</td>
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<td>COP 5556</td>
<td>Programming Language Principles</td>
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<td>Distributed Operating System Principles</td>
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<td>Formal Languages and Computation Theory</td>
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<td>Fundamentals of Engineering Project Management</td>
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</tbody>
</table>
Student Learning Outcomes

**Computer engineering (phd)**

**SLO 1  Knowledge**
Students identify, formulate, and solve computer science and engineering problems

**SLO 2  Knowledge**
Students can critically read computer science and engineering literature

**SLO 3  Skills**
Students use the techniques, skills, and tools necessary for computer science and engineering practice at an advanced level

**SLO 4  Professional Behavior**
An understanding of professional and ethical responsibility

**SLO 5  Professional Behavior**
Students can communicate effectively

**Computer Engineering (ME & MS)**

**SLO 1  Knowledge**
Students identify, formulate, and solve computer science and engineering problems

**SLO 2  Knowledge**
Students can critically read computer science and engineering literature

**SLO 3  Skills**
Students use the techniques, skills, and tools necessary for computer science and engineering practice at an advanced level

**SLO 4  Professional Behavior**
Professional experience: an understanding of professional and ethical responsibility

**SLO 5  Professional Behavior**
Professional experience: Students can communicate effectively

**Computer Science (Engineering)**

**Program Information**

The Department of Computer and Information Science and Engineering offers the Master of Science degree in Computer Science through the College of Engineering. Minimum requirements for this degree are given in the Graduate Degrees (p. 48) section of this catalog.

**Degrees Offered**

**Degrees Offered with a Major in Computer Science**

- Doctor of Philosophy
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

**Computer and Information Science and Engineering Departmental Courses**

<table>
<thead>
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<td>Computer Graphics</td>
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<td>CAP 6701</td>
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<td>CDA 5155</td>
<td>Computer Architecture Principles</td>
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<td>Natural User Interaction</td>
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<tr>
<td>CEN 5728</td>
<td>User Experience Design</td>
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<td>CEN 6070</td>
<td>Software Testing and Verification</td>
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<td>CEN 6075</td>
<td>Software Specification</td>
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<td>CIS 5370</td>
<td>Computer and Information Security</td>
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<td>CIS 5371</td>
<td>Introduction to Cryptology</td>
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<td>CIS 6905</td>
<td>Individual Study</td>
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<td>CIS 6910</td>
<td>Supervised Research</td>
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<td>CIS 6930</td>
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<td>CIS 6935</td>
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<td>CIS 6940</td>
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<td>CIS 6971</td>
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<td>CIS 7979</td>
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<td>CIS 7980</td>
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<td>Computer Networks</td>
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<td>CNT 5412</td>
<td>Network and System Security</td>
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<td>CNT 5517</td>
<td>Mobile Computing</td>
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<td>CNT 6107</td>
<td>Advanced Computer Networks</td>
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<td>CNT 6885</td>
<td>Distributed Multimedia Systems</td>
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<td>COP 5536</td>
<td>Advanced Data Structures</td>
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<td>COP 5556</td>
<td>Programming Language Principles</td>
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<td>COP 5615</td>
<td>Distributed Operating System Principles</td>
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<td>COP 5618</td>
<td>Concurrent Programming</td>
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<td>COP 5625</td>
<td>Programming Language Translators</td>
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<td>COP 5725</td>
<td>Database Management Systems</td>
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<td>COP 6726</td>
<td>Database System Implementation</td>
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<tr>
<td>COT 5405</td>
<td>Analysis of Algorithms</td>
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<td>COT 5442</td>
<td>Approximation Algorithms</td>
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<td>COT 5519</td>
<td>Sparse Matrix Algorithms</td>
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<tr>
<td>COT 5520</td>
<td>Computational Geometry</td>
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<td>COT 5615</td>
<td>Mathematics for Intelligent Systems</td>
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</tr>
<tr>
<td>COT 6315</td>
<td>Formal Languages and Computation Theory</td>
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</table>
Digital Arts and Sciences (Engineering)

Program Information

The Department of Computer and Information Science and Engineering offers the Master of Science degree in Digital Arts and Sciences through the College of Engineering. Minimum requirements for this degree are given in the Graduate Degrees (p. 48) section of this catalog.

This specialized program integrates engineering and design and was created for students with an interest in video games, human-computer interaction, 3D modeling and animation, virtual reality, and computer graphics. The curriculum includes core computer science with a special emphasis on human-centered computing and provides students the flexibility to focus on both computer science and design, and to create software that is computationally complex, user friendly and aesthetically pleasing.

Specific degree requirements and options may be found here: http://cise.ufl.edu/academics/grad

Instructions for application for admission may be found here: http://cise.ufl.edu/admissions/grad

Degrees Offered

Degrees

- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Computer and Information Science and Engineering Departmental Courses

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<tr>
<th>Code</th>
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<th>Title</th>
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<td>EEE 5354L</td>
<td>Semiconductor Device Fabrication Laboratory</td>
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<tr>
<td>EGN 5010L</td>
<td>NRF Training Lab</td>
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<td>EGN 5949</td>
<td>Practicum/Internship/Cooperative Work Experience</td>
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<td>EGN 6640</td>
<td>Entrepreneurship for Engineers</td>
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<tr>
<td>EGN 6642</td>
<td>Engineering Innovation</td>
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<td>Engineering Graduate Research</td>
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<td>EGN 6933</td>
<td>Special Topics</td>
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<td>EGN 6937</td>
<td>Engineering Fellowship Preparation</td>
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<td>EGS 6039</td>
<td>Engineering Leadership</td>
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<td>EGS 6101</td>
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<td>ESI 6900</td>
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</tbody>
</table>

### Student Learning Outcomes

#### Digital Arts & Sciences (MS)

**SLO 1 Knowledge**
Students identify, formulate, and solve computer science and engineering problems

**SLO 2 Knowledge**
Students can critically read computer science and engineering literature

**SLO 3 Skills**
Students use the techniques, skills, and tools necessary for computer science and engineering practice at an advanced level

**SLO 4 Professional Behavior**
Professional experience: an understanding of professional and ethical responsibility

**SLO 5 Professional Behavior**
Professional experience: Students can communicate effectively

### Human-Centered Computing

#### Program Information

The Department of Computer and Information Science and Engineering offers doctorate in Human-Centered Computing through the College of Engineering. Minimum requirements for this degree are given in the Graduate Degrees (p. 48) section of this catalog.

Human-Centered Computing (HCC) draws on the disciplines of digital media, engineering psychology, assistive technologies, architecture, industrial and systems engineering, industrial design, music, and public policy to name a few. HCC research meets industrial and societal needs for education and research in humanizing computer technology through understanding how computers affect human quality of life, relationships, and culture, while also designing cutting edge technologies, and exploring the underlying issues of science, engineering, art, and design.

#### Degrees Offered

**Degrees Offered with a Major in Human-Centered Computing**

- Doctor of Philosophy

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

#### Courses

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Electrical and Computer Engineering Department

Chair: J. Harris
Graduate Coordinator: YK Yoon

The Department of Electrical and Computer Engineering offers the Master of Science and Doctor of Philosophy degrees. Minimum requirements for these degrees are given in the Graduate Degrees Section (p. 48) of this catalog. For more information about our program, please visit the link below.

**Majors**

- Electrical and Computer Engineering (p. 316)

**Faculty**

**Professor**

- Arnold, David P.
- Bhunia, Swarup
- Bobda, Christophe
- Bretas, Arturo Suman
- Eisenstadt, William R.
- Fang, Yuguang
- Feng, Philip
- Figueiredo, Renato Jansen
- Guo, Jing
- Hammer, Jacob
- Harris, John Gregory
- Judy, Jack
- Lampotang, Samsun
- Li, Jian
- Li, Tao
- Lin, Jenshan
- Nishida, Toshikazu
- Oweiss, Karim
- Rakov, Vladimir Alek
- Ray, Sandip
- Razdan, Rahul
- Shea, John Mark
- Tehranipoor, Mark M.
- Thompson, Scott E.
- Wong, Tan Foon
- Wu, Dapeng
- Xie, Huikai
Electrical and Computer Engineering

Program Information

The Department of Electrical and Computer Engineering offers the Master of Science and Doctor of Philosophy degrees. Minimum requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.
The department offers graduate study and research in computer engineering, devices, electromagnetics and energy systems, electronics, and signals and systems.

Graduate students in the Department of Electrical and Computer Engineering have bachelor's degrees from many areas: electrical engineering, other engineering disciplines, chemistry, mathematics, physics, and other technical fields. The Department of Electrical and Computer Engineering offers both thesis and non-thesis options for the master's degrees.

In the thesis option a student shall complete a minimum of 30 semester credit hours with a maximum of 6 semester credit hours of EEL 6971 Research for Master's Thesis (1-15 cr.). While the Graduate School sets the minimum requirements, the supervisory committee determines the appropriate number of thesis hours a student shall be required to take for the thesis. Other course requirements include a minimum of 18 hours at the 5000 or 6000 level in electrical and computer engineering. Excluded from satisfying these course requirements are EEL 5905 Individual Work (1-4 cr.) and EEL 6905 Individual Work (1-4 cr.) EEL 6910 Supervised Research (1-5 cr.), EEL 6932, EEL 6940 Supervised Teaching (1-5 cr.), and EEL 6971 Research for Master's Thesis (1-15 cr.). No more than 6 hours of Individual Work (EEL 5905 Individual Work (1-4 cr.) or EEL 6905 Individual Work (1-4 cr.)) may be counted toward the degree.

In the non-thesis option a student shall complete a minimum of 30 semester credit hours with a maximum of 6 semester credit hours of Individual Work (EEL 5905 Individual Work (1-4 cr.) or EEL 6905 Individual Work (1-4 cr.)). The course requirements include a minimum of 21 semester credit hours at the 5000 or 6000 level in electrical and computer engineering. Excluded from satisfying these course requirements are EEL 5905 Individual Work (1-4 cr.) and EEL 6905 Individual Work (1-4 cr.). EEL 6910 Supervised Research (1-5 cr.), EEL 6932, EEL 6940 Supervised Teaching (1-5 cr.), and EEL 6971 Research for Master's Thesis (1-15 cr.).

The Department also offers a combined bachelor's/master's degree program. This program allows qualified students to earn both a bachelor's degree and master's degree with a saving of one semester. Qualified students may begin their master's programs while seniors, counting up to 12 hours of specified electrical and computer engineering graduate courses for both bachelor's and master's degree requirements. Bachelor's/master's program admission requirements are

1. satisfaction of Graduate School admission requirements for the master's degree,
2. an upper-division (undergraduate) GPA of at least 3.3, and
3. completion of at least 7 EEL core courses and 2 EEL laboratories.

Students with a GPA between 3.3 and 3.59 can double count up to 6 hours, while students with a GPA of 3.6 or higher can double count up to 12 hours.

All prospective doctoral students must take the written part of the Ph.D. qualifying examination within the first year of enrollment. Other requirements for the doctoral degree, as well as requirements for master's and engineer degrees, are given in the Electrical and Computer Engineering Department's Graduate Guidelines (see http://www.ece.ufl.edu/content/graduate-academics) and in the front section of this catalog.

The following course listing indicates the major areas of faculty interest. Special topics courses EEL 5934 Special Topics in Electrical Engineering (1-3 cr.) and EEL 6935 Special Topics in Electrical Engineering (1-4 cr.) cover a wide variety of subjects for which there are no present courses.

### Degrees Offered

#### Degrees Offered with a Major in Electrical and Computer Engineering

- Doctor of Philosophy
  - without a concentration
  - concentration in Clinical and Translational Science
- Master of Engineering
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

#### Electrical and Computer Engineering Program Courses

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<td>EEE 5216</td>
<td>Introduction to Biophotonics</td>
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<tr>
<td>EEE 5225</td>
<td>Resonant MEMS</td>
<td>3</td>
</tr>
<tr>
<td>EEE 5283</td>
<td>Neural Signals, Systems and Technology</td>
<td>3</td>
</tr>
<tr>
<td>EEE 5317C</td>
<td>Introduction to Power Electronics</td>
<td>3</td>
</tr>
<tr>
<td>EEE 5320</td>
<td>Analog IC Design I</td>
<td>3</td>
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<tr>
<td>EEE 5322</td>
<td>VLSI Circuits and Technology</td>
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<td>EEE 5364</td>
<td>Fundamentals of Data Converters</td>
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<td>EEE 5374</td>
<td>Radio Frequency Electronics</td>
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<td>EEE 5400</td>
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<td>Practicum/Internship/Cooperative Work Experience</td>
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<td>EGN 6640</td>
<td>Entrepreneurship for Engineers</td>
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<td>Engineering Graduate Research</td>
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Student Learning Outcomes

**Electrical & Computer engineering (PHD)**

SLO 1 Knowledge
- Ability to identify, formulate and solve engineering problems. Ability to critically read and integrate engineering research literature

SLO 2 Skills
- Ability to use applied mathematical and/or modern experimental techniques. Ability to use modern engineering tools for practice at an advanced level

SLO 3 Professional Behavior
- Ability to communicate effectively

**Electrical & Computer Engineering (Me & Ms)**

SLO 1 Knowledge
- Ability to identify, formulate and solve electrical and computer engineering problems

SLO 2 Skills
- Ability to use applied mathematical techniques. Ability to use modern engineering tools for practice at an advanced level

**Environmental Engineering Sciences Department**

Director: Kirk Hatfield
Graduate Coordinator: Chang-Yu Wu

The Department of Environmental Engineering Sciences offers graduate study in the following areas: Air Resources; Biogeochemical Systems; Environmental Nanotechnology; Solid and Hazardous Waste Management; Storm Water, Water Supply and Waste Water; Sustainability Science & Engineering; Systems Ecology and Ecological Engineering; and Water Resources. Students graduated from the program will demonstrate depth in individual focus areas as well as breadth of core knowledge concepts in all areas.

Please visit the program page below and our website: http://www.essie.ufl.edu for more information about our program in Environmental Engineering Sciences.
Majors
- Environmental Engineering Sciences (p. 320)

Faculty

Professor
- Annable, Michael D.
- Douglas, Elliot Paul
- Lindner, Angela S.
- Mazycz, David W.
- Sansalone, John Joseph
- Townsend, Timothy G.
- Wu, Chang-Yu

Associate Professor
- Behdad, Sara
- Bonzongo, Jean-Claude J.
- Jang, Myoseon
- Jutla, Antarpreet Singh
- Kaplan, David A.

Assistant Professor
- Altieri, Andrew H.
- Angelini, Christine
- Fonseca De Faria, Andreia
- Todd-Brown, Katherine Elizabeth

Other
- Cornwell, David Alan
- Deliz Quinones, Katherine Y.

Affiliated Faculty
- Gader, Paul D.
  Professor
- Hiltunen, Dennis R.
  Professor
- Newman, Mark A.
  Research Assistant Scientist
- Properzio, William S.
  Associate Professor
- Sheremet, Alexandru Aurica
  Professor
- Wasman, Scott Joseph
  Research Assistant Professor

Environmental Engineering Sciences

Program Information
Graduate study is offered leading to the degrees Master of Engineering, Master of Science, and Doctor of Philosophy in the field of environmental engineering sciences. Our graduate research and education areas are

Air Resources
- Monitoring of air pollutants: indoor, ambient, industrial, and occupational
- Monitoring methodology and instrumentation development
- Formation and fate of air pollutants
- Air quality modeling
- Air pollution control: system, process and materials
- Sustainability of air quality
- Health effects and environmental impact of air pollutant

Environmental Nanotechnology
- Manufacturing and tailoring of nanomaterials and nanodevices for application in environmental and human health research
- Environmental fate and transport of nanomaterials
- Environmental implications of nanomaterials

Engineering Education Collaborative
- Student-centered learning and design based apprenticeship
- Problem solving and critical thinking
- Diversity and cultures of inclusion
- Role of informal learning environments
- Universal design for STEM students with (learning) disabilities

GeoSystem Engineering/Waste Management
- Bioreactor Landfills
- Combustion and Thermal Treatment Residuals
- Contaminated Soil Characterization and Treatment
- Construction and Demolition Debris
- Electronic Waste
- Hazardous Waste
- Landfill Design and Operations
- Landfill Gas and Leachate
- Recycling and Beneficial Use of Wastes
- Treated Wood
- Waste Characterization and Leaching
- Solid Waste Management in Developing Countries

Stormwater, Water Supply and Wastewater
- Fundamental characterization of aqueous and particulate-phase contaminants including emerging contaminants: representative ambient monitoring, methodology and load quantification.
- Sourcing and generation of aqueous and particulate phase contaminants, physics and chemistry of contaminant transport and fate.
- Water contaminant control: systems, unit operation and processes, and materials development, in particular innovative mass transfer materials and low impact development materials.
- Water reuse as part of the urban water cycle: volumetric and contaminant load impacts
- Unit operation and process modeling: scalable physical models and computational fluid dynamics (CFD).
- Integrated physical, chemical, biological and thermal treatment phenomena for water cycle components.
- Coupling fundamental monitoring and material balance testing with urban water modeling.
• Fundamental and applied studies of physical-chemical water treatment processes, such as adsorption, coagulation, ion exchange, and oxidation, for a wide range of water qualities including surface water, groundwater, membrane concentrate, landfill leachate, and human urine.
• Innovative applications of ion exchange for water treatment.
• Fundamental studies in aquatic chemistry with a focus on the role of natural organic matter.
• Fundamental and applied studies of adsorption and photocatalysis, including surface optimization
• Bottom up integrated urban water system simulation and optimization

Sustainability Science & Engineering
• Rational design of nanomaterial through acute and full-life-cycle toxicity assessment
• Life cycle assessment calculations and comparisons of alternative energy and materials options
• Industrial ecology
• Corporate water resources sustainability
• Campus green building codes
• Green laboratory techniques
• Operation of buildings to meet green energy requirements

Systems Ecology and Ecological Engineering
• Ecological Engineering
• Emergy Analysis and Environmental Economics
• Wetlands and Watershed Ecology
• Ecological Modeling
• Community and Conservation Ecology
• Environmental Policy
• Microbiology of Natural and Engineered Systems
• Biological and Chemical Remediation of Contaminated Systems
• Effects of Climate and Land Use Changes on Biogeochemical Cycles

Water Systems
• Contaminant transport and fate
• Decision support systems
• Ecohydrology and hydrologic restoration
• Hydrology
• Stormwater control
• Water resources planning and management
• Water conservation
• Fundamental characterization of aqueous and particulate-phase contaminants including emerging contaminants: representative ambient monitoring, methodology and load quantification.
• Sourcing and generation of aqueous and particulate phase contaminants, physics and chemistry of contaminant transport and fate.
• Water contaminant control: systems, unit operation and processes, and materials development, in particular innovative mass transfer materials and low impact development materials.
• Water reuse as part of the urban water cycle: volumetric and contaminant load impacts
• Unit operation and process modeling: scalable physical models and computational fluid dynamics (CFD).
• Integrated physical, chemical, biological and thermal treatment phenomena for water cycle components.
• Coupling fundamental monitoring and material balance testing with urban water modeling.
• Fundamental and applied studies of physical-chemical water treatment processes, such as adsorption, coagulation, ion exchange, and oxidation, for a wide range of water qualities including surface water, groundwater, membrane concentrate, landfill leachate, and human urine.
• Innovative applications of ion exchange for water treatment.
• Fundamental studies in aquatic chemistry with a focus on the role of natural organic matter.
• Fundamental and applied studies of adsorption and photo catalysis, including surface optimization
• Bottom up integrated urban water system simulation and optimization
• Aqueous Geochemistry and Water Treatment

Graduate students can also combine one or more of the above areas with specialties in other departments at the University of Florida.

The department participates in the hydrologic sciences interdisciplinary concentration that is offered through 9 departments in 3 colleges. This concentration is described under Interdisciplinary Graduate Studies.

Direct admission into the Master of Science and Doctor of Philosophy programs requires a bachelor's degree in engineering or in a basic science such as chemistry, geology, physics, biology, or mathematics. Persons with a degree in a nontechnical field may also be admitted into this program after completing appropriate technical courses. Direct admission into the Master of Engineering program requires a bachelor's degree in engineering from an ABET-accredited institution.

Requirements for a master's degree normally take 12 to 24 months to complete. The length of time required for the Doctor of Philosophy degree depends partly on the research topic, and may be completed in 3 years, but often takes longer, depending on prior academic experience.

Combined degree program: The department offers a combined bachelor's/master's degree program. This program allows qualified students to earn both a bachelor's degree and a master's degree, with a savings of 12 credits.

Joint program: The Environmental Engineering Sciences Department, in partnership with the Levin College of Law, offers a joint program leading to the M.S. or M.E. degree in environmental engineering sciences and the Juris Doctor degree. Twelve credits of appropriate course work are counted toward both degrees.

For more information, please see our website: http://www.essie.ufl.edu.


- without a concentration
- concentration in Geographic Information Systems
- concentration in Hydrologic Sciences
- concentration in Wetland Sciences

- Master of Science
  - without a concentration
  - concentration in Geographic Information Systems
  - concentration in Hydrologic Sciences
  - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

#### Environmental Engineering Sciences Program Courses

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<tr>
<td>CWR 6252</td>
<td>Environmental Biochemistry of Trace Metals</td>
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<tr>
<td>CWR 6536</td>
<td>Stochastic Subsurface Hydrology</td>
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<tr>
<td>CWR 6537</td>
<td>Contaminant Subsurface Hydrology</td>
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</tr>
<tr>
<td>EES 5105</td>
<td>Advanced Wastewater Microbiology</td>
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<tr>
<td>EES 5245</td>
<td>Water Quality Analysis</td>
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<td>EES 5305C</td>
<td>Ecological and General Systems</td>
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<td>Energy Analysis</td>
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<td>Advanced Ecological Engineering</td>
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<td>Advanced Energy and Environment</td>
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<td>Advanced Environmental Planning and Design</td>
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<td>Wetland Ecology</td>
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<td>Principles of Industrial Ecology</td>
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<td>Springs Ecosystems</td>
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<td>Environmental Nanotechnology</td>
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<td>Modeling the Fate of Air Pollutants</td>
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<td>ENV 6439</td>
<td>Activated Carbon: Environmental Design and Application</td>
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<td>ENV 5105</td>
<td>Foundations of Air Pollution</td>
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<td>ENV 5306</td>
<td>Municipal Refuse Disposal</td>
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<td>ENV 5518</td>
<td>Field Methods in Environmental Hydrology</td>
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<td>Hydraulic Systems Design</td>
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<td>ENV 6052</td>
<td>Immiscible Fluids in Porous Media</td>
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<td>ENV 6126</td>
<td>Air Pollution Control Design</td>
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<td>ENV 6130</td>
<td>Aerosol Mechanics</td>
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<td>ENV 6301</td>
<td>Advanced Solid Waste Containment Design</td>
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<td>ENV 6435</td>
<td>Advanced Water Treatment Process Design</td>
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<td>ENV 6438</td>
<td>Advanced Potable Water Systems Design</td>
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<td>ENV 6441</td>
<td>Water Resources Planning and Management</td>
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<td>ENV 6416</td>
<td>Advanced Stormwater Control Systems</td>
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<td>ENV 6508</td>
<td>Wetland Hydrology</td>
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#### Hydrology / Water Resources Shared Courses

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<td>CWR 5125</td>
<td>Groundwater Flow I</td>
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<td>CWR 5127</td>
<td>Evaluation of Groundwater Quality</td>
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<td>CWR 5235</td>
<td>Open Channel Hydraulics</td>
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<td>CWR 6115</td>
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<td>CWR 6126</td>
<td>Variable-Density Groundwater Flow</td>
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<td>Groundwater Flow II</td>
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<td>EGM 5816</td>
<td>Intermediate Fluid Dynamics</td>
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<td>ENV 6052</td>
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<td>ENV 6441</td>
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#### Environmental Engineering Sciences Departmental Courses

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<td>Environmental Biochemistry of Trace Metals</td>
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<td>EES 6140</td>
<td>Biology of Exotic Species</td>
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<td>EES 6208</td>
<td>Principles of Water Chemistry I</td>
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<td>EES 6335</td>
<td>Springs Ecosystems</td>
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</table>
Environmental Engineering Sciences (PHD)

**SLO 1 Knowledge**
Knowledge an ability to identify, formulate, and solve environmental problems using scientific and engineering methods and tools

**SLO 2 Skills**
An ability to critically read and evaluate engineering or science literature. An ability to use the techniques, methods, and appropriate professional tools necessary for professional practice at an advanced level An ability to communicate effectively

**SLO 3 Professional Behavior**
An understanding of professional and ethical responsibility

**Environmental Engineering Sciences (ME & MS)**

**SLO 1 Knowledge**
An ability to identify, formulate, and solve environmental problems using scientific and engineering methods and tools

**SLO 2 Skills**
An ability to critically read and evaluate engineering or science literature

**SLO 3 Professional Behavior**
An understanding of professional and ethical responsibility

**Industrial and Systems Engineering Department**

Chair: David Kaber  
Graduate Coordinator: Yongpei Guan

The Department of Industrial and Systems Engineering offers the Master of Engineering and the Master of Science degrees, each with a thesis or non-thesis option, with specialization in engineering management, manufacturing and logistics systems engineering, operations research, quality engineering, and special interest options such as health systems. In addition, the Department offers the Doctor of Philosophy degree with specialization in linear, combinatorial, nonlinear, and global optimization; supply chain management and e-commerce; financial engineering; manufacturing management; facilities location and layout; quality engineering; and stochastic processes.

Complete descriptions of the requirements for the M.E., M.S., and Ph.D. degrees are provided in the **General Information** section of this catalog.

A degree in one of the engineering disciplines or in mathematics, statistics, physics, computer sciences, quantitative management, or similar fields is prerequisite. Where the student's background is deficient, an articulation program of foundation courses will be required.
The Department offers a combined bachelor's/master's degree program of B.S.I.S.E./Master of Science (Management), B.S.I.S.E./Master of Engineering or Master of Science, and a B.S. from disciplines within the College of Engineering/Master of Science or Master of Engineering. Contact the graduate coordinator for information.

Majors

- Industrial and Systems Engineering (p. 324)

Faculty

Professor

- Guan, Yongpei
- Kaber, David B.
- Uryasev, Stanislav

Associate Professor

- Akcali, Elif
- Tufekci, Suleyman

Assistant Professor

- Alvarado, Michelle McGaha
- Giang, Wayne Chi Wei
- Hu, Boyi
- Liu, Hongcheng
- Napoli, Nicholas
- Reisi Gahrooei, Mostafa
- Sun, Xu
- Xian, Xiaochen
- Zhong, Xiang

Distinguished Professor

- Pardalos, Panagote M.

Industrial and Systems Engineering

Program Information

The Department of Industrial and Systems Engineering offers the Master of Engineering degree, the Master of Science degree, the Engineer degree, and the Doctor of Philosophy degree. Complete descriptions of the minimum requirements for the M.E., M.S., Engineer, and Ph.D. degrees are provided in the Graduate Degrees (p. 48) section of this catalog.

Master of Science (M.S.) Program

Admission to the Master of Science program is open to students with an undergraduate degree in engineering, mathematics, statistics, computer science, physics, quantitative management, or similar field. The M.S. degree does not require a thesis, although a student interested in pursuing research or possibly continuing their education beyond a master's degree is encouraged to write one.

Master of Engineering (M.E.) Program

Students seeking admission to the Master of Engineering program must have a bachelor's degree from an ABET-accredited curriculum or have taken sufficient articulation course work to meet the minimum requirements specified by ABET. The M.E. degree does not require a thesis and is generally considered a terminal degree.

Ph.D. Program

The doctoral program in Industrial and Systems Engineering covers the areas of data analytics, health systems engineering, human-systems engineering, operations research (including deterministic and stochastic processes), risk management and financial engineering, and supply chain and logistics systems. Application areas include energy systems, financial engineering, healthcare, manufacturing systems, security systems, supply chain management, and transportation systems.

For more information, please see our website: http://www.ise.ufl.edu.

Degrees Offered

Degrees Offered with a Major in Industrial and Systems Engineering

- Doctor of Philosophy
  - without a concentration
  - concentration in Quantitative Finance
- Master of Engineering
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Industrial and Systems Engineering

Program Courses

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>EIN 6176</td>
<td>Advanced Quality Management and Engineering for Business Processes</td>
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<td>EIN 6336</td>
<td>Advanced Production and Inventory Control</td>
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<td>EIN 6357</td>
<td>Advanced Engineering Economy</td>
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<td>EIN 6422</td>
<td>Manufacturing Management</td>
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<td>Principles of Manufacturing Systems Engineering</td>
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<td>EIN 6905</td>
<td>Special Problems</td>
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<td>EIN 6910</td>
<td>Supervised Research</td>
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<td>Special Problems</td>
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<td>ESI 5236</td>
<td>Reliability Engineering</td>
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<td>ESI 6314</td>
<td>Deterministic Methods in Operations Research</td>
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<td>ESI 6323</td>
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<td>ESI 6325</td>
<td>Applied Probability Methods in Engineering</td>
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<td>ESI 6341</td>
<td>Intro to Stochastic Optimization</td>
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<td>ESI 6346</td>
<td>Decision Making under Uncertainty</td>
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<td>ESI 6355</td>
<td>Decision Support Systems for Industrial and Systems Engineers</td>
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<td>ESI 6417</td>
<td>Linear Programming and Network Optimization</td>
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<tr>
<td>ESI 6418</td>
<td>Linear Programming Extensions and Applications</td>
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Industrial and Systems Engineering
Departmental Courses

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<td>ESI 6429</td>
<td>Introduction to Nonlinear Optimization</td>
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</tr>
<tr>
<td>ESI 6448</td>
<td>Discrete Optimization Theory</td>
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<td>Advanced Simulation Design and Analysis</td>
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<td>ESI 6546</td>
<td>Stochastic Modeling and Analysis</td>
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<tr>
<td>ESI 6552</td>
<td>Systems Architecture</td>
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<td>ESI 6553</td>
<td>Systems Design</td>
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<tr>
<td>ESI 6555</td>
<td>Systems Management</td>
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<td>ESI 6900</td>
<td>Principles of Engineering Practice</td>
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College of Engineering Courses

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<td>EGI 6913</td>
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<td>Human Factors in System Design</td>
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<td>Advanced Quality Management and Engineering for Business Processes</td>
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<td>EGI 6212</td>
<td>Loss Assessment and Control</td>
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<td>EGI 6216</td>
<td>Occupational Safety Engineering</td>
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<td>EGI 6336</td>
<td>Advanced Production and Inventory Control</td>
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<td>Advanced Engineering Economy</td>
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<td>EGI 7979</td>
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<td>EGI 6216</td>
<td>Safety Engineering</td>
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<td>Decision Making under Uncertainty</td>
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<td>Financial Optimization Case Studies</td>
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<tr>
<td>ESI 6546</td>
<td>Stochastic Modeling and Analysis</td>
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Student Learning Outcomes

Industrial and systems engineering (PHD)

SLO 1 Knowledge
Basic proficiency in the core methodological areas of operations research and industrial engineering, including mathematical modeling and optimization theory and algorithms

SLO 2 Professional Behavior
Ability to effectively and professionally communicate industrial engineering concepts and information in lecture format

SLO 3 Skills
Ability to assimilate foundational material, describe important research contributions, and independently plan future research activities that advance the state-of-the-art in the student’s field of expertise

SLO 4 Knowledge
Contribution of significant new research to the student’s field of expertise, either in theoretical foundations or practical applications

Industrial & Systems Engineering (Me & MS)

SLO 1 Knowledge
Proficiency in the core methodological areas of operations research and industrial engineering, including mathematical modeling and analysis of business problems

SLO 2 Skills
Ability to apply methodology in the customized development of solutions for business problems, and the use of information technologies for solution delivery

SLO 3 Professional Behavior
Ability to effectively and professionally communicate industrial engineering concepts and information in written and oral forms
J. Crayton Pruitt Family Department of Biomedical Engineering

Chair: C. Schmidt  
Graduate Coordinator: Cherie Stabler

The mission of the J. Crayton Pruitt Family Department of Biomedical Engineering (BME) is to educate students with strong engineering and science backgrounds for Master's and/or Ph.D. degrees in biomedical engineering. Graduates in BME typically apply their skills and training directly to engineering solutions to clinical problems in medicine. The BME mission is accomplished through a core program of study that has strong collaborations with faculty in the Colleges of Engineering and Medicine.

Degrees offered include: Doctor of Philosophy, Master of Science (thesis and non-thesis options), and Master of Engineering (thesis and non-thesis options). More details regarding these degrees and the minimum entry requirements are provided at [http://www.bme.ufl.edu/academics/graduate](http://www.bme.ufl.edu/academics/graduate).

The Biomedical Engineering Department faculty members work collaboratively with joint, affiliate, and adjunct faculty from many other departments in the College of Engineering, the College of Medicine, and local industry. This diversity ensures students the highest-quality education and varied opportunities for cutting-edge research.

Areas of Research within these graduate programs include:

- Biomaterials and Regenerative Medicine
- Biomechanics and Bionics
- Biomedical Imaging and Applications
- Molecular and Cellular Engineering
- Modeling and Biomedical Data Science
- Neural Engineering

More information about our dynamic and collaborative department is available at: [http://www.bme.ufl.edu](http://www.bme.ufl.edu).

Majors

- Biomedical Engineering (p. 327)

Faculty

Professor

- Bolch, Wesley Emmett
- Dobson, Jon P.
- Ferris, Daniel Perry
- Keselowsky, Benjamin G.
- Liu, Chihray
- Otto, Kevin
- Rinaldi, Carlos
- Schmidt, Christine E.
- Stabler Anderson, Cheryl

Associate Professor

- Allen, Kyle
- Gunduz, Aysegul

Assistant Professor

- McFetridge, Peter S.
- Murfee, Walter L.
- Ormerod, Brandi K.
- Van Oostrom, Johannes H.
- Williams, Lakiesha Nicole
- Yang, Lin

Assistant Professor

- Fang, Ruogu
- Hintenlang, Kathleen M.
- Hudalla, Gregory
- Nichols, Jennifer A.
- Phelps, Edward Allen
- Rashidi, Parisa
- Sharma, Blanka

Other

- Fuller, Eric G.
- Mansy, May M.

Research Associate Professor

- Forder, John R.

Distinguished Professor

- Ding, Mingzhou

Clinical Professor

- Li, Jonathan G.
- Samant, Sanjiv Singh

Research Assistant Professor

- O’Dell, Walter G.

Engineer

- Rowlinson, Sarah C.

Affiliated Faculty

- Allen, Josephine
  Associate Professor
- Angelini, Thomas Ettor
  Associate Professor
- Arreola, Manuel Munoz
  Clinical Assistant Professor
- Banks, Scott Arthur
  Professor
- Batich, Christopher D.
  Professor
- Berceli, Scott A.
  Professor
- Bova, Frank J.
  Professor
- Brennan, Anthony B.
  Professor
- Dickinson, Richard Bernhart
Biomedical Engineering

Program Information

The Master's degree (thesis or nonthesis) requires at least 30 semester hours. The Doctoral degree requires at least 90 semester credit hours beyond the bachelor's degree. No more than 30 hours of a master's degree from another institution will be transferred to the Ph.D. degree. If a student holds a master's degree in a discipline different from the doctoral program, the master's work will not be counted toward the doctoral degree unless the BME Department successfully petitions the Dean of the Graduate School. Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Complete BME program details and courses available are listed in the Biomedical Engineering Graduate Guidelines, on the BME website (https://www.bme.ufl.edu/) (which also offers information on available research areas).

**Combined program:** Biomedical Engineering also offers a combined bachelor's/master's degree program in collaboration with the other departments in the College of Engineering. This program allows qualified students to earn both a bachelor’s degree and a master’s degree within 5 years for a net savings of 1 year. Contact the BME academic services office for more information or see http://www.bme.ufl.edu/academics/combined/.

### Degrees Offered

**Degrees Offered with a Major in Biomedical Engineering**

- Doctor of Philosophy
  - without a concentration
  - concentration in Clinical and Translational Science
- Master of Engineering
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

#### Biomedical Engineering Program Courses

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<tr>
<td>BME 5085</td>
<td>Patents, Product Development, and Technology Transfer</td>
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<td>BME 5401</td>
<td>Biomedical Engineering and Physiology I</td>
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<td>BME 5407</td>
<td>Molecular Biomedical Engineering</td>
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<td>BME 5703</td>
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<td>Cell and Tissue Engineering</td>
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<td>Neural Engineering</td>
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<td>Biomedical Multivariate Signal Processing</td>
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<td>Advanced Therapeutic Radiological Physics</td>
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<td>BME 6593</td>
<td>Therapeutic Radiological Physics III</td>
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Biomedical Engineering Departmental Courses

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College of Engineering and College of Medicine Courses

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<td>EGS 6101</td>
<td>Divergent Thinking</td>
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<td>Fundamentals of Engineering Project Management</td>
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<td>Principles of Engineering Practice</td>
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Student Learning Outcomes

### Biomedical Engineering (PHD)

**SLO 1**  Knowledge
An ability to develop a broad-based knowledge of Biomedical Engineering problems

**SLO 2**  Knowledge
An ability to critically read Biomedical Engineering literature

**SLO 3**  Skills
An ability to use apply fundamental engineering principles to identify, analyze and solve biomedical engineering problems

**SLO 4**  Skills
An ability to design and conduct scientific and engineering experiments, and to analyze and interpret the resulting data

**SLO 5**  Professional Behavior
An understanding of professional and ethical responsibility and the impact of clinically significant engineering solutions

**SLO 6**  Professional Behavior
An ability to communicate effectively and work collaboratively

### Biomedical Engineering (ME & Ms)

**SLO 1**  Knowledge
An ability to develop a broad-based knowledge of Biomedical Engineering problems

**SLO 2**  Knowledge
An ability to critically read Biomedical Engineering literature

**SLO 3**  Skills
An ability to use apply fundamental engineering principles to identify, analyze and solve biomedical engineering problems

SLO 4  Skills
An ability to design and conduct scientific and engineering experiments, and to analyze and interpret the resulting data

SLO 5  Professional Behavior
An understanding of professional and ethical responsibility and the impact of clinically significant engineering solutions

SLO 6  Professional Behavior
An ability to communicate effectively and work collaboratively

Materials Science and Engineering Department

Chair: M.V. Manuel
MSE Graduate Coordinator: W.M. Sigmund
NE Graduate Coordinator: D. Schubring

The Department of Materials Science and Engineering offers the Master of Science, Master of Engineering, and Doctor of Philosophy degrees in Materials Science & Engineering (MSE) and Nuclear Engineering (NE). Requirements for these degrees are described in the General Information section of this catalog.

Degrees in MSE include specific areas of research and study in biomaterials, ceramics, composites, computational materials science, electronic materials, metals, polymers, nanomaterials, and nuclear materials. Degrees in NE include specific areas of research and study in advanced nuclear power concepts and systems, digital control of nuclear reactor power plant technology and operations, reactor dynamics and control, advanced radiation detectors and analysis in support of nuclear forensics and homeland security.

Nontraditional Degree Programs: The Department offers combined bachelor/master’s degree programs: MSE BS/MS, NE BS/MS, and students may also combine the MSE BS with the MS awarded through the Dept. of Biomedical Engineering (BME). The combined bachelor/master’s program allows qualified students to earn both degrees in materials science and engineering with savings of a tangible number of credit hours. Qualified students are allowed to begin master’s course work in their junior years and double count specific graduate courses for both degrees. The master’s degree may be completed within 2 to 3 semesters after completing the bachelor’s degree. Program admission requirements are:

1. satisfaction of Graduate School admission requirements prior to the beginning of the senior year,
2. an upper division GPA of at least 3.5 in MSE and 3.4 in NE,
3. for MSE, completion of a minimum of 18 credit hours of courses,
4. admission by the Department’s Graduate Admission Committee and approval by the College of Engineering and the Graduate School.

For more information, contact the Department.

The J.D./M.S. in MSE (thesis/non-thesis) is a joint degree program culminating in both the Juris Doctor degree, awarded by the College of Law, and the Master of Science (thesis/non-thesis), awarded by the College of Engineering. Under this program, a student can earn both degrees in approximately 1 year less than it would take to attain both degrees if pursued consecutively.

The concurrent M.D./Ph.D. degree in MSE is a joint degree program offered through a collaborative program between the College of Medicine and Materials Science and Engineering. For more information, please contact the Department.

To be eligible for regular admission to the graduate program within the Department, the student must hold a B.S. in an appropriate major. Because of the breadth of MSE graduate programs, students with degrees in materials, ceramics, metallurgy, other engineering, mathematics, or science areas (such as biology, chemistry, or physics) have found ample opportunities to pursue their research and training areas of interest.

Majors

- Materials Science and Engineering (p. 330)
- Nuclear Engineering Sciences (p. 333)

Faculty

Professor

- Abernathy, Cammy
- Batich, Christopher D.
- Brennan, Anthony B.
- Gower, Laurie B.
- Hennig, Richard
- Hummel, Rolf E.
- Mecholsky, John J.
- Myers, Michele V.
- Nino, Juan C.
- Norton, David P.
- Sigmund, Wolfgang Michael
- Singh, Rajiv K.
- Wall, Nathalie A.
- Xue, Jiangeng

Associate Professor

- Allen, Josephine
- Andrew, Jennifer
- Fuchs, Gerhard E.
- McDevitt, Christopher
- Shen, Chiayi
- Tonks, Michael
- Watson, Justin C.

Assistant Professor

- Aitkaliyeva, Assel
- Butala, Megan Marie
- Gorman, Brian P
- Hartig, Kyle Cameron
- Kim, Honggyu
- Krause, Amanda Rochelle
- Miller, Victoria Mayne
- Moore, Erika Michelle
Materials Science and Engineering

Degrees Offered

- Doctor of Philosophy
  - without a concentration
  - concentration in Clinical and Translational Science
- Master of Engineering
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Materials Science and Engineering

Program Courses

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### Materials Science and Engineering Departmental Courses

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<td>Introduction to Nuclear Reactor Materials</td>
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Student Learning Outcomes

Materials science & Engineering (PHD)

SLO 1 Knowledge
Identify unknown aspects of structure-property-processing relationships for a materials system and formulate an approach to elucidating those aspects using engineering and/or scientific principles at a level appropriate to a doctoral research.

SLO 2 Knowledge
Demonstrate proficiency on appropriate experimental or computational techniques used for materials characterization, and uses these techniques to investigate structure-property-relationships in material systems at a level appropriate to doctoral research.

SLO 3 Skills
Obtain information from primary literature and technical reports, and integrate that information to reach conclusions regarding the current state of the art and areas in which further research is needed.

SLO 4 Skills
Write and/or orally present the results of a research project or literature review in a manner that clearly communicates one or more of the following: current state of the art, areas in which additional research is needed, research objectives, procedures, results, and conclusions.

SLO 5 Professional Behavior
Write reports and research papers following ethical standards regarding appropriate citation and plagiarism.

SLO 6 Professional Behavior
Work cooperatively with others, interact with supervisors, follow guidelines for appropriate management of data, and follow safety requirements for working in a research laboratory. Develop leadership skills.

Materials Science & Engineering (ME & MS)

SLO 1 Knowledge
Identify unknown aspects of structure-property-processing relationships for a materials system and formulate an approach to elucidating those aspects using engineering and/or scientific principles at a level appropriate to a master student.

SLO 2 Skills
Obtain information from primary literature and technical reports, and integrate that information to reach conclusions regarding the current state of the art and areas in which further research is needed.

SLO 3 Skills
Write and/or orally present the results of a research project or literature review in a manner that clearly communicates one or more of the following: current state of the art, areas in which additional research is needed, research objectives, procedures, results, and conclusions.

SLO 4 Professional Behavior
Write reports and research papers following ethical standards regarding appropriate citation and plagiarism.
Nuclear Engineering Sciences

Degrees Offered

Degrees Offered with a Major in Nuclear Engineering Sciences

- Doctor of Philosophy
- without a concentration
- concentration in Imaging Science and Technology
- Master of Engineering
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Nuclear Engineering Sciences Program Courses

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<td>ENU 5186</td>
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<td>Imaging System Analysis with Medical Physics Applications</td>
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Nuclear Engineering Sciences Departmental Courses

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Nuclear Engineering Sciences

Graduate Degrees

- Master of Science
- Doctor of Philosophy
- Master of Engineering

Courses

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College of Engineering Courses

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</table>
Student Learning Outcomes

**Nuclear engineering sciences (PHD)**

**SLO 1  Knowledge**
Identify unknown aspects of nuclear and/or radiological systems and formulate an approach to elucidating those aspects using engineering and/or scientific principles at a level appropriate to a doctoral research.

**SLO 2  Knowledge**
Demonstrate proficiency on appropriate experimental or computational techniques used for nuclear engineering research, and use these techniques to investigate various relationships (atomic, nuclear, mechanical, materials performance, etc.) in nuclear systems at a level appropriate to doctoral research.

**SLO 3  Skills**
Obtain information from primary literature and technical reports, and integrate that information to reach conclusions regarding the current state-of-the-art and areas in which further research is needed.

**SLO 4  Skills**
Write and/or orally present the results of a research project or literature review in a manner that clearly communicates one or more of the following: current state-of-the-art, areas in which additional research is needed, research objectives, procedures, results, and conclusions.

**SLO 5  Professional Behavior**
Follow requirements for writing reports and research papers, and do so based on ethical standards regarding appropriate citation and plagiarism.

**SLO 6  Professional Behavior**
Work cooperatively with others, interact with supervisors, follow guidelines for appropriate management of data, and follow safety requirements for working in a research laboratory.

**Nuclear Engineering Sciences (Me & Ms)**

**SLO 1  Knowledge**
Identify unknown aspects of nuclear and/or radiological systems and formulate an approach to elucidating those aspects using engineering and/or scientific principles at a level appropriate to a Master of Science degree in nuclear engineering.

**SLO 2  Skills**
Obtain information from primary literature and technical reports, and integrate that information to reach conclusions regarding the current state of the art and areas in which further research is needed.

**SLO 3  Skills**
Write and/or orally present the results of a research project or literature review in a manner that clearly communicates one or more of the following: current state-of-the-art, areas in which additional research is needed, research objectives, procedures, results, and conclusions.

**SLO 4  Professional Behavior**
Follow requirements for writing reports and research papers, and do so based on ethical standards regarding appropriate citation and plagiarism.

Mechanical and Aerospace Engineering Department

Chair: David W. Hahn
Graduate Coordinator: Malisa Sarntinoranont

The Department of Mechanical and Aerospace Engineering offers the degrees of Master of Science (thesis or non-thesis), Master of Engineering (thesis or non-thesis), and Doctor of Philosophy in Aerospace Engineering and Mechanical Engineering. Minimum requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Prospective students are expected to have strong backgrounds in engineering. For the first year of study, each student is generally required to take a minimum of three regular courses each semester. There are three areas of specialization available for graduate studies: dynamics, systems, and control; solid mechanics, design, and manufacturing; thermal science and fluid dynamics. Within a specialization there are unique opportunities to conduct analytical, experimental, and/or numerical study in a wide variety of challenging problems.

The Department offers a combined bachelor's/master's degree program. Contact the graduate coordinator for information.

For more information, please see the program pages below and our website: http://www.mae.ufl.edu/current/graduate (http://www.mae.ufl.edu/current/graduate/).

**Majors**
- Aerospace Engineering (p. 335)
- Mechanical Engineering (p. 337)

**Faculty**

**Professor**
- Arakere, Nagaraj Keshavamurthy
- Banks, Scott Arthur
- Barooah, Prabir
- Cazacu, Oana
- Crane, Carl D.
- Dixon, Warren E.
- Fan, Zhonghui Hugh
- Hahn, David Worthington
- Huang, Yong
- Ifju, Peter G.
- Kim, Nam Ho
- Mei, Renwei
- Mohseni, Kamran
- Roy, Subrata
- Sankar, Bhavani V.
- Sawyer, Wallace Gregory
- Schueller, John Kenneth
- Segal, Corin
- Sheplak, Mark
- Sherif, Sherif Ahmed
- Subhash, Ghatu
A total of 30 credit hours is required for the Master's degree. The Master's degree, with thesis option, includes a minimum of 24 graded credit hours of coursework (excluding S/U courses) and up to 6 credits of thesis research. For students pursuing the non-thesis degree option, a total of 30 graded credit hours (excluding S/U courses) is required. For both the thesis and non-thesis degree, up to 6 credits of out of department coursework at the 3000 or 4000 level (excluding EGN courses and S/U courses) may be completed to satisfy degree requirements, as long as the coursework completed is included in an approved Plan of Study.

A comprehensive final examination is required by the Graduate School for the M.E. or M.S. non-thesis degree option. Passing the written qualifying Ph.D. exam may substitute for the M.S. non-thesis examination for those continuing towards for Ph.D. Note: The exam must be completed in either the semester of graduation or the proceeding semester in which the degree is to be conferred.
Doctor of Philosophy
The Doctor of Philosophy (Ph.D.) is a research intensive degree requiring independent mastery of a field of knowledge. As such, considerable flexibility is allowed by the Graduate School and by MAE in the tailoring of individual programs.

All Ph.D. students must take a minimum of 39 graded credit hours (excludes S/U graded courses) beyond the B.S. degree. Students are expected to complete a Plan of Study by the second term of enrollment, which should include a tentative title for the student’s dissertation. As the student progresses toward the degree, any significant deviations in their program from the approved Plan of Study should be discussed and approved by the student’s advisor, and recorded in the submission of a revised Plan of Study.

Guidelines for Plan of Study
During the first year of graduate study, each student should complete a minimum of three didactic courses in the Fall and Spring semesters. Generally, core courses are selected, as well as an appropriate mix of elective courses for the chosen specialization. (Ph.D. Students should include coursework to prepare for the qualifying exam.) Except for a minority of students doing interdisciplinary specializations whose Plans of Study will be reviewed by the Graduate Committee, a student will follow the requirements of one of the three MAE graduate study groups:

- Dynamics, Systems, and Control (DSC)
- Solid Mechanics, Design, and Manufacturing (SMDM)
- Thermal Science and Fluid Dynamics (TSFD)

The Plan of Study (and qualifying exam if a Ph.D. student) will be based upon the chosen group. Please reference the MAE degree programs and requirements (http://www.mae.ufl.edu/current/graduate/degree-programs-requirements/) for complete details.

Additional information about the department and graduate programs can be found at http://www.mae.ufl.edu.

Degrees Offered

Degrees Offered with a Major in Aerospace Engineering
- Doctor of Philosophy
  - without a concentration
  - concentration in Clinical and Translational Science
- Master of Engineering
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Mechanical and Aerospace Engineering

Departmental Courses

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<td>Data Measurement and Analysis</td>
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<td>High Strain Rate Behavior of Materials</td>
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<td>Applied Elasticity and Advanced Mechanics of Solids</td>
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<td>Combustion</td>
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<td>Control System Theory</td>
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<td>Computer Control of Machines and Processes</td>
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<td>Energy Management for Mechanical Engineers</td>
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<td>EML 5515</td>
<td>Gas Turbines and Jet Engines</td>
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<td>EML 5516</td>
<td>Design of Thermal Systems</td>
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<td>EML 5526</td>
<td>Finite Element Analysis and Application</td>
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<td>Orthopedic Biomechanics</td>
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<td>EML 5605</td>
<td>Advanced Refrigeration</td>
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<td>Introduction to Compressible Flow</td>
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<td>EML 6154</td>
<td>Conduction Heat Transfer</td>
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SLO 1 Knowledge
Ability to identify, formulate, and solve engineering problems. Ability to critically read and integrate engineering research literature.

SLO 2 Skills
Ability to use applied mathematical techniques. Ability to use modern engineering tools for practice at an advanced level.

SLO 3 Professional Behavior
Ability to communicate effectively.

### Aerospace Engineering (PHD)

#### College of Engineering Courses

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<td>EGN 6937</td>
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<td>EMA 6581</td>
<td>Polymeric Biomaterials</td>
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### College of Engineering Courses

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<td>Multiphase Convection Heat Transfer</td>
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<td>Geometry of Mechanisms and Robots I</td>
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### Student Learning Outcomes

#### Aerospace Engineering (PHD)

**SLO 1 Knowledge**
Ability to identify, formulate, and solve engineering problems. Ability to critically read and integrate engineering research literature.

**SLO 2 Skills**
Ability to use applied mathematical techniques. Ability to use modern engineering tools for practice at an advanced level.

**SLO 3 Professional Behavior**
Ability to communicate effectively.

#### Aerospace Engineering (MS and ME)

**SLO 1 Knowledge**
of Study will be reviewed by the Graduate Committee, a student will follow the requirements of one of the three MAE graduate study groups:

- Dynamics, Systems, and Control (DSC)
- Solid Mechanics, Design, and Manufacturing (SMDM)
- Thermal Science and Fluid Dynamics (TSFD)

The Plan of Study (and qualifying exam if a Ph.D. student) will be based upon the chosen group. Please reference the MAE degree programs and requirements (http://www.mae.ufl.edu/current/graduate/degree-programs-requirements/) for complete details.

Additional information about the department can be found at http://www.mae.ufl.edu.

Degrees Offered

Degrees Offered with a Major in Mechanical Engineering

- Doctor of Philosophy
  - without a concentration
  - concentration in Clinical and Translational Science
- Master of Engineering
- Doctor of Philosophy

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Mechanical and Aerospace Engineering Departmental Courses

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<th>Code</th>
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College of Engineering Courses

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<td>Principles of Engineering Practice</td>
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Student Learning Outcomes

**mechanical engineering (PHD)**

SLO 1 Knowledge
Ability to identify, formulate, and solve engineering problems. Ability to critically read and integrate engineering research literature

SLO 2 Skills
Ability to use applied mathematical and/or modern experimental techniques. Ability to use modern engineering tools for practice at an advanced level

SLO 3 Professional Behavior
Ability to communicate effectively

**Mechanical Engineering (Me & Ms)**

SLO 1 Knowledge
Ability to identify, formulate, and solve engineering problems

SLO 2 Skills
Ability to use applied mathematical techniques. Ability to use modern engineering tools for practice at an advanced level

SLO1 Comprehensive Knowledge
Describe knowledge of the normal structure and physiologic function of the human body and how failure of normal function is associated with disease

Nuclear and Radiological Engineering Department

The graduate degrees offered with a major in Nuclear Engineering Sciences are now administered through the Materials Science and Engineering Department (p. 329).

Faculty

**Professor**
- Bova, Frank J.
- Mendenhall, Nancy P.

**Associate Professor**
- Baciak, James Edward
- Properzio, William S.
- Yang, Yong

**Assistant Professor**
- Enqvist, Per Andreas Jon

**Affiliated Faculty**
- Aitkaliyeva, Assel
- Allen, Josephine
- Andrew, Jennifer
- Angelini, Thomas Ettor
- Batich, Christopher D.
- Bolch, Wesley Emmett
- Brennan, Anthony B.
- Colina, Coray Mariu
- DeHart, Mark
- Dobson, Jon P.
- Douglas, Elliot Paul
- Fuchs, Gerhard E.
- Gilland, David R.
- Goluoglu, Sedat
- Gower, Laurie B.
- Hartig, Kyle Cameron
- Hennig, Richard
- Huang, Yong
- Jones, Kevin S.
- Li, Jonathan G.
- Li, Meimei
College of Health and Human Performance

Dean: M. Reid

Research and teaching in HHP has an impact on almost every aspect of the human condition. The college’s four centers – the Florida Center for Health Promotion (http://www.hhp.ufl.edu/heb/fchp/fchp.php), Center for Exercise Science (http://apk.hhp.ufl.edu/index.php/departments-centers/center-for-exercise-science-ces/), and the Eric Friedheim Tourism Institute (http://efti.hhp.ufl.edu/) – as well as its three primary departments – Applied Physiology and Kinesiology (p. 340), Health Education and Behavior (p. 343), and Tourism, Recreation, and Sport Management Department (p. 345) – place the college firmly in a position to influence and improve an array of societal problems and challenges.

For more information about the College of Health and Human Performance, please see our website: http://hhp.ufl.edu

Departments

- Applied Physiology and Kinesiology (p. 340)
  - Applied Physiology and Kinesiology (p. 341)
- Health Education & Behavior (p. 343)
- Health Education and Behavior (p. 343)
- Sport Management (http://catalog.ufl.edu/graduate/colleges-departments/health-human-performance/sport-management/)
  - Sport Management (http://catalog.ufl.edu/graduate/colleges-departments/health-human-performance/sport-management/sport/)
- Tourism, Hospitality, and Event Management (http://catalog.ufl.edu/graduate/colleges-departments/health-human-performance/tourism-hospitality-event-management/)

Faculty

Complete faculty listings: Follow this link (http://apk.hhp.ufl.edu/index.php/about/directoryfaculty-directory-apkmichael-b-reid-ph-d/).

Applied Physiology and Kinesiology Department

Chair: T. Clanton
Graduate Coordinator: R. Seidler

Complete faculty listing by department: Follow this link (http://gradschool.ufl.edu/GimsPublic/Acalog/Faculty.aspx).

The Ph.D. program is offered with concentrations in biobehavioral science and exercise physiology. Students in the biobehavioral science concentration specialize in one of four areas: biomechanics, performance psychology, motor control / learning, or sports medicine. These interdisciplinary concentrations focus on preparing students as researchers with a blend of course work and research training.

Programs leading to the Master of Science degree in applied physiology and kinesiology (thesis and non-thesis options) are also offered. Areas of concentration for the master’s program include athletic training/sports medicine, biobehavioral science, clinical exercise physiology, exercise physiology, and human performance. The thesis option gives the student an opportunity to study, conduct research, and prepare a thesis in an area of special interest. The non-thesis option offers the student a specialization in a selected area of study, with additional work in other complimentary areas to meet the student’s interests and the specialty skills needed to be leaders in the field. A comprehensive written examination is required for this option, as is a capstone internship experience. Requirements for these degrees are given in the General Information section of this catalog.

Athletic training/sports medicine: This concentration provides comprehensive academic preparation, research, and clinical experience in the areas of injury prevention, assessment, treatment, rehabilitation, and therapeutic modalities.
Biobehavioral Science: This thesis mandatory concentration is multidisciplinary and flexible, permitting students to tailor their scholarly experience to the development of research skills in one of several related disciplines: biomechanics, motor control and learning, and performance psychology. Each area of specialization is briefly described below.

- **Biomechanics:** The specialization in biomechanics draws from the fields of neuroscience, engineering, and medicine. The course work and training include kinematics and kinetics of movement. Course work also includes anatomy/kinesiology, biomechanics, engineering, neuroscience, medicine, psychology, physical therapy, and statistics.

- **Motor learning / control:** This interdisciplinary specialization draws on experiences and a knowledge base in the movement and sport sciences, cognitive sciences, and physical therapy. Students are prepared to conduct research and provide expertise in traditional motor performance and learning settings.

- **Performance psychology:** This area of specialization provides the basis for understanding and influencing the underlying thought processes and attitudes that will ultimately determine the performance of individuals involved in sport, exercise, and other achievement oriented activities. The primary emphasis is to develop the scientific background and skills necessary for doctoral training and research.

Clinical exercise physiology: The purpose of this non-thesis program is to give students the opportunity to develop advanced knowledge and competencies in Exercise Physiology. Clinical Exercise Physiologists typically practice in hospitals, clinics and wellness centers as part of a health care team that administers tests and develops programs of exercise, counseling, and education for patients with cardiopulmonary, metabolic, and musculoskeletal diseases.

Exercise physiology: This thesis mandatory area of concentration is concerned with the scientific study of how the various physiological systems of the human body respond to physical activity. It is a multidisciplinary field with strong ties to the basic life sciences and medicine, and application to clinical, normal, and athletic populations.

Human performance: This non-thesis master’s concentration merges a range of specializations within the Department into a curriculum that provides educational experiences to graduate students interested in studying the factors that determine human performance in both athletic and nonathletic domains. This flexible approach allows students to focus on specific applications that best meet their individual interests. Human performance incorporates components such as nutrition, psychology, motor behavior, and physiology that are applicable to athletic and clinical populations.

**Majors**

- Applied Physiology and Kinesiology (p. 341)

**Faculty**

**Professor**

- Barton, Elisabeth R.
- Cauraugh, James H.
- Christou, Evangelos A.
- Clanton, Thomas Lindsay
- Dodd, Stephen
- Hass, Christopher J.
- Janelle, Christopher M.
- Reid, Michael B.
- Seidler, Rachael Dianne
- Vaillancourt, David E.

**Associate Professor**

- Borsa, Paul A.
- Christou, Demetra Demetriou
- Coombes, Stephen A.
- Ferreira, Leonardo Franklin
- Manini, Todd M.

**Assistant Professor**

- Choi, Julia
- Ryan, Terence E.
- Smuder, Ashley Joslin
- Vahdat, Shahabeddin

**Other**

- Ahlgren, Joslyn Korrin
- Mani, Diba

**Lecturer**

- Beatty, Garrett Freeman
- Harrison, Blain Christopher

**Distinguished Professor**

- Powers, Scotty K.

**Clinical Associate Professor**

- Tripp, Brady L.
- Tripp, Patricia M.

**Affiliated Faculty**

- Clark, David J.
  - Associate Professor
- Mankowski, Robert Tomasz
  - Assistant Professor
- Taivassalo, Tanja
  - Research Associate Professor
- Vedam-Mai, Vinata
  - Research Assistant Professor
- Vincent, Heather K.
  - Associate Professor
- Vincent, Kevin R.
  - Associate Professor

**Applied Physiology and Kinesiology Program Information**

Graduate study in Applied Physiology and Kinesiology (APK) is focused on research in concentration areas including: athletic training; biomechanics; motor control and learning; exercise physiology; and performance psychology. Graduate students are exposed to and directly involved in research covering the full multidisciplinary spectrum of human potential from young to old, fit to unfit, healthy to diseased, able-
bodied to disabled, and from the casual recreational participant to the high-level athlete. In addition to human performance issues, APK faculty and students study the immediate and lasting effects of exercise and its use in disease prevention and rehabilitation.

For more information, please see our website: [http://apk.hhp.ufl.edu/index.php/current-students/prospective-students](http://apk.hhp.ufl.edu/index.php/current-students/prospective-students).

**Degrees Offered**

**Degrees Offered with a Major in Applied Physiology and Kinesiology**

- Master of Science
  - without a concentration
  - concentration in Athletic Training/Sports Medicine
  - concentration in Biobehavioral Science
  - concentration in Clinical Exercise Physiology
  - concentration in Exercise Physiology
  - concentration in Human Performance

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

### Applied Physiology and Kinesiology Departmental Courses

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<td>Assessment in Exercise Science</td>
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<td>APK 5404</td>
<td>Sport Psychology</td>
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<td>APK 6116C</td>
<td>Physiological Bases of Exercise and Sport Sciences</td>
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<td>APK 6118</td>
<td>Neuromuscular Adaptation to Exercise</td>
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<td>APK 6126</td>
<td>Cardiopulmonary Pathologies</td>
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<td>EKG Interpretation</td>
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<td>Strength and Conditioning</td>
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<td>SPM 6106</td>
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<td>SPM 6726</td>
<td>Issues in Sport Law</td>
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**Student Learning Outcomes**

### Applied Physiology & Kinesiology (MS)

**SLO 1 Subject Matter**

Discuss, explain, and defend subject matter relevant to the discipline – exercise physiology, biobehavioral science, clinical exercise physiology, human performance, athletic training

**SLO 2 Discipline specific skills**
Discuss, explain, and defend in the discipline specific skills - exercise physiology, biobehavioral science, clinical exercise physiology, human performance, athletic training.

SLO 3 Professional Behavior
Display ethical behavior, cultural sensitivity, team work, professional conduct and professional communication

Health Education and Behavior Department

Chair: Jalie A. Tucker
Graduate Coordinator: Virginia Dodd

Complete faculty listing by department: Follow this link (http://gradschool.ufl.edu/GimsPublic/Acalog/Faculty.aspx).

The Department of Health Education and Behavior offers a Doctor of Philosophy (Ph.D.) in Health and Human Performance with a concentration in Health Behavior, a non-thesis 30-credit hour Master of Science and a 36-credit Master of Science (M.S.) in Health Education and Behavior. Requirements for the Ph.D. and M.S. degrees are given in the Graduate Degrees section of this catalog.

The Ph.D. degree program trains health behavior researchers for academic positions in federal health agencies such as the Centers for Disease Control and Prevention and the National Institutes of Health, for postdoctoral research fellowships, and for the private sector.

The 30-credit hour, non-thesis M.S. degree program is designed for students seeking an advanced practitioner’s degree. A distinctive feature of this option allows students to choose a minimum of 15 credit hours of major elective coursework that matches their interests with faculty expertise to plan a program that achieves their professional goals. The degree prepares health promotion specialists to work in local, state, and federal health agencies, nongovernmental health organizations, patient care settings, and the private sector. Full-time students can complete this M.S. option in one year. This degree may also give students unique and distinguishing training experiences when applying to professional schools such as law, medicine, physician assistant, dentistry, chiropractic, osteopathy, nursing, occupational therapy, and physical therapy.

The 36-credit hour project in lieu of thesis, and the 36-credit hour thesis options are designed for students interested in developing research skills through conducting evaluation projects and empirical studies, as well as pursuing advanced graduate study, particularly the doctoral degree. Students typically can complete these options in about 4 semesters.

The Department also offers an accelerated B.S./M.S. program in Health Education and Behavior to enable students to receive both B.S. and M.S. degrees with a reduction of 12 credits (about one semester of course work).

Students who complete a graduate degree program in the Department of Health Education and Behavior acquire a range of skills required to research, plan, implement, and evaluate health promotion policies and programs aimed at improving the health and well-being of individuals, families, and communities. Specific skills include:

- Conducting needs and capacity assessments to identify health priorities
- Planning, implementing, and evaluating health promotion policies and programs
- Conducting research on questions associated with determinants of health, as well as health promotion policies and programs
- Administering and managing health promotion programs
- Advocating for health promotion policies and programs in schools, communities, health care facilities, and workplaces
- Developing social marketing and health communication messages and campaigns
- Researching and developing social media and new media-based health promotion applications
- Serving as a resource person for health information and referrals
- Using a variety of teaching-learning strategies appropriate to the target audience and setting
- Writing scholarly and professional articles
- Working collaboratively with public and private agencies, nongovernmental organizations (NGOs), and the private sector to achieve the goal of a healthier population.

This degree prepares the health promotion specialists and health behavior scientists to work in:

- Local, state, and federal health, education and social agencies
- Nongovernmental health organizations
- Schools and universities
- Healthcare settings
- Private sector

Sample position titles for individuals with this degree include:

- Health education specialist
- Health promotion specialist
- Public health adviser or public health analyst
- Health promotion coordinator or health promotion consultant
- Campus health educator or patient health educator,
- Health communication specialist
- Wellness specialist
- Wellness promotion coordinator
- Prevention specialist

For additional information, visit http://www.heb.hhp.ufl.edu. (http://www.heb.hhp.ufl.edu)

Health Education and Behavior Program Information

The 30-credit hour, non-thesis Master of Science in Health Education and Behavior degree program is designed for students seeking an advanced practitioner’s degree. A distinctive feature of this option allows students to choose a minimum of 15 credit hours of major elective coursework that matches their interests with faculty expertise to plan a program that achieves their professional goals. The degree prepares health promotion specialists to work in local, state, and federal health agencies, nongovernmental health organizations, patient care settings, and the private sector.

The 30-credit, non-thesis Pre-Professional Health Science Track is designed for students seeking a career in health care. This option
allows you to choose a minimum of 12 credits of basic science elective coursework which are prerequisites for dental, medical, nursing, occupational therapy, physician assistant, physical therapy, and other health professional programs including 6 credits of undergraduate science courses (3000-4999). This degree track prepares students who are interested in graduate studies in the health sciences and/or pursuing health professional training. Full-time students can complete the 30-credit hour M.S. options in one year.

The 36-credit Thesis and the 36-credit Project In Lieu Of Thesis Master of Science in Health Education and Behavior degree options are designed for students interested in improving their research skills through conducting evaluation projects and empirical studies, as well as pursuing advanced graduate study, particularly the doctoral degree. Students typically complete these options in about 4 semesters.

For more information, please see our website: http://hhp.ufl.edu/about/departments/heb/.

Degrees Offered

Degrees Offered with a Major in Health Education and Behavior

- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Health Education and Behavior

Departmental Courses

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<td>HLP 6515</td>
<td>Evaluation Procedures in Health and Human Performance</td>
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<td>Teaching Health in Elementary Schools</td>
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<td>Nutrition Education for Special Populations</td>
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<td>HSC 5606</td>
<td>Spirituality and Health</td>
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<td>Advanced Exercise Therapy, Adapted Physical Activity &amp; Health</td>
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<td>Minority Health Issues</td>
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<td>Health and End-of-Life Issues</td>
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<td>HSC 5956</td>
<td>Writing for Professional Publications</td>
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<td>Philosophy and Principles of Health Education</td>
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<td>Health Promotion and Programming in Gerontology</td>
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<td>HSC 6571</td>
<td>Contemporary Issues in Health Promotion</td>
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<td>HSC 6595</td>
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<td>HSC 6603</td>
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<td>Social Marketing and Health</td>
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<td>Community Health Methods in Injury Prevention &amp; Control</td>
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<td>HLP 6971</td>
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</table>

Student Learning Outcomes

Health Education & Behavior (MS)

SLO 1 Knowledge
Identify, define, and describe principles and foundations of health education/promotion.

SLO 2 Skills
Assess needs, assets and capacity for health education/promotion.

SLO 3 Skills
Plan health promotion programs

SLO 4 Skills
Implement health education/promotion programs

SLO 5 Skills
Conduct evaluation and research related to health education/promotion.

SLO 6 Skills
Administer and manage health education/promotion programs.

SLO 7 Skills
Serve as a health education/promotion resource person.

SLO 8 Skills
Communicate and advocate for health and health education and health promotion.

SLO 9 Professional Behavior
Illustrate the highest standards of conduct and ethical behavior when making professional decisions in accordance to the Unified Code of Ethics for the Health Education Profession (Coalition of National Health Education Organizations, 2011)

Health and Human Performance
Program Information
The Ph.D. in Health and Human Performance is a single college-wide Ph.D. program with 6 concentrations that are housed and administered by the three departments, according to the following organizational structure:

- **Applied Physiology and Kinesiology (APK):** Ph.D. students in APK study the immediate and lasting effects of exercise and its use in disease prevention and rehabilitation. APK Ph.D. concentrations include Exercise Physiology and Biobehavioral Science, with further specializations in biomechanics, motor control and learning, exercise and performance psychology, and sports medicine / athletic training.

- **Health Education & Behavior (HEB):** Ph.D. students in HEB systematically investigate health promotion strategies aimed at modifying behaviors which will improve individual, family, workplace, and community health and well-being. The HEB Ph.D. concentration is in Health Behavior.

- **Tourism, Recreation, and Sport Management (TRSM):** TRSM Ph.D. students study the impact of tourism, recreation activities, professional and amateur sports, ecotourism, parks and beaches on the personal, social, economic, environmental and resource infrastructures of society. Ph.D. concentrations in TRSM include Natural Resource Recreation, Sport Management, and Tourism.

Students are expected to be involved in research throughout their Ph.D. program, which requires approximately three to five years of full-time study for completion. Graduates of the program are trained to assume positions as post-doctoral research scientists, or entry level professorships at colleges and universities throughout the country. The program of study is developed by the student and the supervisory committee based on the student’s background, interests, and career goals, as well as faculty expertise. By design, the program is multidisciplinary and flexible, permitting students to tailor their scholarly experience to the development of research skills in their areas of concentration.

For more information, please see our website: [http://gradprograms.hhp.ufl.edu/index.php/doctoral-program](http://gradprograms.hhp.ufl.edu/index.php/doctoral-program/).

Degrees Offered

**Degrees Offered with a Major in Health and Human Performance**

- Doctor of Philosophy
  - without a concentration
  - concentration in Applied Physiology and Kinesiology

  - optional second concentration in Clinical and Translational Science

  - concentration in Biobehavioral Science

  - concentration in Clinical and Translational Science

  - concentration in Exercise Physiology

  - concentration in Health Behavior
    - optional second concentration in Clinical and Translational Science

  - concentration in Historic Preservation

  - concentration in Recreation, Parks, and Tourism

  - concentration in Sport Management

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

#### Applied Physiology and Kinesiology

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<td>APK 5127</td>
<td>Assessment in Exercise Science</td>
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<td>APK 5404</td>
<td>Sport Psychology</td>
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<td>APK 6116C</td>
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<td>APK 6118</td>
<td>Neuro muscular Adaptation to Exercise</td>
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<td>APK 6126</td>
<td>Cardiopulmonary Pathologies</td>
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<td>APK 6128</td>
<td>EKG Interpretation</td>
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<td>APK 6145</td>
<td>Movement Disorders</td>
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<td>APK 6167</td>
<td>Nutrition Aspects of Human Performance</td>
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<td>APK 6170</td>
<td>Advanced Exercise Physiology</td>
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<td>APK 6176</td>
<td>Strength and Conditioning</td>
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<td>Movement Screening and Assessment</td>
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Health and Human Performance

Health Education and Behavior

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<td>PET 6947</td>
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Tourism, Recreation, and Sport Management Departmental Courses

Student Learning Outcomes

Health and human performance

SLO 1 Knowledge
Discuss, explain, and defend subject matter relevant to the discipline – exercise physiology, biobehavioral science, health behavior, recreation, parks and tourism, or sport management.

SLO 2 Knowledge
Discuss, explain, and defend traditional and current research methods in their discipline - exercise physiology, biobehavioral science, health behavior, recreation, parks and tourism, or sport management.

SLO 3 Skills
Discuss, explain, and defend the use of appropriate research methods as determined by the discipline and faculty committee.

SLO 4 Skills
Articulate and defend, orally and in writing, the results of their research and scholarship.

SLO 5 Professional Behavior
Ethically conduct research that is suitable for the discipline.

College of Journalism and Communications

Dean: D. McFarlin
Senior Associate Dean for Graduate Studies and Research: T. Kelleher

Graduate Coordinators:

• (Advertising) H. Chen
• (International Communication) K. Walsh-Childers
• (Journalism) R. Rodgers
• (Public Relations) M.A. Ferguson
• (Pro Master's) E. Calienes
• (Science/Health Communication) D. Treise
• (Telecommunication) J. Babanikos

Through the Division of Graduate Studies and Research, the College of Journalism and Communications offers the Doctor of Philosophy degree and the Master of Arts in Mass Communication (thesis or project option) degree which is divided into two areas-PhD preparation and professional development. Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Doctoral students work closely with faculty members in research leading to a dissertation embodying a humanities, law/policy, or social sciences approach. Emphases within these approaches for which faculty members have expertise include advertising, journalism, public relations, telecommunication, international communication, and political communication. Details of doctoral faculty research interests and other aspects of the program are given in the College's Ph.D. Handbook.

The master's program is a two-track system, one focused on PhD preparation and one on professional development. In the PhD-preparation program, you learn the ideas and skills you need for satisfying lifelong careers in mass communication. You can choose to obtain a Master of Arts in Mass Communication degree by selecting one of the specializations below. Master's students in the PhD-preparation track may complete a thesis in advertising, journalism, public relations, telecommunications, international communication, or science/health communication. A project in lieu of thesis option is available for some specializations.

The Pro Master's track allows students to “mix and match” coursework from three key career areas-Data/Research, Creative or Management - to develop a customizable curriculum. Students can use the suggested curriculum or create their own path to reach personal career goals.

Mass Communication/Law joint degree programs: Programs leading to the Master of Arts in Mass Communication or the Doctor of Philosophy and the Juris Doctor are offered under the joint auspices of the College of Journalism and Communications and the College of Law. For students interested in scholarship or practice of communication law or in reporting on the law, the programs offer the opportunity to blend relevant work from the two colleges. Students must meet the entrance requirements of both colleges. A thesis or dissertation is required. Interested students should apply for admission to both the Graduate School and the College of Law, noting on the applications the joint nature of the admission requests. Further information on the programs and on application procedures is available from the Holland Law Center and from the Division of Graduate Studies and Research of the College of Journalism and Communications.

General admission: Admission is granted to applicants with and without background in mass communication. Students without academic preparation in mass communication or appropriate experience may be required to take articulation work. These courses are taken concurrently with general graduate courses, starting in the first term of registration. Some degree plans require a background course in statistics. Students who have satisfied that requirement must provide written verification. Including articulation courses, the master's degree normally can be earned in one or two years of full-time study. Doctoral studies require three or more years of full-time study and research. Students who may require articulation courses should contact the Associate Dean of Graduate Studies and Research.

Grading policy: Any student whose cumulative GPA falls below 3.0 will be placed on probation. Any doctoral student who receives one grade below B- or a Master's student who receives one grade below C+ will be placed on probation, with the exception of courses taken from the Levin College of Law. For these courses, any student receiving one grade below C in any course from the Levin College of Law will be placed on probation. A requirement of the probation is that the student must achieve or maintain a cumulative grade point average of 3.0 or higher at the end of the next academic term in residence. A student who fails to satisfy the requirement will be suspended. A Doctoral student who accumulates two grades below "B-"– or a Master's student who accumulates two grades below C+ during graduate studies will be suspended, as will a student who receives one grade of "D+" or lower at any time. Students will be allowed only one suspension.

Combined degree program: The College offers a combined bachelor's/master's program. For information, contact the Associate Dean for Undergraduate Affairs.

For additional information, please see our website: http://www.jou.ufl.edu/grad.

Programs

• Mass Communication (p. 348)

Faculty

Professor

• Babanikos, James
• Chan-Olmsted, Sylvia M.
• Ferguson, Mary A.
• Hon, Linda L.
• Kalyanaraman, Sriram
• Kaplan, John
• Kelleher, Thomas A.
• Kioussis, Spiro K.
• LoMonte, Frank Daniel
• Mcadams, Melinda Jeanne
• Morris, Jon D.
• Ostroff, David Howard
• Raup-Krieger, Janice
• Roberts, Churchill L.
• Spiker, Theodore D.
• Treise, Deborah M.
• Walsh-Childers, Kim B.
• Wanta, Wayne M.
• Weigold, Michael Fredrick

Associate Professor
• Bylund-Lincoln, Carma
• Coffey, Amy Jo
• DiStaso, Marcia
• Fisher, Carla L.
• Freeman, John Glenn
• Goodman, Jennifer Robyn
• Lee, Moon J.
• Leslie, Michael
• Lewis, Norman Paul
• Men, Linjuan
• Morton Padovano, Cynthia R.
• Rodgers, Ronald
• Sorel, Tim
• Tripp, Bernell E.

Assistant Professor
• Alpert, Jordan M.
• Chen, Huan
• Coche, Roxane Jeanne Lilia
• Fernandes, Juliana D.
• Grant, Rachel L.
• Hmielowski, Jay
• Hutchens, Myiah Joan
• Johnson, Benjamin K.
• Lee, Yu-Hao
• McNealy, Jasmine E.
• Shin, Jieun
• Waddell, Thomas F.
• Windels, Kasey Farris
• Xu, Kun

Eminent Scholar
• Calvert, Clay

Research Assistant Professor
• Strekalova, Yulia A.

Affiliated Faculty
• Barnett, Cynthia Lynn
  Other
• Basu, Monimala
  Other
• Bridis, Theodore W.
  Other
• Esterline, Eric C.
  Other
• Hernandez, Joanna
  Other
• Hove, Harrison C.
  Other
• Lowe, Herbert
  Other
• Nall, Mickey Glen
  Other
• Searight, Ann Elizabeth
  Professor
• Selepak, Andrew G.
  Other
• Wells, Houston A.
  Other
• Zawahry, Iman Kamal
  Other

Mass Communication
Program Information
Ph.D. in Mass Communication
The Ph.D. degree is a research degree. The Ph.D. program is designed to help develop knowledge, attitudes, and skills so graduates can make important contributions to understanding mass communication. Faculty members help students lay the foundation for a lifetime of significant, creative work.

The doctoral program prepares students for a variety of opportunities in mass communication. Graduates are expected to teach at colleges and universities; conduct research for organizations in advertising, journalism, public relations, telecommunication, and other mass communication fields; do consulting; and conduct research and contribute to policy in government and private organizations. Doctoral students in the College of Journalism and Communications gain valuable experience in both teaching and research. Assistantships help prepare students for academic and other research positions. Students in the program have consistently been among the nation's leaders in winning top-paper awards at national and regional scholarly meetings.

Master of Arts in Mass Communication (M.A.M.C.)
There are several specializations available for the Master of Arts in Mass Communication:

The Journalism specialization program in the UF College of Journalism and Communications combines study of the academic literature on the societal role and effects of mass communication in general and
journalism in particular with courses designed to improve students’ practice of the journalism craft. The Journalism specialization at the master’s level is designed for students interested in all areas of non-broadcast journalism (i.e., newspapers, magazines and online publishing). Those who have an educational and/or professional background in journalism can enhance their understanding of the role of journalism in society, as well as improving reporting and writing skills. However, the program is also well-suited for students with a long-term interest in college-level journalism education, who can pursue the master’s degree as preparation for entry into a doctoral program. For more information, please see our website: http://www.jou.ufl.edu/academics/masters/mamc-journalism (http://www.jou.ufl.edu/academics/masters/mamc-journalism/).

The **Pro Master’s specialization**: The Professional Master’s track is an on-campus program focused in four core/cross disciplines:

- applied theory;
- communication, technology and society;
- multimedia storytelling; and
- data creation/analysis/data visualization.

The track is designed specifically for those who want to develop additional skills to become more competitive in the job market. The program allows you to develop your own customizable curriculum from three key career areas: Data/Research, Creative or Management. Students can use our suggested curriculum or create your own path to reach your personal career goals.

The Professional Masters’ can be completed in one year, for those who want an accelerated program, or two years. Admission is for the fall semester only. For more information, please see our website: https://www.jou.ufl.edu/current-students/masters/promasters/.

The **Public Relations specialization** at the master’s level is a research-based program designed to prepare students for careers and advancement in the industry or for entering doctoral studies. Students learn the conceptual foundations of public relations and develop professional and research competency within the duration of the program. Courses in the public relations specialization focus on conceptual foundations of public relations, including mass communication and society, professional and managerial skills mastery; and research expertise. For more information, please see our website: http://www.jou.ufl.edu/academics/masters/master-of-public-relations (http://www.jou.ufl.edu/academics/masters/master-of-public-relations/).

The **Telecommunication specialization** program in the UF College of Journalism and Communications combines courses in Mass Communication, Telecommunication, and other areas relevant to the student’s goals. There is a thesis track, appropriate for students who will later seek the Ph.D. or who wish to learn the skills and knowledge associated with thesis research or project in lieu of thesis. The Telecommunication track is designed for students with the following interests:

- Operation or management of telecommunication outlets (broadcast stations, cable systems, program distributors, etc.) and emerging media
- Telecommunication regulation and policy
- Audience research
- Preparation for an advanced degree

For more information, please see our website: http://www.jou.ufl.edu/academics/masters/mamc-telecommunication (http://www.jou.ufl.edu/academics/masters/mamc-telecommunication/).

The **International/Intercultural Communication specialization**: The field of international communication encompasses the study of international journalism (both print and broadcast) and international business and marketing communication. The field of intercultural communication focuses on the interactions between people of different cultures, values and histories. Through their study, students learn to appreciate and engage diverse cultures and media, gaining the knowledge and skills you need to thrive in today’s challenging global community. The international/intercultural track in mass communication culminates with the student writing a thesis on an international/intercultural topic in communication, applying one or more of the methods used in communication research. For more information, please see our website: http://www.jou.ufl.edu/academics/masters/mamc-internationalintercultural-communication-specialization (http://www.jou.ufl.edu/academics/masters/mamc-internationalintercultural-communication-specialization/).

The **Science and Health Communications specialization** program is designed to teach scientists and health specialists to communicate effectively via media, and to teach mass media specialists the background science to translate the language of science and health into meaningful and understandable stories for their audiences. These goals are achieved through theoretical writing and applied courses. At least two aspects of the program make it unique among science communication programs nationwide. First, other existing science communication programs in the U.S. focus on training journalists. UF’s program is open to journalists who want to specialize in covering science and health, offers training for people planning to work as public affairs or public information officers for science and health organizations, for other communication specialists, and for scientists who need to be able to communicate with the public about their work. Second, the program focuses on training students to understand and communicate effectively about science and health policy. For more information, please see our website: http://www.jou.ufl.edu/academics/masters/mamc-sciencehealth-communication (http://www.jou.ufl.edu/academics/masters/mamc-sciencehealth-communication/).

For more help with any of our graduate degree programs, please refer to our website: http://www.jou.ufl.edu/academics (http://www.jou.ufl.edu/academics/).

### Degrees Offered

### Degrees Offered with a Major in Mass Communication

- **Doctor of Philosophy**
  - without a concentration
  - concentration in Clinical and Translational Science
- **Master of Arts in Mass Communication**

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.
## College of Journalism and Communications Courses

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<td>Selling Today</td>
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</table>
The College of Liberal Arts and Sciences constitutes the intellectual core of the university. Its principal mission is to lead the academic quest to understand our place in the universe, and to help shape our society and environment.

For more information, please see our website: http://www.clas.ufl.edu
Animal Molecular and Cellular Biology Department

Director: P.J. Hansen

For more information about the program, contact P.J. Hansen at pjhansen@ufl.edu (ealy@ufl.edu), follow the link below to our catalog page, or visit the program’s website at http://www.animal.ufl.edu/amcb/.

Animal Molecular and Cellular Biology

Program Information
The animal molecular and cell biology (AMCB) graduate program offers Master of Science and Doctor of Philosophy degrees. Faculty are drawn from these disciplines:

- Animal Sciences
- Biochemistry and Molecular Biology
- Large Animal Clinical Sciences
- Obstetrics and Gynecology
- Zoology

Early in the program, students choose a faculty supervisor who will ensure the quality of their research experience. Students may also do optional rotations through the laboratories of one or more other faculty. The Annual Research Symposium features guest speakers and student research presentations. A weekly journal club and monthly seminars draw on the knowledge and diversity the campus offers in molecular and cell biology.

Core course requirements for the M.S. degree are BCH 5045 Graduate Survey of Biochemistry (4 cr.), registration in a 1-credit graduate seminar course and successful completion of a course on responsible and ethical conduct of research. Core course requirements for the Ph.D. include: BCH 5413 Mammalian Molecular Biology and Genetics (3 cr.) and GMS 6421 Cell Biology (4 cr.), registration in two graduate seminar courses and successful completion of a course on responsible and ethical conduct of research.

Contact P.J. Hansen at pjhansen@ufl.edu (ealy@ufl.edu) or visit the program’s website at http://www.animal.ufl.edu/amcb/.
Degrees Offered

Degrees Offered with a Major in Animal Molecular and Cellular Biology

- Doctor of Philosophy
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Animal Molecular and Cellular Biology Courses

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<th>Credits</th>
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<td>ANS 6288</td>
<td>Experimental Techniques and Analytical Procedures in Meat Research</td>
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<td>Current Concepts in Reproductive Biology</td>
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<td>Genetic Analysis of Complex Traits in Livestock</td>
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Student Learning Outcomes

Animal Molecular & Cellular Biology (PHD)

SLO 1  Principles of Molecular and Cellular Biology
Identify, recall, appraise, and interpret the principles of molecular and cellular biology and their application to comparative biology

SLO 2  Scientific Experiments
Design, conduct and draw sound conclusions on scientific experiments

SLO 3  Professional Behavior
Interact with peers and instructors with honesty, cultural sensitivity and effective communication.
Animal Molecular & Cellular Biology (MS)

SLO 1 Knowledge
Identify, recall, appraise, and interpret the principles of molecular and cellular biology and their application to comparative biology

SLO 2 Skills
Design, conduct and draw sound conclusions on scientific experiments

SLO 3 Professional Behavior
Interact with peers and instructors with honesty, cultural sensitivity and effective communication

Anthropology Department

Chair: P. Collings
Graduate Coordinator: K. Grillo

The Department of Anthropology offers the Master of Arts and Doctor of Philosophy Degrees. Complete descriptions of the minimum requirements for these degrees are provided in the General Information section of this catalog.

The Department provides training in the four main areas of specialization, or subfields:

- Anthropological Linguistics,
- Archaeology,
- Biological Anthropology, and
- Cultural Anthropology.

Department strengths include training in Social Research Methods, Medical Anthropology, and the Archaeology of the Americas. The C.A. Pound Human Identification Lab provides opportunities for specialized training in Forensic Anthropology.

Given the holistic nature of Anthropology, the Department maintains close ties with other units in Liberal Arts and Sciences, including the Center for African Studies (CAS), the Center for Latin American Studies (LAS), the School of Natural Resources and Environment (SNRE), the African American Studies program, the Center for European Studies (CES), and the Department of Linguistics. Many department faculty hold joint appointments or affiliations with these programs. We also maintain close ties with the Bureau of Economic and Business Research (BEBR), the Florida Museum of Natural History (FLMNH), the Emerging Pathogens Institute (EPI), the Land Use and Environmental Change Institute (LUECI), the Water Institute, and the Genetics Institute.

Prospective students are encouraged to examine the research interests of individual faculty for a more detailed perspective on the Department’s strengths and specialties. Applicants to the graduate program should preferably have an undergraduate major in anthropology, but the Department accepts applicants with degrees in the humanities, arts, social sciences, and physical sciences into the graduate program. All students are required to take the two Proseminar courses, which provide students with baseline knowledge of the discipline’s four subfields.

Majors

- Anthropology (p. 355)

Faculty

Professor

- Broadwell, George Aaron
- Chalfin, Brenda Helene
- Daegling, David
- Defrance, Susan D.
- Gillespie, Susan D.
- Grove, David C.
- Johnson, Jeffrey C.
- Kugelmass, Jack M.
- McCarty, Christopher
- Mulligan, Connie Jo
- Sassaman, Kenneth Edward
- Tucker, Catherine May

Associate Professor

- Brandt, Steven Andrew
- Collings, Peter F.
- Davidson, James M.
- Deleon, Valerie Burke
- Gravlee, Clarence C.
- Heckenberger, Michael Joseph
- Kane, Abdoulaye
- Kernaghan, Richard B.
- Krigbaum, John
- Oyuela-Caycedo, Augusto
- Shih, Chuan-Kang
- Stepp, John Richard

Assistant Professor

- Contreras, Daniel A.
- Grillo, Katherine M.
- Johnson, Alix B.
- Ostebo, Marit Tolo
- Prieto, Oscar Gabriel
- Strong, Adrienne E.
- Valenta, Kim L.
- Waters, Gifford J.

Other

- Bogart, Stephanie L.
- Schwartz, Saul G.

Associate Curator

- Emery, Katherine Freances
- Wallis, Neill Jansen

Assistant Scientist

- Walker, Karen J.
Curator
- Cobb, Charles R.
- Keegan, William Francis
- Marquardt, William Harrison

Affiliated Faculty
- Bloch, Jonathan I.
  Curator
- Bloch, Lindsay
  Other
- Jusionyte, Ieva
  Assistant Professor
- Lefebvre, Michelle J.
  Assistant Curator
- Paulson, Susan
  Professor
- Resende, Rosana D.
  Lecturer
- Wright, Robin
  Associate Professor

Anthropology

Program Information
The department of Anthropology offers graduate work leading to the Master of Arts (thesis or non-thesis option) and Doctor of Philosophy degrees. Requirements for these degrees are given in the General Information section of this catalog. For more information, visit the departmental website: http://anthro.ufl.edu. Graduate training is offered in cultural anthropology, archaeology, biological anthropology, and linguistic anthropology.

Each graduate student should specify a major field of study among the four fields of anthropology. In addition, each must choose one of three tracks: the specialized track in which a student focuses on one field of anthropology, the multifield track in which a student combines two fields, or the interdisciplinary track in which a student adds study in a second discipline to anthropology. Knowledge of a foreign language or of statistics may be required by the student’s supervisory committee.

The department generally requires applicants to have acceptable scores on the GRE (verbal and quantitative portions) and a 3.5 overall grade point average based on a 4.0 system. Previous work in anthropology is an asset but not a strict requirement for admission. Potential applicants are urged to visit the website to familiarize themselves with the specializations of our faculty and to indicate in their application those faculty with whom they might work. Barring special circumstances, the Department restricts admission to applicants interested in earning a Ph.D. Entering students who have earned a master’s degree in anthropology may apply for direct admission to the doctoral program. Students who enter without an M.A. in anthropology will generally work for their M.A. on the way to the Ph.D. This requires either a formally-defended thesis or written comprehensive exams combined with a publishable paper or research report. With their adviser’s permission, they may opt to bypass the M.A. although this is not recommended.

Students enrolled in the M.A. program who wish to continue their studies for a Ph.D. must apply to the Department for certification.

New students are admitted into the graduate program only in the fall of each academic year. The deadline for receiving completed applications for admission into the graduate program is December 15 of the previous year.

Degrees Offered

Degrees Offered with a Major in Anthropology
- Doctor of Philosophy
  - without a concentration
  - concentration in Clinical and Translational Science
  - concentration in Historic Preservation
  - concentration in Tropical Conservation and Development
  - concentration in Women’s/Gender Studies
- Master of Arts
  - without a concentration
  - concentration in Historic Preservation
  - concentration in Tropical Conservation and Development
- Master of Arts in Teaching
  - without a concentration
  - concentration in Tropical Conservation and Development

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Anthropology Courses

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<td>ANG 5085</td>
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ANG 6086  Historical Ecology 3
ANG 6091  Research Strategies in Anthropology 3
ANG 6110  Archaeological Theory 3
ANG 6113  Ideology and Symbolic Approaches in Archaeology 3
ANG 6120C  Environmental Archaeology 3
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ANG 6241  Special Topics in Ecology of Religion 3
ANG 6257  Anthropology, Geographic Information System, and Human Ecosystems 3
ANG 6274  Principles of Political Anthropology 3
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ANG 6592  Seminar in Molecular Anthropology 3
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ANG 6701  Seminar on Applied Anthropology 3
ANG 6737  Medical Anthropology 3
ANG 6740  Advanced Techniques in Forensic Anthropology 3
ANG 6801  Ethnographic Field Methods 3
ANG 6905  Individual Work 1-3
ANG 6910  Supervised Research 1-5
ANG 6915  Research Projects in Social, Cultural, and Applied Anthropology 1-3
ANG 6930  Special Topics in Anthropology 1-3
ANG 6940  Supervised Teaching 1-5
ANG 6945  Internship in Anthropology 1-8
ANG 6971  Research for Master’s Thesis 1-15

ANG 7979  Advanced Research 1-12
ANG 7980  Research for Doctoral Dissertation 1-15

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ANG 6940 Supervised Teaching 1-5
ANG 6945 Internship in Anthropology 1-8
ANG 6971 Research for Master’s Thesis 1-15
ANG 7979 Advanced Research 1-12
ANG 7980 Research for Doctoral Dissertation 1-15

Identify, define and describe the foundational concepts of the discipline of Anthropology and its subfields.

SLO 2 Skills
Identify, describe and explain research methods in the discipline, and apply those skills to formulate a cogent research problem for the M.A. paper or thesis.

SLO 3 Professional Behavior
Conduct research and report findings in a written publication-qualify paper.

Astronomy Department
Chair: C. Telesco
Graduate Coordinator: V. Sarajedini

The University of Florida’s Astronomy Department is one of the largest in the country. Research is an integral part of the graduate program. Students have opportunities to work with faculty and staff on a broad range of astronomical problems using in-house, national and international, and ground- and space-based facilities. Support for graduate studies is available through fellowships, research assistantships, and teaching assistantships. For more information on the program, please follow the link below or visit our website (https://www.astro.ufl.edu/academics/graduate-studies/).

Majors
• Astronomy (p. 358)

Faculty
Professor
• Ge, Jian
• Gonzalez, Anthony Hernan
• Guzman, Rafael
• Lada, Elizabeth Anne
• Telesco, Charles Michael

Assistant Professor
• Ballard, Sarah
• Ezzeddine, Rana
• Ginsburg, Adam
• Morton, Timothy D.
• Narayanan, Desika T.
• Slepian, Zachary Scott
• Torrey, Paul Adam

Lecturer
• Marinas, Naibi

Associate Scientist
• Reyes, Francisco J.

Affiliated Faculty
• Eikenberry, Stephen Scott
Professor
Astronomy

Program Information

The Astronomy Department offers graduate programs leading to the M.S., M.S.T. or Ph.D. degrees in astronomy. Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Planetary Systems: Observational and theoretical studies concentrate in the areas of planet formation, the dynamical evolution of planetary systems and the detection and characterization of extrasolar planets. Members of the department are active in Kepler Mission and ground-based Doppler surveys to identify extrasolar planets. Researchers are also active in studying the origins and orbital evolution of interplanetary dust and small bodies in the solar system and around nearby stars.

Stellar populations: Observational studies concentrate on resolved stars in the Milky Way and nearby galaxies. Studies of particular classes of stars include various types of binary stars and blue stragglers. The goal of these studies is to apply our theoretical understanding of stellar structure and evolution to the properties of stars in a variety of environments.

Origins of stars and planets: Observational studies focus on the properties of giant molecular clouds, the collapse of molecular cloud cores, the formation of stars in clusters and in isolation, and the formation and evolution of circumstellar and protoplanetary disks.

Structure and evolution of galaxies: Observational programs use multi-wavelength photometry of stars and star clusters in galaxies throughout the Local Group and in nearby groups, including the Milky Way, to study galaxy evolution. Other observations focus on the structure and dynamics of galaxies and their interstellar medium using neutral hydrogen (HI) and molecules such as carbon monoxide.

Extragalactic astronomy and cosmology: Observational programs investigate the nature of ultra-luminous galaxies, active galactic nuclei (AGNs), and the formation and chemical evolution of distant galaxies and clusters of galaxies. Theoretical investigations focus on the emission/absorption features in AGN spectra, the star-formation and chemical-evolution properties of galaxies, and applications of general relativity and particle physics to conditions in the very early universe.

Instrumentation programs: The UF Infrared Astrophysics Laboratory is a world leader in designing and constructing advanced near-infrared and mid-infrared instrumentation for major telescopes around the world, including the 8m Gemini North and South Telescopes and the 10m Gran Telescopio Canarias. Instrumentation is also developed in the area of high precision Doppler techniques for planet searches and the development of high contrast imaging techniques for direct imaging of extrasolar planets.

Computing facilities: The Astronomy Department maintains a network of high-performance computers running Linux and OS-X. The local network is maintained by a full-time systems manager. Astronomy students have access to supercomputing facilities maintained by the UF High Performance Computing Center, including thousands of CPU cores with high-performance networking.

Degrees Offered

Degrees Offered with a Major in Astronomy

• Doctor of Philosophy
• Master of Science
• Master of Science in Teaching

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Astronomy Courses

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</table>

Student Learning Outcomes

Astronomy (PHD)

SLO 1 Knowledge
Identifies, describes, and explains the historiography, methodology, and theory of art

SLO 2 Skills
Selects area of specialization and identifies scholarly resources for original advanced art historical research

SLO 3 Professional Behavior
Produces written scholarly research that conforms to academic publishing conventions

SLO 4 Skill
Astronomy (MS)

SLO 1  Knowledge
Students will identify, define and describe the fundamental astrophysics covered by the core curriculum

SLO 2  Skills
Students will conduct supervised research in astrophysics

SLO 3  Professional Behavior
Students will write articles at the level of a conference proceeding based upon their research

Astronomy (MST)

SLO 1  Knowledge
Students will identify, define and describe the fundamental astrophysics covered by the core curriculum

SLO 2  Skills
Students will effectively teach astronomy

SLO 3  Professional Behavior
Students will effectively communicate with their peers in a professional environment

Biology Department

Chair: Marta L. Wayne
Graduate Coordinator: John (Gordon) Burleigh

The Department of Biology offers two graduate programs: Botany and Zoology. Both programs offer graduate work leading to the degrees of Master of Science, Master of Science in Teaching, and Doctor of Philosophy. Requirements for these degrees are available in the Graduate Degrees (p. 48) section of this catalog. More information regarding these programs is available by following the links below and by visiting our departmental website: http://www.biology.ufl.edu.

Combined Bachelor's/master's program: the Department of Biology in collaboration with the College of Medicine offer a combined Bachelor of Science with a major in Biology and Master of Science with a major in Biochemistry & Molecular Biology degree program. Eligible students may substitute up to 12 semester hours of graduate courses for undergraduate electives. These letter-graded, graduate level courses earned with a grade of B or better are double-counted toward the 30 credits required for the Master of Science (with thesis) in Biochemistry & Molecular Biology.

The combined degree program allows students to complete the M.S. degree with a research thesis in as little as one year after receiving the B.S. degree. The program is intended for students who want to complete a mentored research project while taking additional graduate coursework to gain more experience and be more competitive for applications to Ph.D. programs or professional programs (for example, Medical, Dental, or Veterinary school).

Eligibility Requirements for the admission to the undergraduate portion of the combined degree program:

1. Minimum cumulative GPA of 3.2 and minimum upper division GPA of 3.3
2. Completion of all critical-tracking requirements in the Biology B.S.
3. Completion of at least three semester hours of mentored research (e.g., through BSC 4910 Individual Mentored Research in Biology (0-3 cr.) and BSC 4912 Advanced Mentored Research in Biology (0-4 cr.)) or equivalent research experience

Eligibility Requirements for the graduate portion of the combined degree program:

1. Satisfactory completion of the undergraduate portion of the combined degree program
2. Meet the requirements for admission, including minimum GRE score, as established by the Graduate School and the Biochemistry & Molecular Biology graduate program in the College of Medicine.
3. A member of the Biochemistry & Molecular Biology graduate faculty has agreed to serve as the student’s advisor.

Interested students must apply to the combined degree program by the end of the junior year. Upon acceptance, the Biology Major Undergraduate Coordinator and the Biochemistry & Molecular Biology Graduate Coordinator will identify up to 12 credits of 5000+ level courses that the student may take in the senior year. The GRE should be taken by the summer before the senior year. In the fall of the senior year, the student will apply to the M.S. Program. Upon acceptance to the M.S. program, the eligible combined degree graduate coursework will be transferred to count toward the M.S. degree during the first semester following award of the B.S. degree.

Students should note the following regarding tuition and fees in this program:

1. the tuition for graduate courses is higher than for undergraduate courses, regardless of whether the courses are taken as an undergraduate or graduate student, and
2. there is no guarantee of a stipend or tuition waiver for graduate students in the MS program.

Majors

- Botany (p. 360)
- Zoology (p. 362)

Faculty

Professor

- Barbazuk, William Bradley
- Braun, Edward Louis
- Chen, Sixue
- Cummings, Derek Adam
- Ewel, John J.
- Gordon, Doria R.
- Kimball, Rebecca T.
- Leibold, Mathew
- Lillywhite, Harvey B.
- Maden, Malcolm
- Miyamoto, Michael Masao
- Nordlie, Frank G.
- Palmer, Todd
• Seaver, Elaine C.
• Smocovitis, Vassiliki B.
• St Mary, Colette Marie
• Wayne, Marta L.
• Webb, Sawney D.

Associate Professor
• Baer, Charles
• Burleigh, John Gordon
• Choe, Keith P.
• Gillooly, James F.
• Hauser, Bernard A.
• Julian, David
• Liao, James C.
• Lichstein, Jeremy W.
• McDaniel, Stuart
• Oppenheimer, David G.
• Ponciano Castellanos, Jose Miguel

Assistant Professor
• Durham, Bryndan P.
• Fraser, Gareth John
• John, Grace
• Keiser, Carl N.
• Longo Berrios, Ana Veronica
• Romero, Claudia
• Ryan, Joseph Francis
• Sessa, Emily
• Strother, James
• Subalusky, Amanda L.
• Vander Zanden, Hannah B.
• Walsh, Stephen J.
• Yan, Hua

Eminent Scholar
• Holt, Robert D.

Associate Curator
• Blackburn, David
• Cellinese, Nicoletta
• Guralnick, Robert Penn
• Kawahara, Akito

Assistant Scientist
• Bolten, Alan Bruce

Scientist
• Gitzendanner, Matthew Aaron

Distinguished Professor
• Ache, Barry W.
• Bjornadal, Karen Anne
• MacFadden, Bruce J.
• Putz, Francis E.
• Soltis, Douglas Edward
• Soltis, Pamela S.

Research Assistant Professor
• Hladish, Thomas

Curator
• Manchester, Steven R.
• Page, Larry M.
• Paulay, Gustav
• Steadman, David W.
• Williams, Norris H.

Affiliated Faculty
• Bloch, Jonathan I.
• Cohn, Martin J.
• Kowalewski, Michal
• Linser, Paul J.
• Majure, Lucas C.
• Martindale, Mark Q.
• Moroz, Leonid Leonidovich
• Naylor, Gavin
• Robinson, Scott K.
• Schnitzler, Christine

Botany

Program Information
Chair: Marta L. Wayne
Graduate Coordinator: John (Gordon) Burleigh

The Department of Biology offers graduate work in Botany leading to the degrees of Master of Science, Master of Science in Teaching, and Doctor of Philosophy.

The Department offers studies in the areas of biochemistry, molecular biology, cell biology, physiology, ecology, systematics, and evolution. Specific areas of specialization include anatomy/morphology with emphasis on extant and fossil vascular plants; ecology and environmental studies including ecosystem ecology, conservation biology and genetics, fire ecology, exotic invasive species, and tropical botany and ecology; cell biology with emphasis on the cytoskeleton and cell morphogenesis; physiology, biochemistry, and molecular biology with emphasis on photosynthesis, growth and development of angiosperms,
protein phosphorylation and signal transduction, global analysis of spatial patterns of gene expression; plant secondary metabolism and proteomics; systematics with emphasis on DNA- and morphology-based phylogenetic analyses, phylogeographic studies, molecular evolution/development, and monographic and floristic studies. To be considered for admission to graduate studies, students should have:

- The equivalent of an undergraduate degree in botany or biology with basic course work in their area of interest
- Acceptable GRE scores (verbal, quantitative, and analytical writing)
- Letters of recommendation
- International students must submit an acceptable score on one of the following: TOEFL (Test of English as a Foreign Language: computer=213, paper=550, web=80), IELTS (International English Language Testing System: 6), MELAB (Michigan English Language Assessment Battery: 77), or successful completion of the UF English Language Institute program. The program of graduate study for each student will be determined by a supervisory committee, and deficiencies in background coursework will be made up early in the graduate program. No more than 9 credits of BOT 6905 Individual Studies in Botany (1-3 cr.) may be used to satisfy the credit requirements for a master's degree.

Degrees Offered

Degrees Offered with a Major in Botany

- Doctor of Philosophy
  - without a concentration
  - concentration in Tropical Conservation and Development
  - concentration in Wetland Sciences

- Master of Science
  - without a concentration
  - concentration in Tropical Conservation and Development
  - concentration in Wetland Sciences

- Master of Science in Teaching
  - without a concentration
  - concentration in Tropical Conservation and Development
  - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

<table>
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<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>BOT 5225C</td>
<td>Plant Anatomy</td>
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<td>BOT 5305</td>
<td>Paleobotany</td>
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<td>BOT 5505C</td>
<td>Intermediate Plant Physiology</td>
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<td>BOT 5625</td>
<td>Plant Geography</td>
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<td>BOT 5655C</td>
<td>Physiological Plant Ecology</td>
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<td>BOT 5685C</td>
<td>Tropical Botany</td>
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<td>BOT 5695C</td>
<td>Ecosystems of Florida</td>
<td>4</td>
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<tr>
<td>BOT 5725C</td>
<td>Taxonomy of Vascular Plants</td>
<td>4</td>
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<td>BOT 6508C</td>
<td>Proteomics Theory and Practice</td>
<td>3</td>
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<td>BOT 6516</td>
<td>Plant Metabolism</td>
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<td>BOT 6566</td>
<td>Plant Growth and Development</td>
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<tr>
<td>BOT 6716C</td>
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<td>BOT 6726C</td>
<td>Principles of Systematic Biology</td>
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<td>BOT 6905</td>
<td>Individual Studies in Botany</td>
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<td>BOT 6910</td>
<td>Supervised Research</td>
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<td>BOT 6927</td>
<td>Advances in Botany</td>
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<td>BOT 6935</td>
<td>Special Topics</td>
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<td>BOT 6936</td>
<td>Graduate Student Seminar</td>
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<td>Research for Master’s Thesis</td>
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<td>BOT 7979</td>
<td>Advanced Research</td>
<td>1-12</td>
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<td>BOT 7980</td>
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<td>PCB 5046C</td>
<td>Advanced Ecology</td>
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<td>PCB 5338</td>
<td>Principles of Ecosystem Ecology</td>
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<td>PCB 5356</td>
<td>Tropical Ecology</td>
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<td>PCB 6675C</td>
<td>Evolutionary Biogeography</td>
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<td>PLP 6656C</td>
<td>Fungal Biology</td>
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Biology Departmental Courses

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<th>Title</th>
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<tr>
<td>BOT 6276C</td>
<td>Phylogenomics</td>
<td>4</td>
</tr>
<tr>
<td>BOT 6656</td>
<td>Plant Symbiosis</td>
<td>3</td>
</tr>
<tr>
<td>BSC 6038</td>
<td>Broader Impacts of Science on Society</td>
<td>2</td>
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<tr>
<td>PCB 6675C</td>
<td>Evolutionary Biogeography</td>
<td>3</td>
</tr>
<tr>
<td>PCB 6685</td>
<td>Population Genetics</td>
<td>4</td>
</tr>
<tr>
<td>ZOO 6930</td>
<td>Seminar in Molecular Evolution</td>
<td>2</td>
</tr>
</tbody>
</table>

Student Learning Outcomes

Botany (PHD)

SLO 1      Knowledge
Students will identify, define, and describe basic fundamentals of biology and a thorough understanding of the fundamentals of botany

SLO 2      Skills
Students will design a research project, collect data, analyze and interpret the results. They will be able to present the results of original research in oral and written form

SLO 3      Skills
Students design a research project, collect data, analyze and interpret the results. They will be able to present the results of original research in oral and written form

SLO 4      Professional Behavior
Students will practice ethical behaviors and professional conduct

SLO 5      Professional Behavior
Students will be able to interact and communicate with professionals at scientific conferences

Botany (MS)

SLO 1      Knowledge
Students will identify, define, and describe the basic fundamentals of biology and botany

SLO 2      Skills
Students will design a research project, collect data, analyze and interpret the results and present this in written and oral form

SLO 3      Professional Behavior
Students will practice ethical behaviors and professional conduct

SLO 4      Professional Behavior
Students will interact and communicate with professionals at scientific conferences, and practice ethical behaviors and professional conduct
Botany (MST)

SLO 1 Knowledge
Students will identify, define, and describe the basic fundamentals of botany and pedagogy.

SLO 2 Skills
Students will teach botany and biology classroom sessions

SLO 3 Professional Behavior
Students will interact and communicate with professionals at scientific conferences, and practice ethical behaviors and professional conduct

Zoology

Program Information

Chair: Marta L. Wayne
Graduate Coordinator: John (Gordon) Burleigh

The Department of Biology offers graduate programs in Zoology leading to the Master of Science in Teaching, Master of Science, and Doctor of Philosophy degrees. The requirements for these degrees can be found in the Graduate Degrees (p. 48) section of this catalog.

Our program emphasizes Integrative Biology, with integration accomplished through a focus on the theoretical foundations provided by evolutionary biology and ecology. Our faculty has expertise in ecology, evolution, behavior, comparative and environmental physiology, genetics, development, and phylogenetics. We work in a variety of terrestrial and aquatic environments and geographic regions (tropics through subpolar), and on a range of organisms (including plants). Our faculty value integrative research (e.g., by crossing levels of organization from gene expressions to species interactions), linking theory with data (through use of statistical and mathematical tools), and using natural history to guide the development and testing of rigorous conceptual frameworks. Many of our faculty also are interested in applying and testing basic science in applied contexts (e.g., conservation biology and ecotoxicology).

Our approach is highlighted through our first-year, required, graduate course, Integrative Principles. Each student's supervisory committee will recommend additional courses according to the academic background and research plans of the student.

Degrees Offered

Degrees Offered with a Major in Zoology

- Doctor of Philosophy
  - without a concentration
  - concentration in Animal Molecular and Cellular Biology
  - concentration in Tropical Conservation and Development
  - concentration in Wetland Sciences

- Master of Science
  - without a concentration
  - concentration in Tropical Conservation and Development
  - concentration in Wetland Sciences

- Master of Science in Teaching
  - without a concentration
  - concentration in Tropical Conservation and Development
  - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Zoology Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BOT 6726C</td>
<td>Principles of Systematic Biology</td>
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<td>BSC 6038</td>
<td>Broader Impacts of Science on Society</td>
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<td>PCB 5307C</td>
<td>Limnology</td>
<td>4</td>
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<td>PCB 5415C</td>
<td>Behavioral Ecology</td>
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<td>PCB 5615</td>
<td>Molecular Evolution and Systematics</td>
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<td>PCB 6049</td>
<td>Seminar in Ecology</td>
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<td>PCB 6377C</td>
<td>Physiological Ecology of Vertebrates</td>
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<td>PCB 6447C</td>
<td>Community Ecology</td>
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<td>Population Genetics</td>
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<td>PCB 6695</td>
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<td>ZOO 5115C</td>
<td>Vertebrate Paleontology</td>
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<td>ZOO 5486C</td>
<td>Mammalogy</td>
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<td>ZOO 6005</td>
<td>Integrative Principles of Zoology I</td>
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<td>ZOO 6308</td>
<td>Dynamic Optimization Modeling in Behavioral and Evolutionary Ecology</td>
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<td>ZOO 6406</td>
<td>Biology of Sea Turtles</td>
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<td>ZOO 6456C</td>
<td>Ichthyology</td>
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<td>ZOO 6542</td>
<td>Nutritional Ecology</td>
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<td>ZOO 6905</td>
<td>Individual Studies</td>
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<td>ZOO 6910</td>
<td>Supervised Research</td>
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<td>ZOO 6920</td>
<td>Zoology Colloquium</td>
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<td>ZOO 6927</td>
<td>Special Topics in Zoology</td>
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<td>ZOO 6930</td>
<td>Seminar in Molecular Evolution</td>
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<td>ZOO 6931</td>
<td>Seminar in Marine Turtle Biology</td>
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<td>ZOO 6939</td>
<td>Seminar in Animal Behavior</td>
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<td>ZOO 6971</td>
<td>Research for Master's Thesis</td>
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<td>ZOO 7979</td>
<td>Advanced Research</td>
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<td>ZOO 7980</td>
<td>Research for Doctoral Dissertation</td>
<td>1-15</td>
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</table>

Biology Departmental Courses

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<tr>
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<tbody>
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<td>BOT 6276C</td>
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<td>Seminar in Molecular Evolution</td>
<td>2</td>
</tr>
</tbody>
</table>

Student Learning Outcomes

zoology (PHD)

SLO 1 Knowledge
Students will identify, define, and describe basic fundamentals of biology and a thorough understanding of the fundamentals of zoology

SLO 2 Skills
Students will design a research project, collect data, analyze and interpret the results. They will be able to present the results of original research in oral and written form

SLO 3 Skills
Students design a research project, collect data, analyze and interpret the results. They will be able to present the results of original research in oral and written form.

SLO 4  Professional Behavior
Students will demonstrate ethical behaviors, professional conduct

SLO 5  Professional Behavior
Students will be able to interact and communicate with professionals at scientific conferences

**Zoology (MS)**

SLO 1  Knowledge
Students will identify, define, and describe the basic fundamentals of biology and zoology

SLO 2  Skills
Students will design a research project, collect data, analyze and interpret the results and present this in written and oral form

SLO 3  Professional Behavior
Students will practice ethical behaviors and professional conduct

SLO 4  Professional Behavior
Students will interact and communicate with professionals at scientific conferences

**Zoology (MST)**

SLO 1  Knowledge
Students will identify, define, and describe the basic fundamentals of zoology

SLO 2  Skills
Students will define, explain and communicate key concepts in zoology and biology

SLO 3  Professional Behavior
Students will engage in ethical behaviors and professional conduct

SLO 4  Professional Behavior
Students will practice ethical behaviors and professional conduct

**Center for Gender, Sexualities, and Women's Studies Research**

*Director:* Bonnie Moradi  
*Graduate Coordinator:* Kendal Broad

The Center for Gender, Sexualities, and Women's Studies Research offers the MA degree in Women's Studies, with thesis and non-thesis MA options, as well as two Graduate Certificate options. These options give students the opportunity to take advantage of scholarship in this dynamic field, and to become acquainted with different research perspectives and methodologies. Students pursuing interdisciplinary graduate work in the Center learn about feminist, intersectional, and other theoretical approaches and methodologies for examining the roles of gender, race/ethnicity, sexualities, and other sociocultural systems, and they learn about how to *transform* these systems.

The Center offers a regular colloquium series, frequently sponsors speakers, and distributes a newsletter each fall and spring. The Center in Ustler Hall houses archives, a small library, offices, and meeting space.

For more information about our program, please see the program page below or our website: [http://wst.ufl.edu/](http://wst.ufl.edu/).

**Majors**

- Women's Studies (p. 363)

**Faculty**

**Associate Professor**

- Anantharam, Anita
- Broad-Wright, Kendal L.
- Travis, Patricia A.
- Zucker, Alyssa N.

**Assistant Professor**

- Celeste, Manoucheka
- Garcia, Elizabeth
- Hernandez, Jillian

**Scholar**

- Russo, Sandra L.

**Affiliated Faculty**

- Bryant, Marsha C.  
  Professor
- Hedrick, Tace Megan  
  Professor
- Kwolek-Folland, Angel  
  Professor
- Mennel, Barbara Caroline  
  Associate Professor
- Newman, Louise Michelle  
  Associate Professor
- Page, Judith Wallick  
  Professor
- Saunders, Tanya Latrice  
  Associate Professor
- Shehan, Constance L.  
  Professor
- Smith, Stephanie Ann  
  Professor
- Wright, Danaya C.  
  Professor

**Women's Studies**

**Program Information**

The Women's Studies program is administered by the Center for Gender, Sexualities, and Women's Studies Research. This interdisciplinary forum for graduate studies offers both a Thesis and a Non-Thesis M.A., as well as two certificates. The Center also offers a regular colloquium series, frequently sponsors speakers, and distributes a newsletter each fall and spring.

**Master of Arts** (thesis and non-thesis): The Center offers the Master of Arts (M.A.) thesis degree option, which requires the completion and defense of a thesis (30 credit hours), and the Master of Arts non-thesis
degree option, which requires completion and defense of a project or paper (30 credit hours). All Master’s students take a core curriculum of 9 graduate credits (3 courses). For the thesis M.A., the remaining 21 hours consist of 15 credits of approved electives and 6 thesis credits. For the non-thesis M.A., 21 credits of approved electives are required.

Required courses for all MA students (9 credits):

<table>
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<tr>
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<td>WST 5933</td>
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<td>WST 6508</td>
<td>Advanced Feminist Theory</td>
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</tr>
<tr>
<td>WST 6935</td>
<td>Special Topics in Women’s Studies</td>
<td>1-3</td>
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</table>

**Thesis**

- 15 approved credits at 5000-level or higher
- 6 credits of WST 6971 Research for Master’s Thesis (1-15 cr.) (3 of which must be taken in the final graduating term)
- Total for MA thesis: 30 credits

**Non-thesis**

- 21 approved credits at 5000-level of higher;
- at least 6 of these credits must be classes in WST.
- Total for MA non-thesis: 30 credits

**BA/MA Program**: UF offers a number of Bachelor's/Master's programs for superior students. The university created combined degree programs to provide academically talented students an opportunity to complete both a bachelor's and a master's degree in a shorter period of time. The program allows you to double-count graduate courses toward both degrees, thus reducing the time it would normally take to graduate by a semester or more. The combined-degree program reduces the cost of both degrees and enhances your marketability for career advancement.

**M.A./J.D. Joint Degree**: The faculties of the Levin College of Law and Women's Studies in the College of Liberal Arts and Sciences have approved a joint degree program culminating in both a J.D. degree, awarded by the College of Law, and an M.A. degree (thesis or non-thesis), awarded by the College of Liberal Arts and Sciences. Under this joint degree program, a student can obtain both degrees in approximately one year less than it would take to obtain both degrees if pursued consecutively. A student must satisfy the curriculum requirements for each degree before either degree is awarded. At least 12 credits must be taken in each program. The graduate program in Women's Studies will accept 12 credits of appropriate professional courses toward the M.A. degree. The 12 credits selected from the professional curriculum must be approved by the Graduate Coordinator upon the recommendation of the student's graduate supervisory committee. Reciprocally, the law school will accept 12 credits of appropriate Women's Studies courses toward the satisfaction of the J.D. degree. Admission to the second program is required no later than the end of the third consecutive semester after beginning one degree of the joint degree program. A summer term is counted as a single semester.

**Concurrent Degrees**: University of Florida provides a concurrent degree program allowing for simultaneous study on an individualized basis that leads to two master's degrees in two different graduate programs. Such a program is initiated by the student and requires prior approval of each academic unit and the Graduate School. If the student is approved to pursue two master's degrees, up to 9 credits of course work from one degree program may be applied toward the second master's degree, thereby allowing both degrees to be completed in less time. The forms required for approval of the concurrent program and petition for acceptance of nine credits of coursework in a second master's program may be found at http://graduateschool.ufl.edu/media/graduate-school/pdf-files/concurrent-degree-program-form.pdf.

**PhD/MA Degrees**: University of Florida provides a non-traditional degree option that allows those already in a PhD program at UF to apply to a MA program also. Up to nine credits from the doctoral degree program may be counted toward the master's degree program. The forms required for approval of such a degree arrangement are available here: http://graduateschool.ufl.edu/media/graduate-school/pdf-files/nontraditional-degree-form.pdf

**Certificates (M.A. or Ph.D. level)**: Two graduate certificates in Women's Studies for master's and doctoral students are offered in conjunction with degree programs in other academic units. The Graduate Certificate in Women's Studies and the Graduate Certificate in Gender and Development require specific sets of course work, designed to give students a thorough grounding in the discipline. The Graduate Certificate in Women's Studies offers students a general overview of the field. The Graduate Certificate in Gender and Development allows students to focus on issues related to gender, economic development, and globalization.

Graduate courses in women's studies are also available from the following academic units or programs:

- Agricultural and Life Sciences
- Anthropology
- Counselor Education
- English
- History
- Journalism and Communication
- Languages, Literatures, and Cultures
- Latin American Studies
- Linguistics
- Medicine
- Philosophy
- Psychology
- Religion
- Sociology
- Teaching and Learning

For more information, please see our website: http://web.wst.ufl.edu.

**Degrees Offered**

**Degrees Offered with a Major in Women's Studies**

- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

**Women's Studies Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
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<td>WST 5933</td>
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<tr>
<td>WST 6004</td>
<td>Feminist Methods in Research and Scholarship</td>
<td>3</td>
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</table>
WST 6348  Ecofeminism  3
WST 6508  Advanced Feminist Theory  3
WST 6905  Independent Study  1-3
WST 6935  Special Topics in Women’s Studies  1-3
WST 6936  Feminist Challenges to Disciplinary Paradigms  3
WST 6946  Internship in Applied Women’s Studies and Gender Research  1-3
WST 6957  International Studies in Women's Studies and Gender Research  1-6
WST 6971  Research for Master’s Thesis  1-15

Center for Gender, Sexualities, and Women’s Studies Research Courses

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
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<tr>
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<td>Special Topics in Women’s Studies</td>
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<tr>
<td>WST 6936</td>
<td>Feminist Challenges to Disciplinary Paradigms</td>
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<tr>
<td>WST 6946</td>
<td>Internship in Applied Women’s Studies and Gender Research</td>
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</tr>
<tr>
<td>WST 6957</td>
<td>International Studies in Women's Studies and Gender Research</td>
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</tr>
<tr>
<td>WST 6971</td>
<td>Research for Master’s Thesis</td>
<td>1-15</td>
</tr>
</tbody>
</table>

Student Learning Outcomes

Women’s Studies (MA)

SLO 1 Knowledge
Students identify, define and describe gender in culture and society. Students recognize multi-cultural and transnational currents of feminist thought.

SLO 2 Skills
Students apply critical thinking, research, and writing skills in all of their courses and other graduate work; communication skills in and out of the classroom as active participants in their own education; and meet deadlines and fulfill academic commitments.

SLO 3 Professional Behavior
Students apply professional behavior, meeting expectations in the academic community and beyond. They fulfill work obligations in a thoughtful and timely way, and display collegiality and sensitivity to faculty and other students in the program. They participate collaboratively and contribute to the life of the CWSGR.

Center for Latin American Studies

Director: Philip J. Williams
Graduate Coordinator: Susan Paulson

The Center for Latin American Studies offers the following graduate programs:

- Latin American Studies
- Sustainable Development Practice

The department also offers a combined bachelor’s/master’s program. Contact the graduate coordinator for further information regarding this option. For more information about all of our programs, please see our individual major pages, following the links below, or by visiting our website: http://www.latam.ufl.edu.

Majors

- Latin American Studies (p. 367)
- Sustainable Development Practice (p. 368)

Faculty

Professor
- Bruna, Emilio M.
- De La Torre Espinosa, Carlos
- Martinez Novo, Maria Del
- Paulson, Susan

Associate Professor
- Saunders, Tanya Latrice

Assistant Professor
- Correia, Joel Edward

Other
- Risner, Mary E.
- Urena Valerio, Lenny A.

Lecturer
- Resende, Rosana D.

Senior Lecturer
- Galloway, Glenn

Affiliated Faculty
- Acevedo Torres, Miguel A.
  Assistant Professor
- Adams, Charles M.
  Professor
- Almeyda Zambrano, Angelica Maria
  Assistant Professor
- Anderson, Leslie Elin
  Professor
- Barnes, Grenville
  Professor
- Bet, Carlos German
  Assistant Professor
- Binford, Michael William
  Professor
- Bjorndal, Karen Anne
  Distinguished Professor
- Blake, John G.
  Professor
• Branch, Lyn Clarke
  Professor
• Branham, Marc A.
  Associate Professor
• Brenner, Mark
  Professor
• Broadbent, Eben North
  Assistant Professor
• Broadwell, George Aaron
  Professor
• Burkhardt, Robert Jeffrey
  Professor
• Buschbacher, Robert John
  Associate In
• Busey, Christopher L.
  Assistant Professor
• Cabanas, Kaira
  Associate Professor
• Carter, Douglas R.
  Professor
• Celeste, Manoucheka
  Assistant Professor
• Coady, Maria R.
  Associate Professor
• Coffey, Amy Jo
  Associate Professor
• Crane, Jonathan H.
  Professor
• Crook, Larry Norman
  Professor
• De Jong, Ester Johanna
  Professor
• DeFrance, Susan D.
  Professor
• DeGennaro, Vincent
  Clinical Associate Professor
• Emery, Katherine Freances
  Associate Curator
• Essegbey, James
  Associate Professor
• Evans, Edward Anthony
  Professor
• Fletcher, Robert Jeffrey
  Associate Professor
• Fusco, Juliana
  Professor
• Geggus, David P.
  Professor
• Gendreau, Brian
  Clinical Professor
• Gillespie, Susan D.
  Professor
• Ginway, Mary E.
  Associate Professor
• Goldman, Abraham C.
  Associate Professor
• Gravlee, Clarence C.
Associate Professor
• Munoz-Carpena, Rafael
  Professor
• Murtha, Timothy M.
  Associate Professor
• Nair, Ramachandran P.
  Distinguished Professor
• Naranjo, Andy
  Professor
• Needell, Jeffrey D.
  Professor
• Nickerson, Max Alan
  Curator
• Ortiz, Paul Andrew
  Associate Professor
• Oyuela-Caycedo, Augusto
  Associate Professor
• Pacheco, Mark B.
  Assistant Professor
• Pascual Cabo, Diego
  Assistant Professor
• Peluffo, Maria Cecilia
  Assistant Professor
• Perez-Mendez, Alfonso
  Professor
• Perz, Stephen George
  Professor
• Peterson, Anna
  Professor
• Pharies, David A.
  Professor
• Powell, Heidi C.
  Other
• Prevatt, David
  Associate Professor
• Putz, Francis E.
  Distinguished Professor
• Renner, Richard R.
  Professor
• Roberts, Thomas G.
  Professor
• Robinson, Scott K.
  Eminent Scholar
• Rogal, Maria K.
  Professor
• Ruiz Menjivar, Jorge H.
  Assistant Professor
• Ryan, Sadie Jane
  Associate Professor
• Sanchez, Pedro
  Research Professor
• Sanchez, Raul
  Associate Professor
• Sandoval Gutierrez, Hector Hugo
  Assistant Professor
• Schmink, Marianne C.
  Professor
• Seale, James L.
  Professor
• Simmons, Cynthia S.
  Associate Professor
• Soledade, Augusto Cesar
  Associate Professor
• Sollenberger, Lynn E.
  Distinguished Professor
• Southworth, Jane
  Professor
• Stacciarini, Jeannie-Marie R.
  Associate Professor
• Stanfield-Mazzi, Maya
  Associate Professor
• Stepp, John Richard
  Associate Professor
• Suarez, Cecilia E.
  Assistant Professor
• Suarez Carrasquillo, Carlos Alberto
  Other
• Thapa, Brijesh
  Professor
• Tremura, Welson Alves
  Professor
• Tucker, Catherine May
  Professor
• Useche, Maria Del-Pilar
  Associate Professor
• Valdes Kroff, Jorge Rodrigo
  Assistant Professor
• Valle-Levinson, Arnoldo
  Professor
• Vargas, Nicholas
  Assistant Professor
• Vittor, Amy Yomiko
  Assistant Professor
• Vrana, Heather A.
  Assistant Professor
• Walker, Robert T.
  Professor
• Widmer, Jocelyn M.
  Assistant Scholar
• Williams, Philip J.
  Professor
• Wright, Robin
  Associate Professor

Latin American Studies
Program Information
The Center for Latin American Studies offers the following graduate programs:

• An interdisciplinary Master of Arts degree in Latin American Studies
• A graduate certificate in Latin American studies
• A graduate certificate and concentration in Tropical Conservation and Development

The graduate program in Latin American studies relies on over 250 courses with Latin American content taught in more than 35 academic units of the above colleges. The degree and certificate programs in Latin American studies are described on our website www.latam.ufl.edu/academics/graduate-programs. Complete course listings are also available on the Center's website: http://www.latam.ufl.edu/academics/las-courses.

Degrees Offered

Degrees
• Master of Arts
  • without a concentration
  • concentration in Tropical Conservation and Development

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Latin American Studies Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOT 6941</td>
<td>Translation Studies Practicum</td>
<td>3</td>
</tr>
<tr>
<td>LAS 6008</td>
<td>Ecological Principles</td>
<td>3</td>
</tr>
<tr>
<td>LAS 6220</td>
<td>Issues and Perspectives in Latin American Studies</td>
<td>3</td>
</tr>
<tr>
<td>LAS 6290</td>
<td>Tropical Conservation and Development</td>
<td>3</td>
</tr>
<tr>
<td>LAS 6291</td>
<td>Conservation and Development Skills</td>
<td>3</td>
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<tr>
<td>LAS 6292</td>
<td>Tropical Conservation and Development Skills</td>
<td>3</td>
</tr>
<tr>
<td>LAS 6293</td>
<td>Design and Methods of Research in Latin American Studies</td>
<td>3</td>
</tr>
<tr>
<td>LAS 6295</td>
<td>Latin American Business Environment</td>
<td>2</td>
</tr>
<tr>
<td>LAS 6905</td>
<td>Individual Work</td>
<td>1-3</td>
</tr>
<tr>
<td>LAS 6938</td>
<td>Seminar in Modern Latin American Studies</td>
<td>3</td>
</tr>
<tr>
<td>LAS 6941</td>
<td>Tropical Conservation and Development Practicum</td>
<td>3</td>
</tr>
<tr>
<td>LAS 6943</td>
<td>Development Theory and Practice in Latin America</td>
<td>3</td>
</tr>
<tr>
<td>LAS 6949</td>
<td>Internship In Latin American Studies</td>
<td>1-6</td>
</tr>
<tr>
<td>LAS 6971</td>
<td>Research for Master's Thesis</td>
<td>1-15</td>
</tr>
</tbody>
</table>

Student Learning Outcomes

Latin American Studies (MA)

SLO 1 Content
Students will identify, describe and explain the prevailing issues in and scholarly perspectives on Latin American Studies

SLO 2 Skills
Students will critically evaluate the significance, quality and veracity of information gathered in the literature, apply it effectively in research for a thesis, and communicate that knowledge effectively in spoken and written formats

SLO 3 Professional Behavior

Students will defend their thesis in an oral exam before their committee members. Many MALAS students will present their research in professional meetings or other academic settings

Sustainable Development Practice Program Information

Director: G. Galloway
Program Coordinator: A. Noss

The Master of Sustainable Development Practice (MDP) Program offers the following academic programs:

• An interdisciplinary Master’s degree in Sustainable Development Practice (MDP)
• A graduate certificate in Sustainable Development Practice (SDP)

The MDP Program is jointly administered by the Center for Latin American Studies and the Center for African Studies. The Master’s degree is described in the Other Master’s Degrees (p. 48) section of the Graduate Catalog.

The MDP prepares development practitioners to address development challenges in creative and dynamic ways, integrating the academic and development pillars of natural sciences, social sciences, health sciences and management through a rigorous and innovative program curriculum. The MDP Degree requires 45 credits of course work: 24 major or core credits across the four pillars, and 21 elective credits through which a student focuses on a specialization (for example entrepreneurship, agriculture, ecotourism, gender, community forest management, nonprofits, or M&E). The MDP is a non-thesis degree. Each student must successfully complete a set of requirements including a summer field practicum with a host organization, the development of a poster presented in a public poster session, a final practicum report approved by their committee, and a public presentation and private defense with committee members of the final report. All students will be expected to meet learning outcome objectives defined for knowledge, skills and professional behavior. Students are required to develop a plan approved by the MDP Program Graduate Coordinator and by their supervisory committee.

The SDP certificate provides training in interdisciplinary knowledge and skills related to sustainable development practice. The 12 credits for Master’s students and 15 credits for Ph.D. students include one required cross-cutting overview course plus 3-4 additional courses in the fields of social sciences, health sciences, natural sciences, and management skills.

MDP major or core courses are listed below under the listing for Sustainable Development Courses. Other courses listed, for example, under the College Agricultural and Life Sciences and the College of Public Health and Health Related Professions may also count toward the major, but only those with relevance to the MDP program will be candidates for inclusion by the department in a student’s program of study. Please visit the MDP Program website for additional information on the SDP certificate, MDP degree and curriculum, including detailed course descriptions and syllabi: http://mdp.africa.ufl.edu.
Degrees Offered

Degrees Offered with a Major in Sustainable Development Practice

- Master of Sustainable Development Practice
- without a concentration
- concentration in Climate Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Sustainable Development Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AEB 6933</td>
<td>Special Topics</td>
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<tr>
<td>AFS 6905</td>
<td>Individual Work in African Studies</td>
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<tr>
<td>AGR 5277C</td>
<td>Tropical Crop Production</td>
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<td>EVR 5705</td>
<td>Natural Resources and Innovation Systems</td>
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<td>LAS 6291</td>
<td>Conservation and Development Skills</td>
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<td>PHC 6445</td>
<td>Global Public Health and Development I</td>
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<td>PHC 6764</td>
<td>Global Public Health and Development III</td>
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African Studies Courses

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<td>AFS 5061</td>
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<td>AFS 6060</td>
<td>Research Problems in African Studies</td>
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<td>AFS 6305</td>
<td>Development Theory and Practice Intro</td>
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<tr>
<td>AFS 6307</td>
<td>Foundations of Economics for Sustainable Development</td>
<td>3</td>
</tr>
<tr>
<td>AFS 6357</td>
<td>Anthropology of Humanitarian Intervention</td>
<td>3</td>
</tr>
<tr>
<td>AFS 6905</td>
<td>Individual Work in African Studies</td>
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</table>

Latin American Studies Courses

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<td>LAS 6938</td>
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<td>LAS 6949</td>
<td>Internship In Latin American Studies</td>
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</tr>
<tr>
<td>LAS 6971</td>
<td>Research for Master’s Thesis</td>
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</tbody>
</table>
Chemistry Department

Introduction to Applied Statistics for Agricultural and Life Sciences 3

Matrix Algebra and Statistical Computing 3

STA 6093

STA 6329

Chemistry Department
Chair: Lisa McElwee-White
Graduate Coordinator: Aaron Aponick

The Department of Chemistry granted its first master’s degree in 1909 and the first Ph.D. in 1930. Specializations in biochemistry, organic, physical, inorganic and analytical are offered with extensive interdisciplinary research opportunities (e.g., bio/nano-science, particle science, green chemistry, polymer chemistry, chemical physics, health related biochemistry, chemistry-engineering, and genomics).

The Department presently offers the Master of Science and Doctor of Philosophy degrees with a major in chemistry. The non-thesis Master of Science in Teaching degree is also offered with a major in chemistry.

For more information, please visit https://www.chem.ufl.edu/.

Majors

Chemistry (p. 371)

Student Learning Outcomes

Sustainable Development Practice

SLO 1 Knowledge Outcome
Students will define, identify and describe complex interdisciplinary dimensions of sustainable development

SLO 2 Skills Outcome
Students will plan and utilize participatory methodologies and/or tasks related to the planning, implementation, monitoring and evaluation of development initiatives

SLO 3 Professional Behavior Outcome
Students will interface with professional peers with honesty, ethical behavior, cultural sensitivity, teamwork, and effective communication

Faculty

Chemistry Department

Chair: Lisa McElwee-White
Graduate Coordinator: Aaron Aponick

The Department of Chemistry granted its first master’s degree in 1909 and the first Ph.D. in 1930. Specializations in biochemistry, organic, physical, inorganic and analytical are offered with extensive interdisciplinary research opportunities (e.g., bio/nano-science, particle science, green chemistry, polymer chemistry, chemical physics, health related biochemistry, chemistry-engineering, and genomics).

The Department presently offers the Master of Science and Doctor of Philosophy degrees with a major in chemistry. The non-thesis Master of Science in Teaching degree is also offered with a major in chemistry.

For more information, please visit https://www.chem.ufl.edu/.

Majors

Chemistry (p. 371)

Student Learning Outcomes

Sustainable Development Practice

SLO 1 Knowledge Outcome
Students will define, identify and describe complex interdisciplinary dimensions of sustainable development

SLO 2 Skills Outcome
Students will plan and utilize participatory methodologies and/or tasks related to the planning, implementation, monitoring and evaluation of development initiatives

SLO 3 Professional Behavior Outcome
Students will interface with professional peers with honesty, ethical behavior, cultural sensitivity, teamwork, and effective communication

Faculty

Professor

Angerhofer, Alexander
Bowers, Clifford Russell
Bruner, Steven Douglas
Cao, Yunwei Charles
Castellano, Ronald K.
Colina, Coray Mariu
Fanucci, Gail E.
Guo, Zhongwu
Harris, Michael
McElwee-White, Lisa Ann
Richardson, David E.
Roitberg, Adrian E.
Seidel, Daniel
Stanton, John F.
Stewart, Jon Dale
Sumerlin, Brent S.
Talham, Daniel R.
Veige, Adam S.
Wagener, Kenneth B.
Yost, Richard A.

Associate Professor

Aponick, Aaron
Brucat, Philip J.
Butcher, Rebecca Ann
Horenstein, Nicole Alana
Kleiman, Valeria Dana
Loesgen, Sandra
Miller, Stephen Albert
Murray, Leslie Justin
Polfer, Nicolas Camille
Savin, Daniel Andrew
Assistant Professor
- Eddy, Matthew T.
- Grenning, Alexander James
- Miranda Quintana, Ramon Alain
- Perez, Alberto
- Prentice, Boone Monroe
- Rudolf, Jeffrey D.
- Searles, Keith
- Zeng, Chenjie

Distinguished Professor
- Christou, George
- Martin, Charles R.
- Tan, Weihong

Research Professor
- Omenetto, Nicolo

Graduate Research Professor
- Bartlett, Rodney J.

Affiliated Faculty
- Li, Chenglong
  Professor
- Tanner, David B.
  Distinguished Professor

Chemistry Courses

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<td>CHM 5235</td>
<td>Organic Spectroscopy</td>
<td>3</td>
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<td>CHM 5275</td>
<td>The Organic Chemistry of Polymers</td>
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<tr>
<td>CHM 5305</td>
<td>Chemistry of Biological Molecules</td>
<td>3</td>
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<td>CHM 5416L</td>
<td>Advanced Physical Chemistry Laboratory</td>
<td>2</td>
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<td>CHM 5511</td>
<td>Physical Chemistry of Polymers</td>
<td>2</td>
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<tr>
<td>CHM 6036</td>
<td>Chemical Biology</td>
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<tr>
<td>CHM 6037</td>
<td>Chemical Biology and Biochemistry Seminar</td>
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</tr>
<tr>
<td>CHM 6153</td>
<td>Electrochemical Processes</td>
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<td>Chemical Separations</td>
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<td>Spectrochemical Methods</td>
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<td>CHM 6271</td>
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Graduate Degrees

- Doctor of Philosophy
  - without a concentration
  - concentration in Clinical and Translational Science
  - concentration in Imaging Science and Technology
- Master of Science
- Master of Science in Teaching

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.
### Chemistry Departmental Courses

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<td>The Chemistry of High Polymers</td>
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<td>CHM 6301</td>
<td>Enzyme Mechanisms</td>
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<td>CHM 6302</td>
<td>Chemistry and Biology of Nucleic Acids</td>
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<td>CHM 6910</td>
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### Student Learning Outcomes

#### Chemistry (PHD)

**SLO 1 Knowledge**

Students will define, identify, and describe the fundamental science of the declared sub-discipline within chemistry (physical, biochemistry, organic, inorganic and analytical chemistry).

**SLO 2 Skills**

Students will formulate new research ideas and carry them out in the laboratory.

**SLO 3 Professional Behavior**

Practice ethical behaviors, cultural sensitivity, teamwork, professional conduct and high level oral and written communication skills.
Chemistry (MS)

SLO 1 Knowledge Students will define, identify, and describe the fundamental science of the declared sub-discipline within chemistry (physical, biochemistry, organic, inorganic and analytical chemistry)

SLO 2 Skills Students will formulate new research ideas and carry them out in the laboratory

SLO 3 Professional Behavior Practice ethical behaviors, cultural sensitivity, teamwork, professional conduct and high level oral and written communication skills

Chemistry (MST)

SLO 1 Knowledge Students will define, identify, and describe the fundamental science of chemistry with a focus on teaching

SLO 2 Skills Students will formulate and evaluate new strategies and approaches to teaching chemistry and practice them in the classroom or the teaching laboratory

SLO 3 Professional Behavior Practice ethical behaviors, cultural sensitivity, teamwork, professional conduct and high level oral and written communication skills

Classics Department

Chair: Mary Ann Eaverly
Graduate Coordinators: Eleni Bozia, Velvet Yates

The department offers the following degrees and programs: the Doctor of Philosophy in classical studies; the Master of Arts degree in classical studies or Latin; the Master of Latin degree, and the Master of Arts in Teaching degree in Latin. Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Within the Ph.D. program are three tracks:

- Philology (prepares students for careers in colleges and universities)
- Classical civilization (available via distance course work)
- Latin and Roman studies (available via distance course work)

Requirements for the philology track of the doctoral degree include:

- 60 credit hours after the M.A. (or a total of 90 credit hours)
- Five additional seminars after the M.A. in classics at the 500 level or higher
- Three of the following seminars:
  - Code Title Credits
  - GRE 6425 Greek Prose Composition 3
  - GRW 6105 The Greek Tradition 3
  - LAT 6425 Latin Prose Composition 3
  - LNW 6105 The Roman Tradition 3
  - CLA 6805 The Classical Research Tradition 3

- A reading knowledge of two modern languages, one of which must be German
- Reading lists in Greek and Roman authors
- Supervised experience in teaching Latin, Greek, or civilization courses is advised
- Successful completion of a series of qualifying examinations appropriate to the chosen specialization (Greek reading; Latin reading; classical Greek literature in its historical context; classical Latin literature in its historical context; special author/topic)
- An oral preliminary examination, dissertation, and final examination

The M.A. degree in classical studies is recommended for students who plan to continue on to the doctoral level. The M.A. degree in Latin is recommended for students who plan to pursue a career in secondary teaching. Both M.A. programs require 30 credit hours, including 6 credits of GRW 6971 Research for Master’s Thesis (1-15 cr.) or LNW 6971 Research for Master’s Thesis (1-15 cr.), a thesis, and final examination.

The Master of Latin degree is a non-thesis degree, designed for currently employed and/or certified teaching professionals who wish to widen their knowledge of Latin, broaden their education in the field of classics, and enhance their professional qualifications through a program of summer course work and directed independent study and/or distance learning courses during the regular academic year. The Master of Arts in Teaching, a non-thesis degree, is offered with a program in Latin and is intended for students preparing to teach in community colleges or high schools.

Classical Studies

Majors

- Classical Studies (p. 373)
- Latin (p. 375)

Faculty

Professor

- Eaverly, Mary Ann
- Kapparis, Konstantinos
- Pagan-Wolpert, Victoria Emma
- Van Steen, Gonda Aline Hector
- Wagman, Robert Sergius

Associate Professor

- Rea, Jennifer Ann
- Wolpert, Andrew Oxman

Assistant Professor

- Bozia, Eleni
- Giannadaki, Ifigeneia
- Iff-Noel, Flora Simone

Other

- Nichols, Andrew G.

Lecturer

- Yates, Velvet Lenore

Classical Studies

Program Information

(The following information refers only to our on-campus programs. Please visit the Distance Learning Homepage (https://distance.ufl.edu/online-degree-programs/) for further details on our Distance Learning programs, especially aimed at elementary, secondary, or community college teachers.)
Ph.D. in Classical Studies

The Ph.D. program in classical studies is a traditional course of study in Greek and Latin language and literature that prepares students for careers in research and teaching at colleges and universities. Students awarded a TA position receive a stipend plus a full tuition waiver. The University also offers competitive fellowships. The department routinely provides research fellowships for its Ph.D. candidates. Department awards are also available for study abroad opportunities. Students are expected to become Florida residents after one year.

M.A. in Classical Studies

The Department of Classics at the University of Florida offers an M.A. degree in Classical Studies. Students are expected to become Florida residents after one year.

The Master of Arts in Classical Studies is recommended for students who plan to continue their studies at the doctoral level.

For minimum degree requirements, see the Graduate Degrees (p. 48) section of the catalog. For additional requirements, please see the department website: http://classics.ufl.edu.

Admissions Requirements to the Classical Studies Programs:

Admission into the university and the program for Classics is ultimately determined and granted according to the rules established by the Graduate School of the University of Florida (see the Graduate Catalog).

All students seeking admission to the department must submit satisfactory scores on the GRE General Test (with at least 320 [old scoring scale] or 140 [new scoring scale] on the verbal portion.

Ph.D. program (Level II) requirements include:

1. A GPA of at least 3.25 in previous graduate work, and an undergraduate average of at least 3.0.
2. Demonstrated reading knowledge of German, French, Italian or Modern Greek (competency in the second language to be demonstrated before the completion of the second year at Level II).
3. Deficiencies that can be corrected within one year will not necessarily prevent admission, if the applicant’s record gives evidence of the capacity to undertake and complete guided independent reading and research at the doctoral level.

Master’s program (Level I) requirements include:

1. Extensive study of Greek and Latin, with at least three years of coursework in one language and at least two years in the other language.
2. A GPA of at least 3.0.
3. Demonstrated reading knowledge of German, French, Italian or Modern Greek (competency in the second language to be demonstrated before the completion of the second year at Level II).
4. Deficiencies that can be corrected within one year will not necessarily prevent admission, if the record shows promise on other grounds.

Degrees Offered with a Major in Classical Studies

- Doctor of Philosophy
- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Classics Departmental Courses

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<th>Code</th>
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<td>CLA 6125</td>
<td>Augustan Age</td>
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<tr>
<td>CLA 6795</td>
<td>Greek and Roman Archeology</td>
<td>3</td>
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<td>CLA 6805</td>
<td>The Classical Research Tradition</td>
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<td>CLA 6895</td>
<td>Athenian Law and Society</td>
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Greek studies Courses

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<td>GRK 6905</td>
<td>Individual Work in Modern Greek</td>
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<td>GRW 6105</td>
<td>The Greek Tradition</td>
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<td>Greek Tragedy</td>
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<td>Greek Lyric Poetry</td>
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<td>GRW 6346</td>
<td>Pindar</td>
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<td>GRW 6347</td>
<td>Homer</td>
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<td>GRW 6386</td>
<td>Greek Historians</td>
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<td>GRW 6506</td>
<td>Plato</td>
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<td>Attic Orators</td>
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<td>GRW 6931</td>
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<td>GRW 7979</td>
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Latin Courses

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<td>Roman Poets: Ovid</td>
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<td>The Ancient Roman Novel</td>
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<td>Studies in Roman Satire</td>
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</table>
Student Learning Outcomes

Classical Studies (PHD)

SLO 1 Knowledge
1. Students identify, define, and relate knowledge of the research methods and theories that pertain to the field of Classical Studies and can bring that knowledge to the classroom in pedagogically-sound ways.

SLO 2 Knowledge
2. Students identify and define expert knowledge of Greek and Roman languages, literatures, and cultures.

SLO 3 Skills
3. Students develop the skills to complete conference papers, research abstracts and chapters, and peer-reviewed publications.

SLO 4 Skills
4. Students will practice their interviewing skills to achieve successful job preparation.

SLO 5 Professional Behavior
5. Students show the capacity to work ethically and professionally with students and colleagues of all backgrounds.

SLO 6 Professional Behavior
6. Students illustrate willingness to take on service commitments or leadership positions through, for example, participation in departmental, college, or university committees, service to professional or community organizations.

Classical Studies (MA)

SLO 1 Knowledge
Students distinguish research methods and theories that pertain to the field of Classical Studies.

SLO 2 Knowledge
Students identify and parse elements of Latin grammar, vocabulary, and syntax to an advanced level of competence.

SLO 3 Skills
Students distinguish research methods and theories that pertain to the field of Classical Studies.

SLO 4 Skills
Students translate and interpret Latin passages at an advanced level of competence.

SLO 5 Professional Behavior
Students develop at least one academic research project of publishable quality.

SLO 6 Professional Behavior
Students work ethically and professionally with students and colleagues of all backgrounds.

Latin

Program Information
(The following information refers only to our on-campus programs. Please visit the Distance Learning Homepage (http://classics.ufl.edu/programs/distance-learning/) for further details on our Distance Learning MA and ML Programs, especially aimed at elementary, secondary, or community college teachers.)

The Department of Classics at the University of Florida offers an M.A. degree in Latin, an M.A.T. degree in Latin, as well as a Master of Latin degree. Students are expected to become Florida residents after one year.

The Master of Arts in Latin is a thesis degree designed specifically for students who are aiming toward a career in secondary teaching, but who still desire the writing experience and credential that a thesis provides.

The Master of Arts in the Teaching of Latin (M.A.T.) is recommended for students who wish to pursue a career in teaching and who want to include educational courses in their program. This is a non-thesis degree.

The Master of Latin (M.L.) degree is designed primarily for currently employed, and/or certified teaching professionals who wish to widen their knowledge of Latin, broaden their education in the field of Classics, and enhance their professional qualifications. This is a non-thesis degree.

For minimum degree requirements, see the Graduate Degrees (p. 48) section of the catalog. For additional requirements, please see the department website: http://classics.ufl.edu.

Admission Requirements to the Latin Programs:

Admission into the university and the program for Classics is ultimately determined and granted according to the rules established by the Graduate School of the University of Florida (see the Graduate Catalog).

All students seeking admission to the department must submit satisfactory scores on the GRE General Test (with at least 320 [old scoring scale] or 140 [new scoring scale on the verbal portion]).

Master’s level (Level I) requirements include:

1. Extensive study of Greek and Latin, with at least three years of coursework in one language and at least two years in the other language.
2. At least six hours in one or more of the following: ancient history, ancient art, archaeology, philosophy, literary criticism, linguistics.
3. A GPA of at least a 3.0.
4. Deficiencies that can be corrected within one year will not necessarily prevent admission, if the record shows promise on other grounds.

Degrees Offered

Degrees Offered with a Major in Latin

• Master of Arts
• Master of Arts in Teaching
• Master of Latin

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.
## Classics Departmental Courses

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## Greek Courses

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<td>GRE 6755</td>
<td>Epigraphy</td>
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<tr>
<td>GRK 6905</td>
<td>Individual Work in Modern Greek</td>
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</tr>
<tr>
<td>GRW 6105</td>
<td>The Greek Tradition</td>
<td>3</td>
</tr>
<tr>
<td>GRW 6216</td>
<td>Greek Novel</td>
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<tr>
<td>GRW 6316</td>
<td>Greek Tragedy</td>
<td>3</td>
</tr>
<tr>
<td>GRW 6317</td>
<td>Ancient Greek Comedy</td>
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<tr>
<td>GRW 6345</td>
<td>Greek Lyric Poetry</td>
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<tr>
<td>GRW 6346</td>
<td>Pindar</td>
<td>3</td>
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<tr>
<td>GRW 6347</td>
<td>Homer</td>
<td>3</td>
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<tr>
<td>GRW 6348</td>
<td>Non-Homeric Grk Epic</td>
<td>3</td>
</tr>
<tr>
<td>GRW 6386</td>
<td>Greek Historians</td>
<td>3</td>
</tr>
<tr>
<td>GRW 6506</td>
<td>Plato</td>
<td>3</td>
</tr>
<tr>
<td>GRW 6705</td>
<td>Attic Orators</td>
<td>3</td>
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<tr>
<td>GRW 6905</td>
<td>Individual Work</td>
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<tr>
<td>GRW 6930</td>
<td>Special Topics in Greek Literature</td>
<td>3</td>
</tr>
<tr>
<td>GRW 6931</td>
<td>Comparative Study of Greek and Latin Literature</td>
<td>3</td>
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<tr>
<td>GRW 6971</td>
<td>Research for Master’s Thesis</td>
<td>1-15</td>
</tr>
<tr>
<td>GRW 7979</td>
<td>Advanced Research</td>
<td>1-15</td>
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<td>GRW 7980</td>
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## Latin Courses

<table>
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<td>Latin Prose Composition</td>
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<td>LNW 5325</td>
<td>Roman Elegiac Poetry</td>
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<td>LNW 5655</td>
<td>Roman Poets: Horace</td>
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<td>LNW 5665</td>
<td>Roman Poets: Vergil</td>
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<tr>
<td>LNW 5675</td>
<td>Roman Poets: Ovid</td>
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<td>The Roman Tradition</td>
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<tr>
<td>LNW 6225</td>
<td>The Ancient Roman Novel</td>
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<tr>
<td>LNW 6315</td>
<td>Plautus and Terence</td>
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<tr>
<td>LNW 6335</td>
<td>Roman Oratory and Rhetoric</td>
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<td>LNW 6365</td>
<td>Studies in Roman Satire</td>
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<td>LNW 6385</td>
<td>Roman Historians</td>
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<td>LNW 6495</td>
<td>Late Latin Literature</td>
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<td>LNW 6905</td>
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<td>LNW 6933</td>
<td>Special Topics in Latin Literature</td>
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<td>LNW 6935</td>
<td>Proseminar in Classics</td>
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<td>LNW 6940</td>
<td>Supervised Teaching</td>
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<td>Research for Master’s Thesis</td>
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</table>

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## Computer and Information Science and Engineering Department

**Chair:** Juan Gilbert

The Department of Computer and Information Science and Engineering (CISE) offers

- Ph.D. in Computer Engineering, Computer Science, and Human-Centered Computing.
- Master of Engineering in Computer Engineering.
- Master of Science in Computer Engineering.
- Master of Science degree in Computer Science through the College of Engineering.
- Master of Science degree in Digital Arts and Sciences through the College of Engineering.
- Master of Science degree in Computer Science through the College of Liberal Arts and Sciences.

The CISE Department has six broad areas of specialization:

- **Computer systems:** computer architecture, distributed systems, networks and communication, operating systems, performance evaluation, security, mobile computing, software engineering, programming languages, multimedia systems, and web technologies
- **Database and information systems:** database management systems, database design, database theory and implementation, data mining, database machines, parallel and distributed databases, digital libraries, E-services and commerce, medical, and bio-informatics
- **High-performance computing/applied algorithms:** design and analysis of algorithms, data structures, parallel and distributed computing, medical algorithms, numerical methods, computational complexity, and applied computational geometry
- **Computer graphics, modeling, and art:** modeling methodology, simulation, virtual reality, aesthetic computing, computer arts, animation, real-time rendering, medical modeling, digital media, and musical acoustics
- **Intelligent systems and computer vision:** artificial intelligence, machine learning, visualization, image analysis and processing, pattern recognition, signal processing, biomedical imaging, and image databases
- **Computer networks and security:** wired and wireless networks, network routing and protocols, and QoS.

Applications for admission must be approved by both the Department and the college in which the student wishes to enroll. Applicants should have a strong computer science background.

All master’s students must satisfy a core requirement by completing the appropriate number of core courses as specified by their degree program. According to Graduate School rule, students must maintain a 3.0 overall GPA, as well as a cumulative 3.0 GPA for all courses taken from CISE,
Students can select a thesis or non-thesis option for the master’s degree. Digital Arts and Sciences students must choose either thesis or project in lieu of thesis. All options require a minimum of 30 credit hours. The thesis degree requires:

- A minimum of 6 credit hours must be taken in CIS 6971 Research for Master’s Thesis (1-15 cr.).
- Specific degree requirements can be found at: https://www.cise.ufl.edu/academics/grad.

The non-thesis option requires:

- Each nonthesis master’s student is required to pass a comprehensive examination.
- Specific degree requirements can be found at: https://www.cise.ufl.edu/academics/grad.

The Digital Arts and Sciences project in lieu of thesis option requires 6 credit hours of project/performance credits.

To demonstrate breadth and proficiency, all Ph.D. students must take required core courses. Depending upon the major, they must earn a 3.4 GPA in specific (to the major) required core courses, with no more than one of the core courses receiving a letter grade below B, to be eligible to take the Ph.D. qualifying examinations.

Ph.D. students are required to take a minimum of 90 credit hours. Of these, at least 36 hours must be graduate-level CISE course work excluding individual study and research credits. A minimum of 3 hours must be taken in CIS 7980 Research for Doctoral Dissertation (1-15 cr.). A maximum of 30 credits may be awarded toward the Ph.D. degree from an appropriate master’s degree.

The Database Systems Research and Development Center, the Software Engineering Research Center, the Center for Computer Vision and Visualization Center, and a number of other campus research centers provide opportunities for students enrolled in the program.

The department offers a combined bachelor’s/master’s degree program. Contact the Department’s Student Services Center for information.

For more information, please see the program pages below, or visit our website: http://www.cise.ufl.edu

Majors

- Computer Science (CLAS) (p. 378)

Faculty

Professor

- Chen, Shigang
- Dorr, Bonnie
- Gader, Paul D.
- Gilbert, Juan Eugene
- Helal, Abdelsalam Ali
- Helmy, Ahmed Abdelghaffar
- Kahveci, Tamer
- Lok, Benjamin
- Mishra, Prabhat Kumar
- Peters, Jorg
- Ranka, Sanjay
- Schneider, Markus Paul
- Thai, My Tra
- Traynor, Patrick
- Vemuri, Baba C.

Associate Professor

- Banerjee, Arunava
- Bermudez, Manuel E.
- Boyer, Kristy
- Butler, Kevin
- Dobra, Alin Viorel
- Entezari, Alireza
- Kavalan, Jonathan C L
- Peir, Jihkwon
- Rangarajan, Anand
- Sanders, Beverly A.
- Shrimpton, Thomas
- Sitharam, Meera
- Ungor, Alper
- Wang, Zhe
- Williams, Byron Joseph
- Wilson, Joseph N.
- Woodard, Damon
- Xia, Ye

Assistant Professor

- Anthony, Lisa
- Bindschaedler, Vincent Christophe
- Boucher, Christina A.
- Chuyew Yee, Sharon Lynn
- Gardner-McCune, Christina
- Huang, Kejun
- Jain, Eakta
- McMullen, Kyla
- Newman, Richard E.
- Ragan, Eric D.
- Ruiz, Jaime
- Thebaut, Stephen M.
- Toler-Franklin, Corey Theresa

Distinguished Professor

- Sahni, Sartaj Kumar

Associate Scientist

- Schmalz, Mark S.

Senior Lecturer

- Zhang, Rong
Affiliated Faculty

- Fortes, Jose A.	Eminent Scholar
- Glenn, Alina Zare	Associate Professor
- Michailidis, George	Professor
- Oliveira, Daniela	Associate Professor
- Rashidi, Parisa	Assistant Professor
- Wu, Dapeng	Professor
- Yang, Lin	Associate Professor
- Yavuz, Tuba	Assistant Professor

Computer Science (CLAS)

Program Information

The Department of Computer and Information Science and Engineering offers the Master of Science degree in Computer Science through the College of Liberal Arts and Sciences. Minimum requirements for this degree are given in the Graduate Degrees (p. 48) section of this catalog.

The department offers graduate study and research in Algorithms, Computer Vision, Databases, Graphics and Modeling, Machine Learning, Networks, and Systems, with active labs in Bioinformatics, Computational Science and Intelligence; Vision, Graphics and Medical Imaging; Database Systems Research and Development; Data Science Research; Mobile and Pervasive Computing; Human-Centered Computing; and Cybersecurity.

Specific degree requirements and options may be found here: http://cise.ufl.edu/academics/grad/ (http://cise.ufl.edu/academics/grad/)

Instructions for application for admission may be found here: http://cise.ufl.edu/admissions/graduate (http://cise.ufl.edu/admissions/graduate/)

Degrees Offered

Degrees Offered with a Major in Computer Science

- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Computer and Information Science and Engineering Departmental Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CAP 5100</td>
<td>Human-Computer Interaction</td>
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<tr>
<td>CAP 5108</td>
<td>Research Methods for Human-Centered Computing</td>
<td>3</td>
</tr>
<tr>
<td>CAP 5416</td>
<td>Computer Vision</td>
<td>3</td>
</tr>
<tr>
<td>CAP 5510</td>
<td>Bioinformatics</td>
<td>3</td>
</tr>
<tr>
<td>CAP 5515</td>
<td>Computational Molecular Biology</td>
<td>3</td>
</tr>
<tr>
<td>CAP 5635</td>
<td>Artificial Intelligence Concepts</td>
<td>3</td>
</tr>
<tr>
<td>CAP 5705</td>
<td>Computer Graphics</td>
<td>3</td>
</tr>
<tr>
<td>CAP 5771</td>
<td>Introduction to Data Science</td>
<td>3</td>
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<tr>
<td>CAP 6137</td>
<td>Malware Reverse Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CAP 6516</td>
<td>Medical Image Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CAP 6610</td>
<td>Machine Learning</td>
<td>3</td>
</tr>
<tr>
<td>CAP 6615</td>
<td>Neural Networks for Computing</td>
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</tr>
<tr>
<td>CAP 6617</td>
<td>Advanced Machine Learning</td>
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<tr>
<td>CAP 6685</td>
<td>Expert Systems</td>
<td>3</td>
</tr>
<tr>
<td>CAP 6701</td>
<td>Advanced Computer Graphics</td>
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</tr>
<tr>
<td>CAP 6769</td>
<td>Advanced Topics in Data Science</td>
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<td>CAP 6779</td>
<td>Projects in Data Science</td>
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<td>CDA 5155</td>
<td>Computer Architecture Principles</td>
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<td>CDA 5636</td>
<td>Embedded Systems</td>
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<td>CEN 5035</td>
<td>Software Engineering</td>
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<td>CEN 5726</td>
<td>Natural User Interaction</td>
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<tr>
<td>CEN 5728</td>
<td>User Experience Design</td>
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<tr>
<td>CEN 6070</td>
<td>Software Testing and Verification</td>
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<tr>
<td>CEN 6075</td>
<td>Software Specification</td>
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<td>CIS 5370</td>
<td>Computer and Information Security</td>
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<tr>
<td>CIS 5371</td>
<td>Introduction to Cryptology</td>
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<td>CIS 6905</td>
<td>Individual Study</td>
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<tr>
<td>CIS 6910</td>
<td>Supervised Research</td>
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<tr>
<td>CIS 6930</td>
<td>Special Topics in CIS</td>
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<td>CIS 6935</td>
<td>Graduate Seminar</td>
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<tr>
<td>CIS 6940</td>
<td>Supervised Teaching</td>
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<tr>
<td>CIS 6971</td>
<td>Research for Master’s Thesis</td>
<td>1-15</td>
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<tr>
<td>CIS 7979</td>
<td>Advanced Research</td>
<td>1-12</td>
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<td>CIS 7980</td>
<td>Research for Doctoral Dissertation</td>
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<td>CNT 5106C</td>
<td>Computer Networks</td>
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<td>CNT 5410</td>
<td>Computer and Network Security</td>
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<td>CNT 5412</td>
<td>Network and System Security</td>
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<td>CNT 5517</td>
<td>Mobile Computing</td>
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<td>CNT 6107</td>
<td>Advanced Computer Networks</td>
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<td>CNT 6885</td>
<td>Distributed Multimedia Systems</td>
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<td>COP 5536</td>
<td>Advanced Data Structures</td>
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<td>COP 5556</td>
<td>Programming Language Principles</td>
<td>3</td>
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<td>COP 5615</td>
<td>Distributed Operating System Principles</td>
<td>3</td>
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<td>COP 5618</td>
<td>Concurrent Programming</td>
<td>3</td>
</tr>
<tr>
<td>COP 5625</td>
<td>Programming Language Translators</td>
<td>3</td>
</tr>
<tr>
<td>COP 5725</td>
<td>Database Management Systems</td>
<td>3</td>
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<td>COP 6726</td>
<td>Database System Implementation</td>
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<tr>
<td>COT 5405</td>
<td>Analysis of Algorithms</td>
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<td>COT 5442</td>
<td>Approximation Algorithms</td>
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<tr>
<td>COT 5519</td>
<td>Sparse Matrix Algorithms</td>
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</tr>
<tr>
<td>COT 5520</td>
<td>Computational Geometry</td>
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<td>COT 5615</td>
<td>Mathematics for Intelligent Systems</td>
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<td>COT 6315</td>
<td>Formal Languages and Computation Theory</td>
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<td>EGN 5949</td>
<td>Practicum/Internship/Cooperative Work</td>
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<tr>
<td>EGN 6913</td>
<td>Engineering Graduate Research</td>
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</table>

Student Learning Outcomes

Computer Science - Liberal Arts (MS)

SLO 1 Knowledge
Students identify, formulate, and solve computer science problems
SLO 2 Knowledge
Students can critically read computer science literature

SLO 3 Skills
Students use the techniques, skills, and tools necessary for computer science practice at an advanced level.

SLO 4 Professional Behavior
Professional experience: an understanding of professional and ethical responsibility

SLO 5 Professional Behavior
Professional experience: Students can communicate effectively

Department of Languages, Literatures and Cultures

Chair: Akintunde Akinyemi

The Department of Languages, Literatures, and Cultures offers the Master of Arts degree (M.A.) and the Doctor of Philosophy degree in German Studies. Complete descriptions of the minimum requirements for the M.A. degree are provided in the Graduate Degrees (p. 48) section of this catalog. For more information about our programs, please follow the hyperlinks below or visit our website: https://languages.ufl.edu/academics/graduate-studies/.

Majors

• French and Francophone Studies (p. 379)
• German (p. 380)
• Romance Languages (Language, Literature and Culture) (p. 381)

Faculty

Professor

• Akinyemi, Akintunde
• Blum, Sylvie E.
• Gorham, Michael S.
• Hasty, Willard R.
• McLaughlin, Fiona
• Murphy, Carol J.
• Watt, Mary A.
• Weltman-Aron, Brigitte

Associate Professor

• Amberson, Deborah
• Antes, Theresa A.
• Blondeau, Helene
• Bloom, Rori I.
• Burak, Alexander Lvovich
• Essegbey, James
• Goodwin, James E.
• Hebblethwaite, Benjamin John
• Kleespies, Ingrid
• Kligerman, Eric Matthew
• Mennel, Barbara Caroline
• Pham, Andrea Hoa
• Rylkova, Galina S.
• Sow, Alioune Badaradiam
• Tlili, Sarra
• Wang, Richard G.
• Wehmeyer, Ann Kathryn
• Xiao, Ying
• Zachmann, Gayle Moskowitz

Assistant Professor

• Felt, Matthieu A.
• Kory, Stephan Nicholas
• Smith, Christopher

Affiliated Faculty

• Huet, Helene I.
  Assistant Librarian

French and Francophone Studies

Chair: Akintunde Akinyemi
Graduate Coordinator: Rori Bloom

Bachelor’s/master’s program: French and Francophone Studies offers a combined 4/1 degree program that enables outstanding undergraduates to obtain both the B.A. and M.A. degrees after successful completion of 152 credit hours. The program is designed for the students who wish to continue their education in French and Francophone Studies past the bachelor’s level but do not intend to pursue a doctorate or for students who wish to expand their training in a specific field before moving on to a doctoral program. Since students in the bachelor’s/master’s program have a graduate classification, students receiving undergraduate scholarships or Pell grants should check with the funding provider to make sure that they will not lose eligibility.

Degrees Offered

Degrees Offered with a Major in French and Francophone Studies

• Master of Arts
• Master of Arts in Teaching

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

French and Francophone Studies Courses

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<td>FRE 6060</td>
<td>Beginning French for Graduate Students I</td>
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<td>FRE 6061</td>
<td>Beginning French for Graduate Students II</td>
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<tr>
<td>FRE 6466</td>
<td>Advanced Translation and Stylistics</td>
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</tr>
<tr>
<td>FRE 6735</td>
<td>Special Studies in French Linguistics</td>
<td>3</td>
</tr>
<tr>
<td>FRE 6736</td>
<td>The French language in the Americas</td>
<td>3</td>
</tr>
<tr>
<td>FRE 6785</td>
<td>French Phonetics and Phonology</td>
<td>3</td>
</tr>
<tr>
<td>FRE 6827</td>
<td>Sociolinguistics of French</td>
<td>3</td>
</tr>
<tr>
<td>FRE 6845</td>
<td>History of the French Language</td>
<td>3</td>
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<tr>
<td>FRE 6855</td>
<td>Structure of French</td>
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</table>
FRE 6856  French in the 21st Century  3
FRE 6945  Practicum in Advanced College Teaching  2
FRE 6956  Overseas Studies in French  1-5
FRW 6217  Seventeenth-Century French Prose  3
FRW 6276  Readings in Eighteenth-Century Literature  3
FRW 6288  Twentieth-Century French Novel  3
FRW 6315  Seventeenth-Century French Drama  3
FRW 6328  Twentieth-Century French Theater  3
FRW 6346  French Poetry of the Renaissance  3
FRW 6355  Modern French Poetry  3
FRW 6396  French Realism and Naturalism  3
FRW 6715  The Philosophic Movement  3
FRW 6780  Studies in Francophone Literature and Culture (Excluding the Caribbean and Sub-Saharan Africa)  3
FRW 6805  Introduction to Graduate Study and Research  3
FRW 6825  French Critical Theory  3
FRW 6900  Special Study in French Literature  3
FRW 6905  Individual Work  1-3
FRW 6910  Supervised Research  1-5
FRW 6938  Seminar in French Literature  3
FRW 6971  Research for Master's Thesis  1-15
FRW 7979  Advanced Research  1-12
FRW 7980  Research for Doctoral Dissertation  1-15

Student Learning Outcomes

French (MA)

SLO 1  Knowledge
Identify, define and describe core areas of French and Francophone literary/cultural or linguistic studies, as agreed upon by the faculty of the department

SLO 2  Skills
Literary/Cultural Studies: Analyze and interpret French and Francophone literary and cultural products

SLO 3  Skills
French and Francophone Linguistics: Analyze and interpret French and Francophone language and language-related data

SLO 4  Professional Behavior
Display knowledge of ethical human data collection, professional conduct and ethical academic writing skills (as established by Linguistic Society of America Ethics Statement and/or Modern Language Association)

German

Program Information

Chair: Akintunde Akinremi
Graduate Coordinator: Eric Kligerman

The Department of Languages, Literatures and Cultures offers Master of Arts (thesis or professional non-thesis option) and Doctor of Philosophy degrees in German. The department also offers a Doctor of Philosophy degree in German with a specialization in women's/gender studies.

Degrees Offered

Degrees Offered with a Major in German

- Doctor of Philosophy
  - without a concentration
  - concentration in Women's/Gender Studies
- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

German Literature and Cinema Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>GET 6526</td>
<td>Weimar Cinema</td>
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<tr>
<td>GET 6529</td>
<td>New German Cinema and its Legacy</td>
<td>3</td>
</tr>
<tr>
<td>GEW 6205</td>
<td>Foundations of Literary Study</td>
<td>3</td>
</tr>
<tr>
<td>GEW 6266</td>
<td>History of the German Novel</td>
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<tr>
<td>GEW 6305</td>
<td>Studies in German Drama and Theater</td>
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<td>GEW 6405</td>
<td>Medieval and Renaissance Literature</td>
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<td>GEW 6425</td>
<td>From Luther to Lessing: Early Modern German Literature</td>
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<td>GEW 6535</td>
<td>German Classical and Romantic Literature</td>
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<td>GEW 6558</td>
<td>Young Germany, Biedermeier, Realism, and Naturalism</td>
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<td>Culture and Society in the Weimar Republic</td>
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<td>Modern German Literature</td>
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<td>GEW 6736</td>
<td>Contemporary German Literature</td>
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<td>GEW 6745</td>
<td>Literature and Culture in the Third Reich</td>
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<td>GEW 6826</td>
<td>German Literary Theory</td>
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<td>GEW 6900</td>
<td>Seminar in Germanic Languages and Literatures</td>
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<tr>
<td>GEW 6901</td>
<td>Special Study in Germanic Languages and Literatures</td>
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</tr>
<tr>
<td>GEW 6905</td>
<td>Independent Study</td>
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<td>Supervised Research</td>
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<td>GEW 6971</td>
<td>Research for Master's Thesis</td>
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<td>GEW 7979</td>
<td>Advanced Research</td>
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<tr>
<td>GEW 7980</td>
<td>Research for Doctoral Dissertation</td>
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</table>

German Language Courses

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>GER 6060</td>
<td>Beginning German for Graduate Students I</td>
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<tr>
<td>GER 6061</td>
<td>Beginning German for Graduate Students II</td>
<td>3</td>
</tr>
<tr>
<td>GER 6940</td>
<td>Supervised Teaching</td>
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</tr>
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</table>

Student Learning Outcomes

German (PHD)

SLO 1  Knowledge

SLO 2  Skills
Literary/Cultural Studies: Students analyze and interpret German literary and cultural products, apply results to broader contexts and engage in academic discourse via writing and oral presentation

SLO 3  Professional Behavior
Students display knowledge of ethical human data collection, professional conduct and ethical academic writing skills (as established by the Modern Language Association)
German (MA)

SLO 1 Knowledge
Students identify, define and describe the core areas of German literary and cultural studies for the MA, as agreed upon by the faculty of the department.

SLO 2 Skills
Literary/Cultural Studies: Students analyze and interpret German literary and cultural products, apply results to broader contexts and engage in academic discourse via writing and oral presentation.

SLO 3 Professional Behavior
Students display knowledge of ethical human data collection, professional conduct and ethical academic writing skills (as established by the Modern Language Association).

Romance Languages (Language, Literature and Culture)

Program Information
The Language, Literature and Culture Department offers a Doctor of Philosophy degree in romance languages with a specialization in French and francophone studies.

Degrees Offered

Degrees Offered with a Major in Romance Languages
- Doctor of Philosophy
  - without a concentration
  - concentration in French and Francophone Studies

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

French and Francophone Studies Courses
See courses under French and Francophone Studies tab to the right.

Student Learning Outcomes

Romance languages & Literatures

SLO 1 Knowledge
Students will identify, define, and describe a specific area within their field of study, as agreed upon by the faculty of the department.

SLO 2 Skills
Literary/Cultural Studies: Students will analyze and interpret literary and cultural products and apply results to broader context and engage in academic discourse via writing and oral presentation. Linguistics: Students will analyze and interpret language and language-related data apply results to broader context and engage in academic discourse via writing and oral presentation.

SLO 3 Professional Behavior
Students will describe and apply ethical human data collection, professional conduct and ethical academic writing skills.

Economics Department

Chair: R. D. Blair  
Graduate Coordinator: S. M. Slutsky

The department offers the Master of Arts (thesis and non-thesis option) and Doctor of Philosophy degrees in economics with specializations in econometrics, economic theory, industrial organization, international economics, monetary economics, and public finance. Complete descriptions of the minimum requirements for the M.A. and Ph.D. degrees are provided on the Graduate Degrees (p. 48) Page of this catalog.

For more information, please visit https://economics.clas.ufl.edu/.

Majors
- Economics (p. 382)

Faculty

Professor
- Ai, Chunrong
- Blair, Roger D.
- Dinopoulous, Elias
- Romano, Richard E.
- Rush, Mark
- Slutsky, Steven M.

Associate Professor
- Waldo, Douglas G.

Assistant Professor
- Adams, Jonathan
- Bet, Carlos German
- Heins, Gunnar
- Kostyshak, Scott G.
- Peluffo, Maria Cecilia
- Rojas Barros, Eugenio Ignacio
- Sandoval Gutierrez, Hector Hugo

Other
- Phillips, Michelle A.
- Saygin Kostyshak, Perihan Ozge

Eminent Scholar
- Sappington, David

Senior Lecturer
- Knight, David T.

Affiliated Faculty
- Serra, Renata
  Senior Lecturer
**Economics**

**Program Information**

The Economics Department offers the Master of Arts degree and the Doctor of Philosophy degree in economics.

**M.A. requirements:** A minimum of 36 credits of course work is required for the M.A. with and without thesis. A maximum of six credits of the research course ECO 6971 Research for Master's Thesis (1-15 cr.) may be included for a master's degree with thesis. The following core courses are required: ECO 7408 Mathematical Methods and Applications to Economics (1-2 cr.) and ECO 7404 Game Theory for Economists (1-2 cr.) or equivalent, ECO 7415 Statistical Methods in Economics (3 cr.) or equivalent, ECO 7115 Microeconomic Theory (3 cr.), and ECO 7206 Macroeconomic Theory I (3 cr.).

**Ph.D. requirements:** Admission requirements for the Ph.D. include:

1. a minimum grade point average of 3.0,
2. an acceptable score on the GRE, and
3. for nonnative speakers of English, an acceptable score on one of the following: TOEFL (Test of English as a Foreign Language: computer=213, paper=550, web=80), IELTS (International English Language Assessment Battery: 77), or successful completion of the UF English Language Institute program.

All core courses must be completed in the first year. In addition, students must complete courses in three fields of specializations and pass qualifying examinations in two of those fields. Additional information about degree requirements can be found by visiting the Graduate Degrees (p. 48) pages of this catalog.

**Combined degree program:** The department offers a combined Bachelor of Arts/Master of Arts degree program. This program allows qualified students to earn both a bachelor's degree and a master's degree, with a savings of 12 credits.

**Degrees Offered**

**Degrees Offered with a Major in Economics**

- Doctor of Philosophy
- Master of Arts
  - without a concentration
  - concentration in Financial Economics

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

**Economics Departmental Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ECO 5114</td>
<td>Microeconomic Analysis</td>
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<td>ECO 5207</td>
<td>Macroeconomic Analysis</td>
<td>4</td>
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<tr>
<td>ECO 5216</td>
<td>Monetary Economics</td>
<td>4</td>
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<td>ECO 5426</td>
<td>Econometric Analysis 1</td>
<td>4</td>
</tr>
<tr>
<td>ECO 5427</td>
<td>Econometric Analysis 2</td>
<td>4</td>
</tr>
<tr>
<td>ECO 5435</td>
<td>Econometric Data Analysis</td>
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<tr>
<td>ECO 5464</td>
<td>Game Theory and Industrial Organization</td>
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</tr>
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<td>ECO 5715</td>
<td>Open Economy Macroeconomics</td>
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<td>ECO 5745</td>
<td>Global Trade and Policy</td>
<td>3</td>
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<tr>
<td>ECO 6409</td>
<td>Game Theory Applied to Business Decisions</td>
<td>2</td>
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<tr>
<td>ECO 6716</td>
<td>International Macroeconomics</td>
<td>3</td>
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<tr>
<td>ECO 6906</td>
<td>Individual Work in Economics</td>
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<td>ECO 6910</td>
<td>Supervised Research</td>
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<tr>
<td>ECO 6936</td>
<td>Special Topics</td>
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<td>ECO 6957</td>
<td>International Studies in Economics</td>
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<tr>
<td>ECO 6971</td>
<td>Research for Master's Thesis</td>
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<tr>
<td>ECO 6977</td>
<td>Financial Economics Capstone</td>
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<td>ECO 7113</td>
<td>Information Economics</td>
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<td>ECO 7115</td>
<td>Microeconomic Theory</td>
<td>3</td>
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<tr>
<td>ECO 7118</td>
<td>Markets and Institutions</td>
<td>1-2</td>
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<td>ECO 7119</td>
<td>Information, Incentives, and Agency Theory</td>
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<tr>
<td>ECO 7120</td>
<td>General Equilibrium and Welfare Economics</td>
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<td>ECO 7206</td>
<td>Macroeconomic Theory I</td>
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<td>ECO 7272</td>
<td>Economic Growth I</td>
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<tr>
<td>ECO 7404</td>
<td>Game Theory for Economists</td>
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<tr>
<td>ECO 7405</td>
<td>Mathematical Economics: Game Theory</td>
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<tr>
<td>ECO 7406</td>
<td>Dynamic Economics: Theory and Applications</td>
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<tr>
<td>ECO 7408</td>
<td>Mathematical Methods and Applications to</td>
<td>1-2</td>
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  Economics
| ECO 7415 | Statistical Methods in Economics              | 3       |
| ECO 7424 | Econometric Models and Methods                | 3       |
| ECO 7426 | Econometric Methods I                         | 3       |
| ECO 7427 | Econometric Methods II                        | 3       |
| ECO 7452 | Best Empirical Practices in Economics         | 1-2     |
| ECO 7467 | Financial Econometrics                        | 3       |
| ECO 7525 | Welfare Economics and The Second Best         | 1-2     |
| ECO 7534 | Empirical Public Economics I                  | 1-2     |
| ECO 7535 | Empirical Public Economics II                 | 1-2     |
| ECO 7536 | Theoretical Public Economics                  | 1-2     |
| ECO 7706 | Theory of International Trade                 | 3       |
| ECO 7707 | International Economic Relations              | 3       |
| ECO 7925 | Research Skills Workshop                      | 3       |
| ECO 7938 | Advanced Economics Seminar                    | 1-4     |
| ECO 7979 | Advanced Research                            | 1-12    |
| ECO 7980 | Research for Doctoral Dissertation            | 1-15    |
| ECP 5702 | Managerial Economics                          | 2       |
| ECP 5705 | Economics of Business Decisions               | 3       |
| ECP 6701 | Competitive Strategies in Expanding Markets   | 2       |
| ECP 6708 | Cases in Competitive Strategy                 | 2       |
| ECP 7407 | Theory of Industrial Organization: Product    | 1-2     |
  Differentiation and Strategy
| ECP 7408 | Empirical Industrial Organization             | 1-2     |
| ECP 7418 | Economics of Regulation                       | 1-2     |
| ECP 7419 | Current Research in Regulation                | 1-2     |
| HSA 6436 | Health Economics                              | 3       |

**Economics Learning Outcomes**

**SLO 1** Knowledge

Manage the technical tools (theory, methodology, statistical analyses, and reporting norms) essential to the departmental area of study

**SLO 2** Skills

Interpret with technical tools to create new knowledge through original research

**SLO 3** Professional Behavior
Communicate specialized information from a field of expertise verbally and in writing

SLO 4  Professional Behavior
Communicate specialized information from a field of expertise verbally at an educated layman or university undergraduate student level

Economics (MA)

SLO 1  Knowledge
Manage the technical tools (theory, methodology, statistical analyses, and reporting norms) essential to the departmental area of study

SLO 2  Skills
Utilize technical tools to apply knowledge in the area of study

SLO 3  Professional Behavior
Communicate specialized information from a field of expertise

English Department

Chair: S. I. Dobrin
Graduate Coordinator: Jodi Schorb

The Department of English offers a MFA degree in creative writing and a PhD degree in English. The PhD program accepts both students who have completed an MA degree and those who have completed only a BA. Complete descriptions of the minimum requirements for the MFA and PhD degrees are provided in the Graduate Degrees (p. 48) section of this catalog. For more information about our programs, please follow the hyperlinks below or visit our website: https://english.ufl.edu/graduate-programs/.

Majors
- Creative Writing (p. 383)
- English (p. 384)

Faculty

Professor
- Bryant, Marsha C.
- Burt, Richard
- Cech, John O.
- Ciment, Jill Karen
- Dobrin, Sidney Irwin
- Gilbert, Pamela K.
- Hedrick, Tace Megan
- Hegeman, Susan Elizabeth
- Hofmann, Michael H.
- Homan, Sidney R.
- Kidd, Kenneth B.
- King, Debra Walker
- Leavitt, David A.
- Logan, William
- Page, Judith Wallick
- Ray, Robert B.
- Reid, Mark Allen
- Rudnytsky, Peter L.
- Schueller, Malini Johar
- Smith, Stephanie Ann
- Turim, Maureen Cheryn
- Wegner, Phillip E.

Associate Professor
- Amoko, Apollo Obonyo
- Emery, Kimberly Lynn
- Harpold, Terry Alan
- Mlinko, Ange
- Rosenberg, Leah Reade
- Sanchez, Raul
- Schorb, Jodi Rene
- Ulanowicz, Anastasia Maria

Assistant Professor
- Akpan, Celestine L.
- Bianchi, Pietro
- Bordas, Camille A.
- Del Hierro, Victor
- Galvan, Margaret
- Gonzales, Laura
- Maioli Dos Santos, Roger
- Mowchun, Trevor Jory
- Steverson, Delia Dennise
- Yan, Rae Xiao

Affiliated Faculty
- Mennel, Barbara Caroline

Associate Professor

Creative Writing

Program Information
The Department of English offers the Master of Fine Arts degree in creative writing. Complete descriptions of the minimum requirements for the M.F.A. are provided in the Graduate Degrees (p. 48) section of this catalog. Full information concerning courses of study is available from the graduate coordinator or by visiting https://mfa.english.ufl.edu/.

Degrees Offered

Degrees Offered with a Major in Creative Writing
- Master of Fine Arts

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

English Departmental Courses

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<th>Code</th>
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<tr>
<td>AML 6017</td>
<td>Studies in American Literature Before 1900</td>
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<td>AML 6027</td>
<td>Studies in 20th-Century American Literature</td>
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<td>CRW 6130</td>
<td>Fiction Writing</td>
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<tr>
<td>CRW 6166</td>
<td>Studies in Literary Form</td>
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CRW 6331  Verse Writing 3
CRW 6906  Individual Work 1-3
ENC 5236  Advanced Business Writing for Accounting 4
ENC 6428  Digital English 3
ENC 7760  From Paper to Publication: The Peer-Reviewed Journal Article in English Studies and Related Fields 3
ENG 6016  Psychological Approaches to Literature 3
ENG 6075  Literary Theory: Issues 3
ENG 6077  Literary Theory: Forms 3
ENG 6137  The Language of Film 3
ENG 6138  Studies in the Movies 3
ENG 6824  Proseminar in Graduate Studies in English: Research, Writing, and the Profession 3
ENG 6906  Individual Work 1-3
ENG 6910  Supervised Research 1-5
ENG 6932  Film and Video Production 3
ENG 6971  Research for Master's Thesis 1-15
ENG 7979  Advanced Research 1-12
ENG 7980  Research for Doctoral Dissertation 1-15
ENL 6246  Studies in Romantic Literature 3
ENL 6256  Studies in Victorian Literature 3
ENL 6276  Studies in 20th-Century British Literature 3
LAE 6940  Supervised Teaching 1-5
LAE 6947  Writing Theories & Practices 3
LIT 6047  Studies in Drama 3
LIT 6236  Postcolonial Studies 3
LIT 6357  African-Am. or African Diaspora Lit./Cultures 3
LIT 6358  Theoretical Approaches to Black Cultural Studies 3
LIT 6855  Issues in Cultural Studies 3
LIT 6856  Cultural Studies: Interventions 3
LIT 6934  Variable Topics 1-5

English

Program Information

The Department of English offers a MFA in Creative Writing and a PhD degree in English with the specializations listed below. Complete descriptions of the minimum requirements for the MFA and PhD degrees are provided in the Graduate Degrees (p. 48) section of this catalog. Specific areas of specialization for the PhD include American, African-American, and British literature; American studies; critical theory and cultural studies; film and media studies; feminisms, genders and sexualities; postcolonial studies; composition and rhetoric; comics and visual rhetoric; and children's literature.

New graduate students should have completed an undergraduate English major of at least 24 semester hours. The PhD program accepts students with BA and MA degrees. Full information concerning courses of study is available from the graduate coordinator.

Degrees Offered

Degrees Offered with a Major in English

- Doctor of Philosophy
- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Student Learning Outcomes

English (PHD)

SLO 1  Skills
Students teach an entry-level college writing course and/or a lower-division course in their field in a professional manner, organizing and delivering content in a mode appropriate to audience

SLO 2  Professional Behavior
Students engage in professional research and writing activity at the PhD level, for example, conference-ready papers and/or materials appropriate for publication

English (MA)

SLO 1  Knowledge
Students will identify and discuss a problem or gap in scholarship in their specialization
To ensure the incorporation of relevant interdisciplinary perspectives in each student's program, the Department maintains close ties with other departments in Liberal Arts and Sciences, and with programs in African studies, Latin American studies, the School of Natural Resources and Environment, the Institute on Aging, urban and regional planning, tropical agriculture, tropical ecology, water resources, the Warrington College of Business Administration, the College of Agricultural and Life Sciences, College of Public Health and Health Professions, and the Hydrological Sciences Academic Cluster. Certificates in certain of these fields may be obtained in addition to graduate degrees in geography. Geography administers the Graduate Certificate in Applied Atmospheric Sciences.

A graduate student should preferably have an undergraduate major in geography, but applicants with degrees in one of the social or physical sciences are accepted into the Department's graduate program. Deficiencies in undergraduate work in geography must be corrected concurrently with registration in graduate level courses. All students in the graduate program are required to take courses in contemporary geographic thought and geographic research skills.

The Department offers a combined bachelor's/master's degree program. Contact the graduate coordinator for information.

For more information, please visit https://geog.ufl.edu/.

Majors

- Geography (p. 386)

Faculty

**Professor**

- Binford, Michael William
- Glass, Gregory E.
- Mossa, Joann
- Southworth, Jane
- Walker, Robert T.
- Waylen, Peter Robert

**Associate Professor**

- Blackburn, Jason K.
- Child, Brian Anthony
- Fik, Timothy J.
- Goldman, Abraham C.
- Mao, Liang
- Matyas, Corene J.
- Ryan, Sadie Jane
- Simmons, Cynthia S.
- Walther, Olivier Jean

**Assistant Professor**

- Ash, Kevin D.
- Hu, Yujie
- Mullens, Esther D.
- Serafin, Katherine
Affiliated Faculty
- Noss, Andrew Jay
- Other
- Swisher, Marilyn E.

Geography
Program Information
The Department of Geography offers the Master of Arts, Master of Science, and Doctor of Philosophy degrees. Complete descriptions of the minimum requirements for these degrees are provided in the Graduate Degrees Section (p. 48) of this catalog.

Degrees Offered

Degrees Offered with a Major in Geography
- Doctor of Philosophy
  - without a concentration
  - concentration in Geographic Information Systems
  - concentration in Hydrologic Sciences
  - concentration in Tropical Conservation and Development
  - concentration in Wetland Sciences
- Master of Arts
  - without a concentration
  - concentration in Applications of Geographic Technologies
  - concentration in Geographic Information Systems
  - concentration in Tropical Conservation and Development
  - concentration in Wetland Sciences
- Master of Arts in Teaching
  - without a concentration
  - concentration in Geographic Information Systems
  - concentration in Tropical Conservation and Development
  - concentration in Wetland Sciences
- Master of Science
  - without a concentration
  - concentration in Applications of Geographic Technologies
  - concentration in Geographic Information Systems
  - concentration in Hydrologic Sciences
  - concentration in Tropical Conservation and Development
  - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Geography Courses

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>GEO 6119</td>
<td>Proposal Writing in Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEO 6160</td>
<td>Introduction to Quantitative Methods for Geographers</td>
<td>3</td>
</tr>
<tr>
<td>GEO 6161</td>
<td>Intermediate Quantitative Methods for Geographers</td>
<td>3</td>
</tr>
<tr>
<td>GEO 6166</td>
<td>Advanced Quantitative Methods for Spatial Analysis</td>
<td>3</td>
</tr>
<tr>
<td>GEO 6255</td>
<td>Climatology</td>
<td>3</td>
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<tr>
<td>GEO 6282</td>
<td>Fluvial Morphology</td>
<td>3</td>
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<tr>
<td>GEO 6348</td>
<td>Floods Seminar</td>
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<td>GEO 6375</td>
<td>Land Change Science Seminar</td>
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<td>GEO 6451</td>
<td>Medical Geography</td>
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<td>GEO 6455</td>
<td>Advanced Study Design in Medical Geography</td>
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<td>GEO 6905</td>
<td>Individual Work</td>
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<td>GEO 6921</td>
<td>How to Survive and Thrive in Academia</td>
<td>1</td>
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<td>GEO 6931</td>
<td>Seminar in Cultural and Political Ecology</td>
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<td>GEO 6938</td>
<td>Selected Topics in Geography</td>
<td>1-5</td>
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<tr>
<td>GEO 6971</td>
<td>Research for Master’s Thesis</td>
<td>1-15</td>
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<td>GEO 7979</td>
<td>Advanced Research</td>
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<td>GEO 7980</td>
<td>Research for Doctoral Dissertation</td>
<td>1-15</td>
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<td>GED 6341</td>
<td>Shelter and Care Options for U.S. Elderly</td>
<td>3</td>
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<tr>
<td>GIS 5008C</td>
<td>Maps and Graphs</td>
<td>4</td>
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<tr>
<td>GIS 5028C</td>
<td>Advanced Aerial Photo Interpretation</td>
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<td>GIS 5038C</td>
<td>Remote Sensing</td>
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<tr>
<td>GIS 5107C</td>
<td>Geographic Information Systems in Research</td>
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<td>GIS 6104</td>
<td>Spatial Networks</td>
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<td>GIS 6117</td>
<td>Applied Geostats</td>
<td>3</td>
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<td>GIS 6425C</td>
<td>GIS Models for Public Health</td>
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<td>MET 5504</td>
<td>Weather and Forecasting</td>
<td>3</td>
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<td>MET 6530</td>
<td>Hurricanes</td>
<td>3</td>
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<tr>
<td>MET 6565</td>
<td>Seminar in Atmospheric Teleconnections</td>
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<td>MET 6752</td>
<td>Spatial Analysis of Atmospheric Data using GIS</td>
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Geography Departmental Courses

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<th>Code</th>
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<tr>
<td>GEA 6419</td>
<td>Seminar: South America</td>
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<td>GEA 6466</td>
<td>Seminar on Geography of Amazonia</td>
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<td>GEO 5305</td>
<td>Environmental Biogeography</td>
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<td>GEO 5920</td>
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<td>GEO 6119</td>
<td>Contemporary Geographic Thought and Research</td>
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<td>Spatial Econometrics and Modeling</td>
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<td>Floods Seminar</td>
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<td>Land Change Science Seminar</td>
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<td>GEO 6408</td>
<td>Parks and People</td>
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<td>GEO 6451</td>
<td>Medical Geography</td>
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<td>GEO 6455</td>
<td>Advanced Study Design in Medical Geography</td>
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<tr>
<td>GEO 6905</td>
<td>Individual Work</td>
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<td>GEO 6921</td>
<td>How to Survive and Thrive in Academia</td>
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GEO 6931 Seminar in Cultural and Political Ecology 3
GEO 6938 Selected Topics in Geography 1-5
GEO 6971 Research for Master's Thesis 1-15
GEO 7979 Advanced Research 1-12
GEO 7980 Research for Doctoral Dissertation 1-15
GEY 6341 Shelter and Care Options for U.S. Elderly 3
GIS 5008C Maps and Graphs 4
GIS 5028C Advanced Aerial Photo Interpretation 3
GIS 5038C Remote Sensing 4
GIS 5107C Geographic Information Systems in Research 4
GIS 6104 Spatial Networks 3
GIS 6117 Applied Geostats 3
GIS 6325 GIS Analysis of Hazard Vulnerability 3
GIS 6425C GIS Models for Public Health 3
GIS 6456C Applications in GIS for Zoonoses and Disease Ecology 3
MET 5504 Weather and Forecasting 3
MET 6530 Hurricanes 3
MET 6565 Seminar in Atmospheric Teleconnections 3
MET 6752 Spatial Analysis of Atmospheric Data using GIS 3

Student Learning Outcomes

Geography (PHD)

SLO 1 Knowledge
Students will describe, identify, and discuss both orally and in writing the subject matter related to their discipline.

SLO 2 Skills
Students will identify, examine and explain the emerging science in their discipline.

SLO 3 Professional Behavior
Students will exhibit professional behavior and ethical practice during the conduct of their research.

Geography (MA)

SLO 1 Knowledge
Students will describe, identify, and discuss both orally and in writing the subject matter related to their discipline.

SLO 2 Skills
Students will identify, examine and explain the emerging science in their discipline.

SLO 3 Professional Behavior
Students will exhibit professional behavior and ethical practice during the conduct of their research.

Geography (MS)

SLO 1 Knowledge
Students will describe, identify, and discuss both orally and in writing the subject matter related to their discipline.

SLO 2 Skills
Students will identify, examine and explain the emerging science in their discipline.

SLO 3 Professional Behavior
Students will exhibit professional behavior and ethical practice during the conduct of their research.

Geological Sciences Department

Chair: David A. Foster
Graduate Coordinator: R. M. Russo

The Department of Geological Sciences is composed of a group of internationally recognized faculty, graduate students, and dedicated support staff. Faculty and students in the Department of Geological Sciences are involved in exciting and groundbreaking research projects throughout the world and in Florida. The Department houses world-class analytical and computing facilities for research and teaching.

The Department has identified six primary areas of emphasis in its research and teaching programs: environmental geology and hydrology, paleoclimatology, tectonophysics, geochemistry and mineralogy/petrology, marine and coastal geology, and paleomagnetism. The Department has collaborative, interdisciplinary programs of study and research with the Florida Museum of Natural History, the Center for Wetlands Research, the Land Use and Environmental Change Institute (L.U.E.C.I.), the Florida Climate Institute, and the University of Florida Water Institute.

For information on our degree programs, current departmental activities, faculty, and research centers, please see the program page below and http://geology.ufl.edu.

Majors

- Geology (p. 388)

Faculty

Professor

- Bianchi, Thomas S.
- Brenner, Mark
- Forte, Alessandro Marco
- Foster, David A.
- Jones, Douglas S.
- Martin, Ellen Eckels
- Martin, Jonathan Bowman
- Meert, Joseph G.
- Mueller, Paul A.
- Screaton, Elizabeth Jane

Associate Professor

- Adams, Peter N.
- Ciesielski, Paul F.
- Dutton, Andrea Lynn
- Jaeger, John M.
- Russo, Raymond Michael
- Zimmerman, Andrew R.

Assistant Professor

- Dannberg, Juliane
- Elardo, Stephen M.
- Hatfield, Robert George
- Sprain, Courtney Jean
- Williams, Amy Jo
Geology Program

Program Information

The Department of Geological Sciences offers programs leading to the Master of Science (thesis), the Master of Science in Teaching (non-thesis), and the Doctor of Philosophy degrees in geology. Minimum requirements for these degrees are described in the Graduate Degrees (p. 48) section of this catalog.

For admission to graduate status in the Department of Geological Sciences, a student must have a baccalaureate degree with a major in geology or a related field or its equivalent. Deficiencies in undergraduate preparation can be corrected by completing the undergraduate courses without credit while enrolled as a graduate student.

Applicants should take the GRE general test. The scores of this examination must be reported to the Department of Geological Sciences. Three letters of recommendation are also required for admission to the doctoral program and for financial aid applications at any level.

A minimum of 32 semester hours of graduate level courses are required for the Master of Science in geology. At least 24 hours must be in organized graduate-level geology courses (excluding research, teaching, special projects, etc.). Six hours of thesis research credit are required. All master’s degrees are terminal; a separate and new application for admission to the doctoral program is required.

For the Master of Science in Teaching degree, at least 36 hours are required. Six of these hours must be in GLY 6943 (cr.) and at least 24 must be in organized graduate-level geology courses. The remaining 6 hours must be in approved electives. A minor in education is required. Candidates also must pass the final oral examination.

90 semester hours of graduate-level class work are required for the Ph.D., including organized course work, individual work, supervised research and teaching, advanced research, dissertation, special projects, or courses in a related field.

The Department offers a combined bachelor’s/master’s degree program. Contact the graduate coordinator for information.

For more information, please see the program page below and our department website: http://geology.ufl.edu.

Degrees Offered

Degrees Offered with a Major in Geology

- Doctor of Philosophy
  - without a concentration
  - concentration in Climate Science
  - concentration in Hydrologic Sciences
  - concentration in Tropical Conservation and Development
  - concentration in Wetland Sciences
- Master of Science
  - without a concentration
  - concentration in Hydrologic Sciences
  - concentration in Tropical Conservation and Development
  - concentration in Wetland Sciences
  - concentration in Climate Science
- Master of Science in Teaching
  - without a concentration
  - concentration in Climate Science
  - concentration in Tropical Conservation and Development
  - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Geology Program Courses

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<td>GLY 5246</td>
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<td>GLY 5247</td>
<td>Surface and Ground Water Interactions</td>
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<td>GLY 5255</td>
<td>Organic Geochemistry and Geobiology</td>
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<td>GLY 5328</td>
<td>Advanced Igneous Petrology</td>
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<td>GLY 5455</td>
<td>Introduction to Geophysics and Tectonics</td>
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<td>GLY 5466</td>
<td>Seismology and Earth Structure</td>
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<td>Terrestrial Gravity and Magnetism</td>
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<td>Sedimentology</td>
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<td>Continental Margin Stratigraphy</td>
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<td>Geomorphology</td>
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<td>GLY 5827</td>
<td>Ground Water Geology</td>
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<td>GLY 6075</td>
<td>Global Climate Change: Past, Present, and Future</td>
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<td>Topics in Geochemistry</td>
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<td>GLY 6425</td>
<td>Tectonics</td>
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<td>GLY 6519</td>
<td>Stratigraphy and Timescales</td>
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<td>Hydrogeologic Modeling</td>
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<td>GLY 6862</td>
<td>Quantitative Methods in Earth Sciences</td>
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<td>Individual Work</td>
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<td>GLY 6971</td>
<td>Research for Master’s Thesis</td>
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</tbody>
</table>
SLO 3 Professional Behavior
Students will conduct research in an ethical and responsible manner.

Geology (MST)

SLO 1 Knowledge
Students will articulate orally and in writing the results and applications of their research and scholarship, using the basic concepts, theories, and observational findings related to Earth materials and processes, as they pertain to the student’s research.

SLO 2 Skills
Students will analyze data in the published literature; synthesize analog and digital datasets to produce original geologic maps and/or datasets; apply the scientific method to analysis of published and self-generated data.

SLO 3 Professional Behavior
Students will conduct research in an ethical and responsible manner.

History Department

Chair: Elizabeth Dale
Graduate Coordinator: Michelle Campos

The Department of History offers the following graduate degrees: Master of Arts with fields of specialization in African, European, Latin American, and United States history, and the Doctor of Philosophy with fields of specialization in African, European, Latin American, and United States history. We offer minor concentrations in the thematic fields of Atlantic, Gender, Legal, Religious, and World History. Students interested in transnational and comparative work may also create their own dual major. In addition to materials required by the Graduate School for admission, applicants must send directly to the History Department the following evidence of aptitude and interest:

- Three recommendations, from persons competent to evaluate your potential for graduate work;
- A 3- to 5-page essay identifying your career goals and particular areas of interest;
- A sample of your written work in history.

Interested students should consult the department web page for more information.

For more information, please visit https://history.ufl.edu/.

Majors

- History (p. 390)
Faculty

Professor
- Adams, Sean P.
- Adler, Jeffrey S.
- Curta, Florin
- Dale, Elizabeth Ruth
- Davis, Jack Emerson
- Gallman, James Matthew
- Geggus, David P.
- Goda, Norman Jacob
- Guerra, Lillian
- Hart, Mitchell B.
- Hunt, Nancy Rose
- Kwolek-Folland, Angel
- Needell, Jeffrey D.
- Sensbach, Jon F.
- Spillane, Joseph F.
- White, Luise Susan

Associate Professor
- Campos, Michelle U.
- Esenwein, George Richard
- Freifeld, Alice
- Harland-Jacobs, Jessica Leigh
- Jacobs, Matthew Fay
- Kroen, Sheryl T.
- Newman, Louise Michelle
- Obrien, Susan M.
- Ortiz, Paul Andrew
- Wise, Benjamin Evan

Assistant Professor
- Bernstein, Seth Franklin
- Bretones Lane, Fernanda
- Deardorff, Max Thomas
- Janzen, Philip Bernard
- Matytsin, Anton Mikhailovich
- Pearlman, Lauren
- Vrana, Heather A.

Eminent Scholar
- Link, William

Master Lecturer
- Noll, Steven G.

Affiliated Faculty
- Caputo, Nina
- Leedy, Todd H.
- Other
- Smocovitis, Vassiliki B.
  Professor

History

Program Information

The Department of History offers the following graduate degrees: Master of Arts degree with fields of specialization in African, European, Latin American, and United States history and the Doctor of Philosophy degree with fields of specialization in African, European, Latin American, and United States history, or with a dual major which allows students to combine two minor fields to create their own major fields. We offer minor concentrations in the thematic fields of Atlantic, Gender, Legal, Religious, and World History.

Master of Arts: This degree serves to prepare students for admission to a Ph.D. program, for a teaching career in high school or community colleges, or for a career in government or business.

Fields of specialization:
- African (East Africa, Southern Africa, West Africa)
- European (medieval, early modern, or modern)
- Latin American (colonial Latin America, post-Colonial Latin America, Brazil, and the Caribbean or Spanish America)
- United States history (early America, 19th century, 20th century)

Thesis option requirements:
- A minimum of 30 credit hours
- At least 15 graduate-level regular course credit hours in your major field. In European, you must take at least two seminars in your area of specialization. In U.S. history, you must take the 19th-century America readings seminar, either the 20th-century or early America readings seminar, and at least one research seminar. In Latin American and African history, you must take the relevant readings seminars in your area of specialization, one other readings seminar, and at least one research seminar.
- At least 6 graduate-level regular course credit hours outside the major field (but in the Department of History). We recommend that you invest these regular course hours in readings seminars.
- Take 3 hours of historiography (HIS 6061 Introduction to Historiography (3 cr.)) by the fourth semester of graduate study.
- Take 3 regular course credit hours from outside the Department. These should be graduate-level hours, but undergraduate 3000 or 4000 level hours may be taken subject to approval by your adviser.
- Complete a master's thesis of original historical research. The semester you graduate, you must be registered for a minimum of 3 thesis research hours (HIS 6971 Research for Master's Thesis (1-15 cr.)) in the fall or spring terms or 2 in a summer term. Your thesis should demonstrate your ability to handle the primary-source material of your field, and a working knowledge of the secondary literature; and should demonstrate your ability to present research results in a coherent, well-written study. The student must complete the thesis and make it available to readers 2 weeks before the oral examination, complete the application for the degree at the Office of the University Registrar before the deadline, and take the examination.
- Each student must pass a final comprehensive oral examination at the end of the program.
Non-thesis option requirements:

- A minimum of 30 credit hours.
- At least 15 graduate-level regular course credit hours inside your major field. In European, you must take at least two seminars in your area of specialization. In U.S. history, you must take the 19th-century American readings seminar, either the 20th-century or the early America readings seminar, and at least one research seminar. In Latin American or African history, you must take the relevant readings seminars in your area of specialization, one other readings seminar, and at least one research seminar.
- At least 6 graduate-level regular course credit hours outside your major field (but in the Department of History). We recommend that you invest these regular course hours in readings seminars.
- Take 3 hours of historiography (HIS 6061 Introduction to Historiography (3 cr.)) by your fourth semester of graduate study.
- Take 3 regular course credit hours from outside the Department; these should be graduate-level hours, but undergraduate 3000 or 4000 level hours may be taken subject to approval by your adviser.
- Complete a research seminar and/or a non-thesis project in history. Your primary goal in either is to complete an article-length essay (approximately 35 to 40 pages) of publishable or near-publishable quality. The essay should be based largely on primary sources.
- You must pass a final comprehensive oral and written examination conducted by your supervisory committee.

Supervisory committee for the M.A.: The committee normally consists of the chair and two other members of the graduate faculty. Additional members may be added if desirable. The committee assists in planning and supervising the student’s program and conducts the final examination. The chair is also the thesis director if that option is chosen.

Duration: The M.A. program can be completed in 3 semesters of full-time registration but may take longer. The Department believes that normally no more than 4 semesters of full-time registration should be spent on the degree. These semesters need not be consecutive. The Board of Education has established 60 credit hours as a maximum for the master’s degree. Up to 6 credits of graduate-level courses taken at another school with a grade of B or better may be transferred into the master’s program if approved by the Graduate School.

Bachelor’s/master’s program: The Department offers a combined 4/1 degree program that enables outstanding undergraduates to obtain both the B.A. and M.A. degrees in history after successful completion of 150 credit hours. The program is designed for the students who wish to continue their education in history past the bachelor’s level but do not intend to pursue a doctorate in history, or for students who wish to expand their training in a specific field before moving on to a doctoral program. The department offers a 4/1 degree program in the standard M.A. fields of study as well as oral history. Please see the Department website for more information. Students in this program are not eligible for departmentally controlled financial aid.

Doctor of Philosophy requirements:

- Professional mastery of your major field, or major fields for students pursuing a dual degree.
- Professional competence in a minor field, which may be drawn from the approved major fields of specialization for the doctorate (African, European, Latin American, or U.S. history), from approved minor fields (Atlantic history, gender, legal history), or may be self designed as a thematic research or teaching field. It must include at least 3 hours outside the historical area that defines your major field. Note: Students pursuing a dual major do not take a department minor field.
- At least 3 regular course credit hours from outside the Department; these should be graduate-level hours, but undergraduate 3000 or 4000 level hours may be taken subject to approval by your adviser.
- Pass a set of written and oral qualifying examinations testing competence in major and additional fields and your knowledge of the nature of history and the historian’s task.
- A dissertation of original historical research for which credit is given in HIS 7980 Research for Doctoral Dissertation (1-15 cr.).

History/law joint degree program: The Department of History and the College of Law offer a program in legal history leading to either the M.A. or a Ph.D. degree in history and the J.D. in law. Because the faculties of history and law stress interdisciplinary training, students admitted to the joint degree program will be allowed to count a significant number of hours toward both degrees. Applicants must be accepted by both the Graduate School and the College of Law. Normally, students will complete the course and examination requirements of both degrees in 4 years. Students may begin their first year of work in either history or law, but they must complete the first year of law school within 1 year and they must do so within the first 2 years after admission to the joint degree program. For further information write to the:

Legal History Coordinator
Department of History
University of Florida
Box 117320
Gainesville, FL 32611-7320.

Degrees Offered with a Major in History

- Doctor of Philosophy
  - without a concentration
  - concentration in Historic Preservation
  - concentration in Women’s/Gender Studies
- Master of Arts
  - without a concentration
  - concentration in Historic Preservation
  - concentration in Jewish Studies

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

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<td>Africa</td>
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<td>AFH 6936</td>
<td>Readings in African History</td>
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<tr>
<td>AMH 5405</td>
<td>The South to 1860</td>
<td>3</td>
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<td>AMH 5930</td>
<td>Topics in United States History</td>
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<td>AMH 6198</td>
<td>Early American Society</td>
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<td>AMH 6199</td>
<td>Nineteenth Century America</td>
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<td>AMH 6290</td>
<td>Modern America</td>
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<td>AMH 6406</td>
<td>Readings in Southern History, 1607-1865</td>
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<td>AMH 6465</td>
<td>Seminar in U.S. Urban History</td>
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AMH 6516 Seminar in American Foreign Relations and Expansion 3
AMH 6557 Seminar in Constitutional or Legal History of the United States 3
ASH 5388 Topics in East Asian History 3
EUH 5195 The Archaeology of the Middle Ages 3
EUH 5934 Topics in European History 3
EUH 6126 Readings in Medieval History 3
EUH 6174 Conversion in the Middle Ages 3
EUH 6177 Economy and Society in Late Antiquity and the Early Middle Ages 3
EUH 6289 Readings, Modern Europe 3
EUH 6469 Modern German History 3
HIS 5485 Special Studies in the History of Science 3
HIS 5939 Second-Year Research Seminar 3
HIS 6061 Introduction to Historiography 3
HIS 6416 Problems in Comparative Legal History 3
HIS 6445 Postcolonial Theories 3
HIS 6488 Readings in the History of Science 1-4
HIS 6905 Individual Study 1-3
HIS 6910 Supervised Research 1-5
HIS 6940 Supervised Teaching 1-5
HIS 6943 Internship in Historical Applications 2-4
HIS 6957 Nonthesis Project in History 1-3
HIS 6971 Research for Master’s Thesis 1-15
HIS 7979 Advanced Research 1-12
HIS 7980 Research for Doctoral Dissertation 1-15
LAH 5438 Modern Mexico 3
LAH 5476 Caribbean History to 1800: Slavery, Colonization, and International Conflict 3
LAH 5527 Andean Nations 3
LAH 5607 History of Amazonia 3
LAH 5637 Brazil Since 1750 3
LAH 5934 Topics in Caribbean History 3
LAH 5934 Topics in Latin American History 3
LAH 6934 Seminar in Colonial Spanish America 3
LAH 6936 Seminar in History of Brazil 3
LAH 6938 Seminar in Modern Spanish America 3
WOH 5932 Topics in World History 3

History Departmental Courses

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<td>Topics in East Asian History</td>
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EUH 5195 The Archaeology of the Middle Ages 3
EUH 5934 Topics in European History 3
EUH 6126 Readings in Medieval History 3
EUH 6174 Conversion in the Middle Ages 3
EUH 6177 Economy and Society in Late Antiquity and the Early Middle Ages 3
EUH 6289 Readings, Modern Europe 3
EUH 6469 Modern German History 3
HIS 5485 Special Studies in the History of Science 3
HIS 5939 Second-Year Research Seminar 3
HIS 6061 Introduction to Historiography 3
HIS 6416 Problems in Comparative Legal History 3
HIS 6445 Postcolonial Theories 3
HIS 6488 Readings in the History of Science 1-4
HIS 6905 Individual Study 1-3
HIS 6910 Supervised Research 1-5
HIS 6940 Supervised Teaching 1-5
HIS 6943 Internship in Historical Applications 2-4
HIS 6957 Nonthesis Project in History 1-3
HIS 6971 Research for Master’s Thesis 1-15
HIS 7979 Advanced Research 1-12
HIS 7980 Research for Doctoral Dissertation 1-15
LAH 5438 Modern Mexico 3
LAH 5476 Caribbean History to 1800: Slavery, Colonization, and International Conflict 3
LAH 5527 Andean Nations 3
LAH 5607 History of Amazonia 3
LAH 5637 Brazil Since 1750 3
LAH 5934 Topics in Caribbean History 3
LAH 5934 Topics in Latin American History 3
LAH 6934 Seminar in Colonial Spanish America 3
LAH 6936 Seminar in History of Brazil 3
LAH 6938 Seminar in Modern Spanish America 3
WOH 5932 Topics in World History 3

Student Learning Outcomes

History (PHD)

SLO 1 Knowledge
Students will identify, define, and describe major issues in the history of their fields of study as well as mastery of the relevant body of historiography

SLO 2 Skills
Students will design and teach courses as teaching assistants or primary instructors

SLO 3 Professional Behavior
Students will contribute to the international community of historians in their field through the publication of their research, and through presentations at seminars, workshops and conferences

SLO 4 Skills and Content Knowledge
Students will apply and demonstrate the methods and practices of historical research and writing

History (MA)

SLO 1 Knowledge
Students will identify, define, and describe major issues in the history of their fields of study as well as mastery of the relevant body of historiography
SLO 2  Professional Behavior
Students write journal quality papers

SLO 3  Skills
Students will describe, define and apply methods and practices of historical research and writing

Linguistics Department

Chair: Eric Potsdam
Graduate Coordinator: Brent Henderson

The Linguistics Department offers graduate programs leading to the M.A. and Ph.D. degrees with specializations in

- The core areas of linguistics (phonetics, phonology, morphology, syntax, semantics, pragmatics)
- Language documentation
- Sociolinguistics and language change
- Discourse analysis
- TESL
- Second language acquisition
- Psycholinguistics
- Neurolinguistics

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog. For detailed information on the program, please visit the link below. For further information on the program, including financial aid, please visit http://lin.ufl.edu.

Majors

- Linguistics (p. 393)

Faculty

Professor
- Boxer, Diana
- Potsdam, Eric H.

Associate Professor
- Hatav, Galia
- Henderson, Brent Mykel
- Kaan, Edith
- Wayland, Ratree
- Wiltshire, Caroline R.

Assistant Professor
- Rossi, Eleonora
- Tang, Kevin
- Wulff, Stefanie

Other
- Garner, James R.

Clinical Professor
- Golombek, Paula R.

Senior Lecturer
- Butler, Emily Rine

Affiliated Faculty
- Aaron, Jessica Elana
  Associate Professor
- Antes, Theresa A.
  Associate Professor
- Blondeau, Helene
  Associate Professor
- Broadwell, George Aaron
  Professor
- Essegbey, James
  Associate Professor
- Haddad, Youssef A.
  Associate Professor
- Hebblethwaite, Benjamin John
  Associate Professor
- Lord-Ward, Gillian E.
  Professor
- McLaughlin, Fiona
  Professor
- Pham, Andrea Hoa
  Associate Professor
- Pharies, David A.
  Professor
- Valdes Kroff, Jorge Rodrigo
  Assistant Professor
- Wehmeyer, Ann Kathryn
  Associate Professor

Linguistics

Program Information
The Linguistics Department offers graduate programs leading to the M.A. and Ph.D. degrees with specializations in

- The core areas of linguistics (phonetics, phonology, morphology, syntax, semantics, pragmatics)
- Language documentation
- Sociolinguistics and language change
- Discourse analysis
- TESL
- Second language acquisition
- Psycholinguistics
- Neurolinguistics

For detailed information on the program, including financial aid, please visit the website http://lin.ufl.edu.

The Certificate in Second Language Acquisition and Teaching is offered to University of Florida graduate degree-seeking students in linguistics and related disciplines.

As part of its service to the University community, Linguistics also offers English as a Second Language training for international applicants and admitted students. These programs, the English Language Institute (ELI),
Academic Written English (AWE), and Academic Spoken English (ASE), are described in the Student Services (p. 38) section of this catalog. This information, along with links to the application form, are available at http://lin.ufl.edu.

Applicants who lack a background in linguistics should develop basic competency in the core areas before commencing graduate work. These deficiencies can be met by taking LIN 3010 Introduction to Linguistics (3 cr.), LIN 3201 The Sounds of Human Language (3 cr.), and LIN 3460 The Structure of Human Language (3 cr.) or the equivalent.

## Degrees Offered

### Degrees Offered with a Major in Linguistics

- Doctor of Philosophy
- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

## Courses

### Linguistics Departmental Courses

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## Student Learning Outcomes

### Linguistics (PhD)

- **SLO 1: Knowledge**
  Student defines, describes, and uses terminology and basic concept from the core areas of linguistics

- **SLO 2: Skills**
  Student critically analyzes and interprets language-related data and theories

- **SLO 3: Professional Behavior**
  Student designs and conducts a language-related program of inquiry producing original research

### Linguistics (MA)

- **SLO 1: Knowledge**
  Student defines, describes, and uses terminology and basic concept from the core areas of linguistics

- **SLO 2: Skills**
  Student critically analyzes and interprets language-related data and theories

- **SLO 3: Professional Behavior**
  Student engages in ethical human data collection, appropriate professional conduct, and ethical academic writing practices (as established by Linguistic Society of America Ethics Statement)

## Mathematics Department

**Chair**: Kevin Knudson  
**Graduate Coordinator**: Peter Sin

The Department of Mathematics offers the Master of Science (thesis or non-thesis) and the Doctor of Philosophy degrees. The non-thesis Master of Arts in Teaching and Master of Science in Teaching are also offered. Minimum requirements for these degrees are described in the Graduate Degrees (p. 48) section of this catalog.

Areas of specialization for graduate research include algebra, number theory, analysis, geometry, topology, logic and set theory, differential equations, dynamical systems, probability theory, optimization, combinatorial theory, biomathematics, and imaging. Faculty and graduate students in mathematics interact with counterparts in biology, biostatistics, computer science, industrial and systems engineering, philosophy, statistics, and the Emerging Pathogens Institute. The department houses the Center for Applied Mathematics and participates in the Center for Applied Optimization.

Aside from the regularly scheduled courses, the department offers a variety of seminars and special topics courses which engage faculty and graduate students at the frontiers of research.

For more information, please see the program page below or our website: http://www.math.ufl.edu.
Majors

- Mathematics (p. 395)

Faculty

Professor

- Alladi, Krishnaswami
- Berkovich, Alexander
- Block, Louis S.
- Bona, Miklos
- Boyland, Philip Lewis
- Brooks, James K.
- Cenzer, Douglas A.
- Garvan, Francis G.
- Glover, Joseph
- Keesling, James E.
- Knudson, Kevin P.
- Martcheva, Maia
- Mccullough, Scott A.
- Pilyugin, Sergei S.
- Rao, Murali
- Robinson, Paul L.
- Rudyak, Yuli B.
- Shabanov, Sergei
- Sin, Peter K.
- Singer, Burton H.
- Turull, Alexandre
- Vince, Andrew J.
- Zapletal, Jindrich

Associate Professor

- Bubenik, Peter
- Crew, Richard Malcolm
- Groisser, David Joel
- Jury, Michael Thomas
- Keating, Kevin P.
- King, Jonathan Leo Flagler
- Olson, Timothy Edward
- Rong, Libin
- Vatter, Vincent
- Zhang, Lei

Assistant Professor

- Bartosova, Dana
- Di Cerbo, Luca Fabrizio
- Hamaker, Zachary
- Marsiglietti, Arnaud
- Ngonghala, Calistus
- Pascoe, James Eldred
- Pollock, Sara N.
- Thormer, Jesse

- Wheeler, Tracy Stepien
- Yu, Cheng

Distinguished Professor

- Chen, Yunmei
- Dranishnikov, Alexander Nikolae
- Hager, William Ward

Mathematics

Program Information

The Department of Mathematics offers the degrees of Doctor of Philosophy, Master of Science, and the Master of Arts in Teaching and Master of Science in Teaching, each with a major in mathematics. Complete descriptions of the minimum requirements for these degrees are provided in the Graduate Degrees (p. 48) section of this catalog.

The Department has an accelerated bachelor's/master's program designed for superior undergraduate students who have the ability to pursue such a plan of study leading to the Master of Science degree. The main feature of the program is that up to 12 semester hours of approved graduate level mathematics courses may be used as dual credit for both the undergraduate and the graduate degree. All other requirements for both the bachelor's degree and the master's degree must be met. For admission requirements for this program, see the undergraduate coordinator.

There are opportunities for concentrated study in a number of specific areas of pure and applied mathematics at both the master's and doctoral levels. The faculty directs studies and research in algebra, number theory, analysis, geometry, topology, logic and set theory, differential equations, dynamical systems, probability theory, optimization, combinatorial theory, biomathematics, and imaging.

In addition to the requirements of the Graduate School, the minimum prerequisite for admission to the program of graduate studies in mathematics is the completion, with an average grade of B or better, of at least 24 credits of undergraduate mathematics, including a full year of calculus and three semesters of appropriate work beyond the calculus. The most appropriate courses for this purpose are advanced calculus, linear algebra and abstract algebra. Students lacking part of the requirements will be required to make up the deficiency early in their graduate work.

Prerequisites to individual courses should be determined before registration by consultation with the instructor concerned. Some of the courses listed are offered only as needed. Since times of offering courses are estimated a year in advance, certain changes may be made if needs are known by the Department.

Students pursuing the master's degree in mathematics must pass two comprehensive written examinations, one in algebra and one in analysis or prepare and provide an oral defense of a thesis on original research conducted under the supervision of a faculty adviser. Students pursuing the Master of Arts in Teaching or the Master of Science in Teaching degree must prepare a teaching portfolio and pass an oral examination. Each of these programs normally requires two years for completion.

The requirements for a doctoral degree include 36 hours of 6000-level course work in mathematics; no hours of teaching, colloquium, dissertation, or individual work will count toward this requirement.
To become a candidate for the doctoral degree, the student must pass a comprehensive preliminary examination with written and oral components administered by the Department. The doctoral student must also pass a reading knowledge examination in one of the following foreign languages: French, German, or Russian. The dissertation is an important requirement for the doctoral degree in mathematics. The topic for the dissertation may be chosen from a number of areas of current research in pure and applied mathematics.

Details concerning all requirements for graduate degrees in mathematics may be obtained by writing the Mathematics Department Graduate Selection Committee or consulting the Department website, http://www.math.ufl.edu.

**Degrees Offered**

**Degrees Offered with a Major in Mathematics**

- Doctor of Philosophy
  - without a concentration
  - concentration in Imaging Science and Technology
  - concentration in Quantitative Finance
- Master of Arts in Teaching
- Master of Science
- Master of Science in Teaching

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

### Mathematics Courses

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<th>Title</th>
<th>Credits</th>
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<td>MAA 5105</td>
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<td>MAA 5229</td>
<td>Modern Analysis II</td>
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<tr>
<td>MAA 5404</td>
<td>Introduction to Complex Variables for Engineers and Physical Scientists</td>
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<td>Complex Analysis I</td>
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<td>MAP 6472</td>
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<td>MAP 6473</td>
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<td>MAP 6487</td>
<td>Biomathematics Seminar I</td>
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<td>MAP 6488</td>
<td>Biomathematics Seminar I</td>
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<td>MAP 6505</td>
<td>Mathematical Methods of Physics and Engineering</td>
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<td>MAP 6506</td>
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<td>MAP 6941</td>
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<td>MAP 7436</td>
<td>Seminar in Applied Mathematics I</td>
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<td>MAP 7437</td>
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<td>MAS 5311</td>
<td>Introductory Algebra I</td>
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<td>Algebra I</td>
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<td>MAS 6332</td>
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<td>MAT 6910</td>
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<td>MAT 6923</td>
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<td>MAT 6971</td>
<td>Research for Master's Thesis</td>
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<td>MAT 7979</td>
<td>Advanced Research</td>
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<td>MAT 7980</td>
<td>Research for Doctoral Dissertation</td>
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<tr>
<td>MHE 5107</td>
<td>Introduction to Set Theory</td>
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<td>MHE 5207</td>
<td>Foundations of Mathematics</td>
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<td>MHE 6306</td>
<td>Mathematical Logic I</td>
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</tr>
<tr>
<td>MTG 5316</td>
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<td>MTG 5317</td>
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<tr>
<td>MTG 5411</td>
<td>Introduction to Fractal Geometry</td>
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<tr>
<td>MTG 5412</td>
<td>Introduction to Dynamical Systems and Chaos</td>
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<td>MTG 6256</td>
<td>Differential Geometry I</td>
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<td>MTG 6257</td>
<td>Differential Geometry II</td>
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<td>Ergodic Theory and Dynamical Systems I</td>
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<tr>
<td>MTG 7396</td>
<td>Advanced Topics in Topology I</td>
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</tbody>
</table>
Student Learning Outcomes

Mathematics (PHD)

SLO 1  Knowledge
Describes and explains advanced knowledge of at least one chosen specialty and conducts research in it.

SLO 2  Skills
Communicates mathematical thinking through clear and compelling arguments to faculty, peers and others.

SLO 3  Professional Behavior
Teaches mathematical courses in a professional manner, assessing the appropriate level of presentation for the students, creating an atmosphere conducive to learning, and supporting student-teacher interactions for active learning.

Mathematics (MAT)

SLO 1  Knowledge
Demonstrates content knowledge relevant to mathematics teaching.

SLO 2  Skills
Communicates mathematics effectively through prior organization of material, effective use of the blackboard or other presentation media, compelling choice of illustrative examples, and emphasis on methods of solving problems rather than on presenting solutions.

SLO 3  Professional Behavior
Prepares for lessons; arrives on time; conducts themselves appropriately.

Mathematics (MS)

SLO 1  Knowledge
Depth: Either solves problems in two areas from algebra/analysis/applied/topology or conducts research in mathematics at the master’s level.

SLO 2  Skills
Writes extended mathematical prose to the precision required by the discipline and supports mathematical arguments with logical reasoning.

SLO 3  Professional Behavior
Teaches mathematical courses in a professional manner, assessing the appropriate level of presentation for the students, creating an atmosphere conducive to learning, and supporting student-teacher interactions for active learning.

Mathematics (MST)

SLO 1  Knowledge
Describes and explains content knowledge relevant to mathematics and teaching.

SLO 2  Skills
Communicates mathematics effectively through prior organization of material, effective use of the blackboard or other presentation media,
compelling choice of illustrative examples, and emphasis on methods of solving problems rather than on presenting solutions.

SLO 3 Professional Behavior
Prepares for lessons; arrives on time; conducts themselves appropriately

 Philosophy Department

Chair: John Palmer
Graduate Coordinator: Stewart Duncan

The Philosophy Department offers the Master of Arts and the Doctor of Philosophy degrees. General requirements for these degrees are described in the Graduate Degrees (p. 48) section of this catalog, and program-specific requirements are provided on the Philosophy Program page.

The Department is dedicated both to pursuing high quality research and providing a rigorous education to its graduate students, whether pursuing just the M.A. or the Ph.D. Faculty provide philosophical expertise in a wide variety of areas, including ancient philosophy, modern philosophy, ethical theory, political theory, ethics of technology, bioethics, philosophy of education, metaphysics, epistemology, philosophy of mind, philosophy of logic, philosophy of science, philosophy of social science, philosophy of language, argument theory and Continental philosophy. For a full and updated list of areas of research see the pages of individual faculty (http://www.phil.ufl.edu/people.html?cat=faculty).

The M.A. program is suitable for those planning or considering a Ph.D. in Philosophy, for those who hope to gain an advanced degree prior to pursuing professional degrees in such fields as law and medicine, and for those who are considering advanced work in related fields such as linguistics, classical studies, religious studies, psychology, and political science.

The Ph.D. program is suitable for those planning to pursue an academic career, including both those focused more on research and those focused more on teaching. Graduates should expect to be trained in doing high quality research in philosophy, to be mentored in the practice of teaching, and to have opportunities for teaching in a broader array of contexts that should serve well the ability to teach courses in writing and the humanities more generally.

For more information, please see the program page as well as our website at http://phil.ufl.edu.

Majors

• Philosophy (p. 398)

Faculty

Professor

• Biro, John I.
• D’Amico, Robert
• Palmer, John Anderson

Associate Professor

• Auþer, Thomas P.
• Duncan, Stewart Douglas
• Ray, Gregory Brian
• Witmer, Gene

Assistant Professor

• Ahlberg, Jaime
• Dorst, Christopher
• Purves, Duncan W.
• Ross, Amber M.
• Rothschild, Jennifer Johnson

Other

• Borges, Rodrigo
• Pismenny, Arina
• Rick, Jonathan D.

Philosophy

Program Information

The Department of Philosophy offers graduate degree programs leading to the M.A. and the Ph.D. degrees in Philosophy.

Graduate students enjoy a supportive community. Teaching assistants are provided with shared office space, and most graduate students participate in organizing a yearly conference, the Southeast Graduate Philosophy conference (for more information, see http://www.phil.ufl.edu/seg (http://www.phil.ufl.edu/seg/)).

Admission to either program requires either a bachelor’s degree in philosophy or sufficient course work in philosophy as determined by the department. Applicants to either program are evaluated on the basis of their academic record, GRE scores, three letters of recommendation, a statement of purpose, and a writing sample. Students admitted into the Ph.D. program who do not already have an M.A. in Philosophy must complete the coursework requirements for the M.A. as part of their first two years of full-time enrollment in the Ph.D. program.

General Program Information

All graduate students must take in their first fall semester of enrollment the Graduate Proseminar (PHI 5935 Proseminar (3 cr.)), an intensive workshop requiring regular writing and presentation of philosophical papers; they must also take in that first year the foundational course on Graduate Logic (PHI 5135 Graduate Logic (3 cr.)). These two critical courses help ensure success in the core curriculum, which is designed to provide a thorough grounding in the three main divisions of philosophical work: history, value theory, and the various areas known together as M&E (“metaphysics and epistemology”).

Additional core courses include surveys in ancient philosophy (PHP 5005 Ancient Philosophy I (3 cr.) and PHP 5015 Ancient Philosophy II (3 cr.)), in modern philosophy (PHH 5405 Modern Philosophy I (3 cr.) and PHH 5406 Modern Philosophy II (3 cr.)), ethical theory (PHI 5665 Ethical Theory (3 cr.)), epistemology (PHI 5365 Epistemology (3 cr.)) and foundations of analytic philosophy (PHP 5785 Foundations of Analytic Philosophy (3 cr.)).

M.A. Program Information

The M.A. degree requires 36 hours of coursework, which can be completed in two years by registering for 9 credits each fall and spring semester. Distribution requirements mandate a selection of core courses and 6000-level seminars, while electives make up 6 hours of coursework.
Requirements include an oral Final Exam administered by a group of faculty selected by the Graduate Studies Committee.

**Ph.D. Program Information**

The Ph.D. requires 90 credit hours, which may include 36 used for the M.A., additional courses at the 6000-level, 3 proposal research hours, 12 doctoral research hours, and the successful completion and defense of a dissertation. In completing the Ph.D. advanced students will normally have an opportunity to teach their own undergraduate courses under the supervision of faculty as well as to work as a Teaching Assistant in many other courses.

**Funding**

Funding for graduate students is provided primarily by Teaching Assistantships. Newer teaching assistants assist with lower level courses (such as Introduction to Philosophy and Contemporary Moral Issues) and more experienced teaching assistants may assist with more advanced courses. M.A. students who have demonstrated exceptional teaching capabilities may have the chance to teach their own course during the summer after they have completed all course requirements for the degree. Advanced Ph.D. students more regularly get these opportunities, during the fall and spring semesters as well as the summer.

Some funding for supporting graduate student travel to conferences is available.

**Further Information**

For more information about the department in general, see its website at http://phil.ufl.edu.

More details about the M.A. and Ph.D. programs, their requirements, policies, and procedures, may be found at http://phil.ufl.edu/grad/grad-program.html.

Prospective students can find detailed information on the admissions process at http://phil.ufl.edu/grad.html?page=prospective.

Questions and requests for help can be directed to the Graduate Coordinator, who may be reached at gradcoord@phil.ufl.edu.

**Degrees Offered**

**Degrees Offered with a Major in Philosophy**

- Doctor of Philosophy
  - without a concentration
  - concentration in Ethics of Technology
- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

**Philosophy Courses**

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<td>PHI 5405</td>
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<td>PHI 5425</td>
<td>Philosophy of Social Science</td>
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<tr>
<td>PHP 5005</td>
<td>Ancient Philosophy I</td>
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<td>PHP 5015</td>
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<td>PHP 5785</td>
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<td>PHP 6930</td>
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**Philosophy Departmental Courses**

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<td>PHH 5405</td>
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<tr>
<td>PHH 5406</td>
<td>Modern Philosophy II</td>
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<tr>
<td>PHH 5605</td>
<td>Studies in Continental Philosophy</td>
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<td>PHH 6105</td>
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<td>Seminar in Philosophy of Mind</td>
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<td>PHI 6506</td>
<td>Seminar in Philosophy of Science</td>
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</tr>
<tr>
<td>PHI 6667</td>
<td>Seminar in Ethics</td>
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<tr>
<td>PHI 6698</td>
<td>Bioethics and Biotechnology</td>
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<tr>
<td>PHI 6699</td>
<td>Ethics, AI, and Data</td>
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<td>PHI 6905</td>
<td>Individual Work</td>
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**Code**

- PHI 5405
- PHI 5406
- PHI 5605
- PHI 6105
- PHI 6425

**Title**

- Modern Philosophy I
- Modern Philosophy II
- Studies in Continental Philosophy
- Seminar in Ancient Philosophy
- Seminar in Modern Philosophy

**Credits**

- 3
Student Learning Outcomes

### Philosophy (PHD)

**SLO 1** Specialist Knowledge
Acquire specialist knowledge of one or more recognized major subfields in philosophy, understood to include the following areas, divided into the three broad categories of history, theoretical philosophy, and matters of value: history (ancient, medieval, modern, 19th century, 20th century); theoretical (metaphysics, epistemology, philosophy of science, philosophy of mind, philosophy of language); value (normative ethics, meta-ethics, aesthetics, political)

**SLO 2** Original Advanced Research
Pursue an original and sustained line of philosophical research that results in a contribution to the body of philosophical knowledge

**SLO 3** Professional Presentation
Produce original research and prepare it in a way that makes it adequate for presentation at a professional conference

**SLO 4** Professional-level Course Design and Teaching
Design, teach, and manage an undergraduate course in philosophy entirely on one's own

### Philosophy (MA)

**SLO 1** Core Competence
Identify, describe and explain key aspects of ancient Greek philosophy, the modern era (1600-1900), and core areas of contemporary philosophy

**SLO 2** Formal Logic
Employ and understand the tools of contemporary formal logic, including first-order predicate calculus and a substantial portion of meta-logical theory

**SLO 3** Research Skills
Read and comprehend contemporary philosophical work, present such work to others, analyze and critically evaluate the arguments therein, and formulate one's own position clearly and defend it in the context of philosophical discussion

**SLO 4** Teaching Skills
Present philosophical material in a lucid and concise fashion to audiences of varying backgrounds, lead discussions of philosophical material in a way that encourages clear and original thinking about the issues, and assess undergraduate work in philosophy classes, including grading written work for clarity of expression, comprehension of material, and cogency of argument

### Physics Department

*Chair: Kevin Ingersent*

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**Graduate Coordinator: Xiaoguang Zhang**

The Department of Physics offers the Master of Science (thesis or non-thesis) and the Doctor of Philosophy degrees. The non-thesis Master of Science in Teaching is also offered. General requirements for these degrees are described in the Graduate Degrees (p. 48) section of this catalog. Program specific requirements are listed under Physics (p. 401) and can be found on our website (http://www.phys.ufl.edu/academics/graduate/degrees.shtml).

Areas of specialization for graduate research include astrophysics and cosmology, atomic and molecular physics, biological physics, chemical physics, condensed matter physics (theory and experiment), nuclear physics, particle physics (theory and experiment), statistical physics, and low temperature physics.

Special interdisciplinary research programs include the Institute for Fundamental Theory (carried out jointly with the Department of Mathematics), the Institute for Theoretical and Computational Studies in Molecular and Materials Science (also known as the Quantum Theory Project or QTP, carried out jointly with Chemistry, Materials Science and Engineering, and Computer and Information Science and Engineering Departments), the Institute of High Energy and Particle Astrophysics, and Microfabricitech (jointly with the College of Engineering). The Center for Condensed Matter Sciences provides opportunities for investigations in a diverse range of subjects and fields, including the Microkelvin Research Laboratory. The University of Florida operates the National High Magnetic Field Laboratory jointly with Florida State University and Los Alamos National Laboratory.

For more information, please see the program page below, and visit our website: http://www.phys.ufl.edu.

### Majors

- Physics (p. 401)

### Faculty

**Professor**

- Acosta, Darin E.
- Avery, Paul Ralph
- Biswas, Amlan
- Cheng, Hai Ping
- Eikenberry, Stephen Scott
- Hagen, Stephen James
- Hershfield, Selman Philip
- Ingersent, J Kevin
- Klimenko, Serguei Grigorievich
- Korytov, Andrey
- Lee, Yoonseok
- Maslov, Dmitrii
- Matchev, Konstantin Tzvetanov
- Meisel, Mark W.
- Mueller, Guido
- Muttalib, Khandker A.
- Reitze, David H.
- Rinzler, Andrew Gabriel
- Stanton, Christopher Jay
- Stewart, Gregory R.
Physics

Program Information

The Department of Physics is dedicated to advancing the forefronts of knowledge in both pure and applied physics, thus providing an exciting intellectual climate for our graduate students. Our research activities include astrophysics (particle astrophysics, cosmology and gravitation), condensed matter and materials physics (experimental, theoretical and computational), low temperature physics, elementary particle physics (experimental and theoretical) and biological physics. With such diversity in research offerings you will have an opportunity to pursue research in most areas of contemporary physics. In spite of the size of our Department, we are committed to designing a program of graduate study that is tailored to your experience and interests. Our Graduate Coordinator sees that each of our graduate students receives personal attention and advice as they progress toward their advanced degree.

Graduate Program Overview

Preliminary Examination

• Covers undergraduate subject matter
• Given twice a year; two years to complete

Graduate Core Courses

• Two semesters of quantum mechanics
• Two semesters of electromagnetism
• One semester of classical mechanics
• One semester of statistical mechanics
• Waivers given for equivalent
• Work at other institutions
• Completed in first or second years

Distribution Requirement

• Advanced course work in three subfields
• Usually completed by the end of the second year

Highlights

• Involvement in research in first summer (or sooner)!
• Diversity of research interdisciplinary options!
• Individualized program designed to meet the unique background of each student!

For more information, please see our website: http://www.physics.ufl.edu.

Degrees Offered

Degrees Offered with a Major in Physics

• Doctor of Philosophy
  • without a concentration
  • concentration in Imaging Science and Technology
• Master of Science
  • Master of Science in Teaching

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.
Student Learning Outcomes

physics

SLO 1 Knowledge
Students who graduate with a PhD in physics from our university are expected to have a very solid and broad understanding of all fundamental aspects of the physical sciences. They are expected to be able to apply their knowledge as well as logical thinking, analysis, and higher level mathematical concepts to many problems and issues well beyond physics.

SLO 2 Knowledge
Graduate students in our PhD program are expected to delve deeply into one or two specific research projects such that they are seen as world-leaders in this particular research area when they graduate. At the same time, they are expected to have a fairly broad knowledge in a variety of sub-field in physics.

SLO 3 Skills
Students are able to dissect complex systems or problems, discuss and analyze them.

SLO 4 Skills
Students publish articles in high impact journals in their specific area of work and present their results at national and international conferences.

SLO 5 Professional Behavior
Students will demonstrate ethical behavior, cultural sensitivity, and professional conduct, and will be able to communicate their work orally as well as in writing.

Plant Molecular and Cellular Biology Department

Plant Molecular and Cellular Biology (PMCB) currently has 45 faculty members in the program. They are based in the departments of Agronomy (http://agronomy.ifas.ufl.edu/), Biology (https://biology.ufl.edu/), Environmental Horticulture (https://hort.ifas.ufl.edu/), Forest Resources and Conservation (http://srcf.ufl.edu/), Horticultural Sciences (https://hos.ifas.ufl.edu/), Microbiology and Cell Science (http://microcell.ufl.edu/), Molecular Genetics and Microbiology (http://mgm.ufl.edu/), and Plant Pathology (https://plantpath.ifas.ufl.edu/) within the colleges of Agriculture and Life Sciences (https://
Majors

• Plant Molecular and Cellular Biology (CLAS) (p. 404)

Faculty

Affiliated Faculty

• Ali, Gul Shad
  Assistant Professor
• Altpeter, Fredy
  Professor
• Barbazuk, William Bradley
  Professor
• Basset, Gilles J.
  Associate Professor
• Bassil, Elias
  Assistant Professor
• Burleigh, John Gordon
  Associate Professor
• Chambers, Alan H.
  Assistant Professor
• Chase, Christine D.
  Professor
• Chen, Sixue
  Professor
• Chourey, Prem S.
  Professor
• Clark, David G.
  Professor
• Colquhoun, Thomas A.
  Assistant Professor
• Davis, John Mark
  Professor
• Ferl, Robert J.
  Distinguished Professor
• Folimonova, Svetlana Yuryevna
  Associate Professor
• Folta, Kevin M.
  Professor
• Gabriel, Dean W.
  Professor
• Gmitter, Frederick G.
  Professor
• Gurley, William B.
  Professor
• Hanson, Andrew D.
  Eminent Scholar
• Harmon, Alice Claire
  Professor
• Hauser, Bernard A.
  Associate Professor
• Jones, Jeffrey B.
  Distinguished Professor
• Kim, Jeongim J.
  Assistant Professor
• Kirst, Matias
  Professor
• Klee, Harry John
  Eminent Scholar
• Koch, Karen E.
  Professor
• Lee, Seonghee
  Assistant Professor
• Lee, Tong Geon
  Assistant Professor
• Levy, Amit
  Assistant Professor
• Liu, Tie
  Assistant Professor
• Mccart, Donald R.
  Professor
• McDaniel, Stuart
  Associate Professor
• McIntyre, Lauren M.
  Professor
• Meru, Geoffrey Mugambi
  Assistant Professor
• Mou, Zhonglin
  Associate Professor
• Munoz, Patricio Ricardo
  Assistant Professor
• Oppenheimer, David G.
  Associate Professor
• Padilla, Kevin Begcy
  Assistant Professor
• Paul, Annalisa
  Research Professor
• Peter, Gary Frank
  Professor
• Rathinasabapathi, Balasubramani
  Professor
• Ribeiro De Resende, Marcio Fernando
  Assistant Professor
• Rollins, Jeffrey A.
  Professor
• Settles, Andrew M.
  Professor
• Soltis, Douglas Edward
  Distinguished Professor
• Soltis, Pamela S.
  Distinguished Professor
• Song, Wen-Yuan
  Associate Professor
• Tieman, Denise M.
  Research Assistant Professor
• Vallejos, Carlos E.
  Associate Professor
• Vermerris, Willem
  Professor
• Wang, Jianping
  Associate Professor
Plant Molecular and Cellular Biology (CLAS)

Program Information

Director: Dr. Svetlana Folimonova
Graduate Coordinator: Dr. Gilles Basset
Program Coordinator: Eliana Kampf

Plant Molecular and Cellular Biology (PCMB) is an interdisciplinary and interdepartmental graduate degree program that emphasizes understanding the molecular and cellular mechanisms that mediate plant development, adaptation, and evolution. Students can pursue an M.S. or a Ph.D. degree through the PMCB program. All students complete core courses in Advanced Genetics, Plant Molecular Biology and Genomics, Plant Cellular and Developmental Biology, and Plant Biochemistry. In addition to the core classes, students can select from a variety of courses in biochemistry, molecular biology, physiology, breeding, genetics, evolution, microbiology, and plant pathology.

New students are exposed to a variety of faculty and experimental systems while they rotate through several laboratories during their first two semesters before selecting an adviser and dissertation research area. Both M.S. and Ph.D. students take four required courses:

PCB 5065 Advanced Genetics (4 cr.), PCB 5530 Plant Molecular Biology and Genomics (3 cr.), PCB 6528 Plant Cell and Developmental Biology (3 cr.) and BOT 6935 Special Topics (1-4 cr.), as well as journal colloquium classes (PCB 7922 Journal Colloquy in Plant Molecular and Cellular Biology (1 cr.).) Additional elective courses are taken after approval by the student’s supervisory committee. For additional information see http://pmcb.ifas.ufl.edu.

Successful candidates should have a strong interest in plant molecular and cellular mechanisms controlling development, metabolism, adaptation, and evolution. Applicants typically have a B.S. or M.S. in the agricultural, forestry, biological or chemical sciences.

Student Learning Outcomes

Plant Molecular & Cellular Biology (PhD)

SLO 1 Knowledge
Describe and explain fundamental theories and concepts in plant biochemistry, cell and developmental biology, genetics and genomics, molecular biology and general plant biology.

SLO 2 Knowledge
Use critical thinking to evaluate research design and experiments.

SLO 3 Skills
Critically evaluate the primary scientific literature.

SLO 4 Skills
Complete plant biology research of sufficient quality to be published in peer-reviewed journals.

SLO 5 Skills
Communicate effectively using scientific writing and oral presentation skills.

SLO 6 Professional Behavior
Effectively work in teams with peers interacting honestly, ethically and with cultural sensitivity.

Plant Molecular & Cellular Biology (MS)

SLO 1 Knowledge
Describe and explain fundamental theories and concepts in plant biochemistry, cell and developmental biology, genetics and genomics, molecular biology and general plant biology.

SLO 2 Knowledge
Use critical thinking to evaluate research design and experiments.

SLO 3 Skills
Critically evaluate the primary scientific literature.

SLO 4 Skills
Develop practical experimental research skills.

SLO 5 Skills
Communicate effectively using scientific writing and oral presentation skills.

SLO 6 Professional Behavior
Effectively work in teams with peers interacting honestly, ethically and with cultural sensitivity.

Political Science Department

Chair: Daniel Smith
Graduate Coordinator: Michael Martinez
The Department of Political Science currently offers two graduate degrees: Master of Arts (thesis or non-thesis option) and Doctor of Philosophy. The political science–international relations program currently offers the Master of Arts (thesis or non-thesis option). Requirements for these degrees are given in the Graduate Degrees Section (p. 48) of this catalog. For further information, please contact the Political Science Department (https://polisci.ufl.edu/) or follow the hyperlinks below to more information about the specific programs offered.

**Majors**
- Political Science (p. 405)
- Political Science - International Relations (p. 408)

**Faculty**

**Professor**
- Anderson, Leslie Elin
- Arfi, Badredine
- Austin, Sharon Denise
- Craig, Stephen C.
- Hedge, David Maurice
- Martinez, Michael D.
- Smith, Daniel A.
- Villalon, Leonardo Alfonso
- Williams, Philip J.

**Associate Professor**
- Brown, Myra Leann
- Conley, Richard Steven
- Hozic, Aida A.
- Kreppel, Amie D.
- McDonald, Michael
- Moraski, Bryon J.
- O'Dwyer, Conor
- Oneill, Daniel
- Oren, Ido
- Rosenson, Beth Ann
- Scicchitano, Michael J.
- Selden, Zachary Alan
- Sjoberg, Laura E.
- Smith, Benjamin B.
- Sohn, Patricia Janice

**Assistant Professor**
- Alarian, Hannah M.
- Elischer, Sebastian
- Gutierrez, Paul
- Janusz, Andrew James
- Kerr, Nicholas Nathan
- McDonald, Suzanne M.
- Rodrigues, Helena
- Rosenberg, Andrew Samuel
- Sanin, Juliana Restrepo
- Wang, Zhiyuan

**Other**
- McCarthy, Angela F.
- Suarez Carrasquillo, Carlos Alberto

**Eminent Scholar**
- Bernhard, Michael H.
- Dodd, Larry Cloyd

**Distinguished Professor**
- Thiele, Leslie Paul

**Affiliated Faculty**
- Johns, Tracy Lynn
  Assistant In

**Political Science**

**Program Information**

Admission to graduate study in the Department of Political Science normally requires the completion of an undergraduate major in political science or its equivalent. Students without this preparation may be required to make up deficiencies early in their graduate work. The core sequence begins in the fall term, providing basic knowledge that students need in later semesters. In evaluating candidates for admission, the Department considers

- Prior academic achievement
- GRE scores
- Letters of recommendation from three faculty members or others familiar with the academic potential or work habits of the applicant
- A statement of purpose that conveys intellectual ambitions, indicates how the program of study satisfies the student's interests and goals, and tells how the student would contribute to the program.

Fields of specialization offered by the Department include American government and politics, comparative politics, international relations, public policy, political theory, political behavior, and political methodology.

**Master of Arts:** The M.A. curricula are designed to serve students who want to pursue goals of an advanced general education, to gain skills and knowledge suitable for various types of public or private employment, or to prepare for further work at the doctoral level. M.A. students are required to complete POS 6736 The Conduct of Inquiry (3 cr.) and either POS 6737 Political Data Analysis (3 cr.) or STA 6126 Statistical Methods in Social Research I (3 cr.). Students may complete their M.A. degrees with or without writing a thesis. Students pursuing the thesis option must complete 30 hours of graduate course work. The thesis is expected to
be of length and quality comparable to papers presented at professional academic conferences or published in academic journals. Students pursuing the non-thesis option must complete 36 semester hours of graduate course work and defend two qualifying papers. For both M.A. options, course work in political science, exclusive of core courses, must include a minimum of two graduate-level courses in one field of political science.

The M.A. degree may be taken in conjunction with the following certificate programs:

• Political campaigning
• Public affairs

Students in these certificate programs pursue the non-thesis option.

Public affairs: This program trains students for leadership positions in state, local, and national governments as well as for careers in nonprofit organizations by providing students with knowledge and skills in the areas of organization behavior, public budgeting and finances, public management, policy analysis, program evaluation, and computer applications. The curriculum consists of seminars in political science, public administration, public policy, process, state and local politics, and research methods. Supervised internships in selected agencies in Florida are arranged by the Department of Political Science as an integral part of the training program. This specialization requires 39 hours of course work plus satisfactory completion of a 3-hour internship at the discretion of the Department. Students must also defend a final management-policy paper that incorporates analytical and substantive expertise. Graduates of the program serve in a variety of professional positions, including city managers, heads of municipal departments, directors of nonprofit organizations, analysts for the state legislature, and budget analysts for the federal government. In addition to the M.A. degree in political science, students receive the Certificate in Public Affairs.

Political campaigning: The program is designed to provide students with the basic political skills, insights, and experience that are critical for success in the rapidly changing profession of politics and political consulting. The program combines an awareness of the academic literature on mass and elite behavior with exposure to the increasingly sophisticated techniques used by campaigns. Students take a total of 39 hours from four major areas:

• Courses required of all M.A. students
• Courses oriented to practical aspects of political campaigning and governmental affairs (lobbying), including a 3-credit campaign-related internship
• Courses placing campaigns and elections in the broader context of American politics
• Related courses offered by the College of Journalism and Communications

Entry-level jobs have included such positions as legislative aide, campaign (or deputy campaign) manager, polling analyst, state party political coordinator, general campaign consultant, and media relations. With additional experience, some former students have gone on to become state legislator (and later, member of the U.S. House of Representatives), deputy chief of staff to the governor of Florida, partner in a major Washington area polling firm, assistant to the Minister of Justice and Attorney General of Canada, and head lobbyist for a nationwide restaurant chain. In addition to the M.A. degree in political science, students receive the Certificate in Political Campaigning.

Law/Public Affairs joint degree program: This program culminates in the Master of Arts in political science and Juris Doctor degrees. A joint degree program culminating in the Master of Arts in political science international relations and Juris Doctor degrees is also available. The joint program enables students to earn both the J.D. and the M.A. in less time than would be required to earn both degrees consecutively. Full-time students who make satisfactory progress can usually earn both degrees in 4 years. Candidates for the joint degree program must meet the entrance requirements for, and be admitted to, both the College of Law and the Department of Political Science. These requirements include both the LSAT and the GRE. Students are encouraged to announce their intent of seeking a joint degree as soon as possible. The Department of Political Science will allow 12 hours of appropriate law school courses to be credited toward the M.A. degree. The 12 credits selected from the law curriculum must be approved by the Political Science graduate coordinator on the recommendation of the student’s supervisory committee. The College of Law will permit 12 hours of credit earned in political science graduate courses to be credited toward the J.D. degree. Students in the joint degree program are permitted, but not required, to pursue a companion certificate program in public affairs or political campaigning.

Combined bachelor’s/master’s degree program: This combined program is designed for superior students who have the ability to pursue an accelerated program leading to the Bachelor of Arts and the Master of Arts degrees in political science or political science international relations.

Up to 12 semester hours of approved graduate-level political science courses may be used as credit for both the undergraduate and graduate degree. Applicants to the program must present

• Acceptable scores on the verbal, quantitative, and analytical writing portions of the GRE
• Completion of at least 24 semester hours at the University of Florida (including at least 12 semester hours of political science) with a GPA of 3.7 or higher
• Letters of recommendation from two faculty members in the Department of Political Science

The combined program is not recommended for students considering a Ph.D. program in political science at UF but is appropriate for those considering one of the M.A. degree plus certificate programs described above. Further information concerning this program is available from the departmental undergraduate and graduate coordinators.

Doctor of Philosophy: The Ph.D. program emphasizes preparation for academic careers through seminars, independent work with faculty, and professional development experiences including graduate paper readings, placement workshops, and a distinguished lecture series. The Ph.D. prepares students for teaching and research in either an academic or governmental environment and opens doors to other career opportunities in both the private and public sectors. The Ph.D. program emphasizes the development of strong analytic skills and sophisticated research methods. As resources permit, the Department provides students with funding for travel expenses to scholarly meetings and professional (methodological) training support. As part of the preparation for careers in academia, doctoral students are also generally expected to contribute to the teaching mission of the Department. All Ph.D. students must complete the following:

• POS 6736 The Conduct of Inquiry (3 cr.)
• POS 6716 Scope and Epistemologies of Political Science (3 cr.)
Fields of study open to Ph.D. students include comparative politics, American politics, public policy, international relations, political behavior, political theory, and political methodology. Applications are particularly welcome from students whose intellectual interests traverse these fields, including those with interests in religion and politics, state political institutions and policy, environmental politics, and minority and ethnic politics.

University of Florida Ph.D. students benefit from associations with faculty in numerous other departments and centers. The Centers for Latin American Studies, African Studies, and European Studies complement department faculty strengths in comparative politics and international relations. Students in the public policy concentration benefit from substantive expertise of faculty in the Institute for Child Health Policy and the Shimberg Center for Housing Studies. Several faculty in the College of Journalism and Communications have interests in media and politics.

For more information, please see our website: http://polisci.ufl.edu.

### Degrees Offered

#### Degrees Offered with a Major in Political Science

- Doctor of Philosophy
  - without a concentration
  - concentration in Educational Policy
  - concentration in Tropical Conservation and Development
- Master of Arts
  - without a concentration
  - concentration in Public Affairs
  - concentration in Political Campaigning
  - concentration in Tropical Conservation and Development

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

#### Political Science Departmental Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPO 5935</td>
<td>Advanced Topics in Comparative Politics Perspective</td>
<td>3</td>
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<tr>
<td>CPO 6077</td>
<td>Social Movements in Comparative Perspective</td>
<td>3</td>
</tr>
<tr>
<td>CPO 6091</td>
<td>Introduction to Comparative Political Analysis</td>
<td>3</td>
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<tr>
<td>CPO 6096</td>
<td>Comparative Qualitative and Mixed Methods</td>
<td>3</td>
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<tr>
<td>CPO 6206</td>
<td>Seminar in African Politics</td>
<td>3</td>
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<td>CPO 6307</td>
<td>Latin American Politics I</td>
<td>3</td>
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<tr>
<td>CPO 6407</td>
<td>Modern Middle East Politics</td>
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<td>CPO 6719</td>
<td>Comparative Gender Politics</td>
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<td>CPO 6728</td>
<td>Ethnicity and Nationalism</td>
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<td>CPO 6732</td>
<td>Democratization and Regime Transition</td>
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<td>CPO 6736</td>
<td>Post-Communist politics</td>
<td>3</td>
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<tr>
<td>CPO 6756</td>
<td>Comparative Elections and Party Systems</td>
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<td>CPO 6757</td>
<td>The European Union In Comparative Perspective</td>
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<tr>
<td>CPO 6795</td>
<td>Environmental Politics</td>
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<td>CPO 6796</td>
<td>Water Politics</td>
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<tr>
<td>INR 6036</td>
<td>Globalization, Regionalism, and Governance</td>
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<td>INR 6039</td>
<td>International Political Economy</td>
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<td>INR 6208</td>
<td>Advanced International Relations Theory</td>
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<td>INR 6305</td>
<td>Politics of American Foreign Policy Making</td>
<td>3</td>
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<td>INR 6337</td>
<td>Survey of International Security</td>
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<td>INR 6352</td>
<td>International Environmental Relations</td>
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<td>INR 6409</td>
<td>The Politics of International Law</td>
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<td>INR 6507</td>
<td>International Organization</td>
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<td>INR 6607</td>
<td>International Relations Theory</td>
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<td>INR 6938</td>
<td>Seminar in Culture and World Politics</td>
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<td>PAD 6108</td>
<td>Public Administration Theory</td>
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<td>PAD 6227</td>
<td>Public Budgeting and Finance</td>
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<td>PAD 6434</td>
<td>Leadership and Ethics in Public Agencies</td>
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<td>PAD 6946</td>
<td>Internship in Government</td>
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<td>POS 5935</td>
<td>Advanced Topics in Political Science</td>
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<td>POS 6045</td>
<td>Seminar in American Politics</td>
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<td>POS 6127</td>
<td>State Government and Politics</td>
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<td>POS 6146</td>
<td>Urban Politics</td>
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<td>POS 6157</td>
<td>Community Analysis</td>
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<td>POS 6196</td>
<td>Patrons, Clients, Corruption, and Accountability</td>
<td>3</td>
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<td>POS 6207</td>
<td>Political Behavior</td>
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<td>POS 6274</td>
<td>Political Campaigning</td>
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<td>POS 6278</td>
<td>Advanced Campaign Strategy</td>
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<td>POS 6279</td>
<td>The Politics of Direct Democracy</td>
<td>3</td>
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<td>POS 6292</td>
<td>Religion and Politics</td>
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<td>POS 6427</td>
<td>Legislative Process</td>
<td>3</td>
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<td>POS 6455</td>
<td>Political Parties and Interest Groups</td>
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<td>POS 6476</td>
<td>Bureaucratic Politics in the U.S.</td>
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<td>POS 6707</td>
<td>Qualitative Research Methods for Political Science</td>
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<td>POS 6716</td>
<td>Scope and Epistemologies of Political Science</td>
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<td>POS 6736</td>
<td>The Conduct of Inquiry</td>
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<td>POS 6737</td>
<td>Political Data Analysis</td>
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<td>POS 6747</td>
<td>Topics in Political Research Methodology</td>
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<td>POS 6757</td>
<td>Survey Research</td>
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<td>POS 6909</td>
<td>Individual Work</td>
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<td>POS 6910</td>
<td>Supervised Research</td>
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<tr>
<td>POS 6933</td>
<td>Special Topics</td>
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<td>POS 6940</td>
<td>Supervised Teaching</td>
<td>1-5</td>
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<td>POS 6971</td>
<td>Research for Master's Thesis</td>
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<td>POS 7979</td>
<td>Advanced Research</td>
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<td>POS 7980</td>
<td>Research for Doctoral Dissertation</td>
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<td>POT 6016</td>
<td>Ancient Political Thought</td>
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<td>POT 6056</td>
<td>Modern Political Thought</td>
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<td>POT 6067</td>
<td>Contemporary Political Theory</td>
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<td>POT 6306</td>
<td>Liberalism and Its Critics</td>
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<td>POT 6315</td>
<td>Democratic Theory</td>
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<td>POT 6505</td>
<td>Politics and Theory</td>
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<td>PUP 6006</td>
<td>Policy Evaluation</td>
<td>3</td>
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<td>PUP 6007</td>
<td>Policy Process</td>
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<td>PUP 6009</td>
<td>Public Policy Analysis</td>
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</tr>
<tr>
<td>PUP 6315</td>
<td>Race, Gender, and Politics</td>
<td>3</td>
</tr>
</tbody>
</table>
Student Learning Outcomes

Political science (PHD)

SLO 1 Knowledge
Identify, describe and explain the central elements of the scope, the epistemologies & methodologies of political science. Fluency in the core literature of political theory

SLO 2 Knowledge
Correctly and effectively utilize quantitative analysis up to OLS regression analysis

SLO 3 Knowledge
Synthesize and explain comprehensively two fields in political science and synthesize core attributes of a third field

SLO 4 Skills
Conduct qualitative and/or quantitative research to address substantive and theoretical questions in political science, constituting an original contribution of knowledge and understanding to the field

SLO 5 Professional Behavior
Display ethics, collegiality, cultural sensitivity and academic honesty

SLO 6 Professional Behavior
Conduct original research at professional conferences and workshops. Attend and critique scholarly presentations during regular departmental workshops and speakers’ series

Political Science (MA)

SLO 1 Knowledge
Articulate knowledge and comprehension of theories of political science, including the historical evolution of the field, and the primary debates in the field, along with the core literature in at least two of the following subfields: Comparative Politics, International Relations, American Politics, and/or Political Theory

SLO 2 Knowledge
Identify, interpret, and appraise research in international relations

SLO 3 Skills (thesis option)
Design and conduct quantitative and/or qualitative research to address theoretical and empirical questions in American Politics, Comparative Politics or Political Theory

SLO 4 Skills (exam option)
Summarize, compare, and enumerate the current state of the field of American Politics, Comparative Politics or Political theory providing recommendations for future research directions

SLO 5 Professional Behavior
Display academic honesty, ethics, collegiality, and cultural sensitivity

SLO 6 Professional Behavior
Attend and critique scholarly presentations during regular departmental workshops and speakers’ series

Political Science - International Relations

Program Information

The Department of Political Science currently offers two graduate degrees: Master of Arts (thesis or non-thesis option) and Doctor of Philosophy. The political science–international relations program currently offers the Master of Arts (thesis or non-thesis option). Requirements for these degrees are given in the Graduate Degrees Section (p. 48) of this catalog. For further information, please contact the Political Science Department (https://polisci.ufl.edu/) directly or visit their departmental catalog page (p. 404).

Admission to graduate study in the Department of Political Science normally requires the completion of an undergraduate major in political science or its equivalent. Students without this preparation may be required to make up deficiencies early in their graduate work. The core sequence begins in the fall term, providing basic knowledge that students need in later semesters. In evaluating candidates for admission, the Department considers

• Prior academic achievement
• GRE scores
• Letters of recommendation from three faculty members or others familiar with the academic potential or work habits of the applicant
• A statement of purpose that conveys intellectual ambitions, indicates how the program of study satisfies the student’s interests and goals, and tells how the student would contribute to the program.

Political science–international relations: The M.A. degree in political science–international relations is designed to provide professional education to those whose primary interest is a career in foreign relations. In this program, students must complete course work in the core of international relations theory and in two or more of the four major subfields of international relations, international political economy, international security, foreign policy, and international organization. The M.A. is a 36-hour degree, requiring successful completion of a 6-credit political science core sequence, 15 credits of departmental or extra-department electives, and a 15-credit international relations major. Students may pursue either a thesis option or take a comprehensive examination at the end of the program.

Law/Public Affairs joint degree program: This program culminates in the Master of Arts in political science and Juris Doctor degrees. A joint degree program culminating in the Master of Arts in political science international relations and Juris Doctor degrees is also available. The joint program enables students to earn both the J.D. and the M.A. in less time than would be required to earn both degrees consecutively. Full-time students who make satisfactory progress can usually earn both degrees in 4 years. Candidates for the joint degree program must meet the entrance requirements for, and be admitted to, both the College of Law and the Department of Political Science. These requirements include both the LSAT and the GRE. Students are encouraged to announce their intent of seeking a joint degree as soon as possible. The Department of Political Science will allow 12 hours of appropriate law school courses to be credited toward the M.A. degree. The 12 credits selected from the law curriculum must be approved by the Political Science graduate coordinator on the recommendation of the student’s supervisory committee. The College of Law will permit 12 hours of credit earned in political science graduate courses to be credited toward the J.D. degree. Students in the joint degree program are permitted, but not required,
to pursue a companion certificate program in public affairs, or political campaigning.

Degrees Offered

Degrees Offered with a Major in Political Science - International Relations

- Master of Arts
- Master of Arts in Teaching

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Political Science Departmental Courses

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Religion Department

Interim Chair: James Mueller
Graduate Coordinator: Whitney Sanford

The graduate program in the Department of Religion at the University of Florida is designed to prepare students for careers in academia, public service, non-governmental organizations, and various forms of advocacy work. Our five areas of study include: Buddhist Traditions, Global Islam, Hindu Traditions, Religion in the Americas and Religion and Nature. For additional information, please refer to the Graduate Student Manual.

The M.A. Program

The M.A. degree provides a broad background in the study of religious traditions and theoretical orientations in the discipline. An M.A. student can choose whether s/he will concentrate in one of the five areas of study. If s/he chooses to do so, s/he needs to take the courses recommended for that field of specialization. If s/he chooses not to, s/he can pick courses from across the fields. Course work usually culminates in a thesis and an oral examination.

The department also offers a combined program designed for superior students who have the ability to pursue an accelerated program leading to the Bachelor of Arts and the Master of Arts degree in Religion.

The Ph.D. Program

A student usually enters with a religion master’s degree either from this or another institution. Those admitted with master’s degrees in disciplines other than religion may petition to bypass the religion master’s degree with additional religion course work. All students are admitted into one of the areas of study and should fulfill the recommended course work as outlined in the area descriptions. Students
in all fields are encouraged to take courses in other departments to support work in their area of specialization.

Course Work
Graduate students in religion ordinarily take courses of different kinds and for different purposes. One aim is to develop familiarity with leading traditions of research and analysis in religious studies. Another is to prepare for PhD examinations. A third is to pursue specific interests relevant to the student’s scholarly development, especially in relation to the thesis or dissertation. A fourth is to prepare for careers outside of academia. Students are expected to consult their supervisory committee chair and the department’s graduate coordinator in designing a course of study that satisfies these aims in the limited time available.

Every year a Method and Theory departmental seminar is offered (Method & Theory I or II in alternate years). This course is required of all first and second year graduate students. Its purpose is to help students develop awareness of various approaches to the study of religion, the history of these approaches, and their assumptions about understanding and explaining religious texts and behavior.

Every other year an Interdisciplinary Seminar is offered. The purpose of this course is bridge the department’s separate areas of study through the examination of topics and themes broadly relevant to the field of religious studies. The content of this course changes each time it is offered and all first and second year graduate students are required to take this course when it is offered during their first two years of graduate study.

Specialized instruction within the areas of study is carried on primarily in courses detailed in the area descriptions. The department also offers graduate seminars in related areas outside the specific fields. In addition, students regularly participate in individual or small reading courses with a member of the faculty, the form and content of which are tailored to the student’s particular needs and interests.

Almost all graduate students in religion take courses outside the department. Most enroll in graduate seminars and reading courses in such departments and centers as African Studies, Anthropology, Botany, English, History, Jewish Studies, Latin American Studies, Philosophy, Political Science, Sociology, Women’s Studies and Gender Research, Zoology, and from the interdisciplinary School of Natural Resources and the Environment.

While specific degree requirements and interests shape a candidate’s program, most generally enroll in three courses, including both seminars and reading courses, during each of the semesters prior to the M.A. thesis or Ph.D. qualifying examinations.

Mentoring
All students are assigned a faculty mentor upon admission to the program, based on expressions of faculty interest and the student’s intended area of study. The mentor and graduate coordinator answer questions and provide support for the student in choosing courses and planning a program. By the end of the second semester all master’s degree students must designate their supervisory committee chair and one additional department committee member. By the end of the second semester all doctoral students must designate their committee chair. By no later than the end of the fourth semester of study, all doctoral students must designate a four member supervisory committee including the chairperson and one UF faculty member from outside the department.
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All students are assigned a faculty mentor upon admission to the program, based on expressions of faculty interest and the student’s intended area of study. The mentor and graduate coordinator answer questions and provide support for the student in choosing courses and planning a program. By the end of the second semester all master’s degree students must designate their supervisory committee chair and one additional department committee member. By the end of the second semester all doctoral students must designate their committee chair. By no later than the end of the fourth semester of study, all doctoral students must designate a four member supervisory committee including the chairperson and one UF faculty member from outside the department.

Degrees Offered

Degrees Offered with a Major in Religion
- Doctor of Philosophy
  - without a concentration
  - concentration in Tropical Conservation and Development
  - concentration in Women’s/Gender Studies
- Master of Arts
  - without a concentration
  - concentration in Jewish Studies
  - concentration in Tropical Conservation and Development
  - concentration in Women’s/Gender Studies

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Religion Courses

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<td>RLG 6138</td>
<td>New Religious Movements</td>
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### Student Learning Outcomes

**Religion (PHD)**

**SLO 1** Knowledge

Students will identify, define, and describe classical and contemporary methods and theories in the study of religion and the sub-fields of religions of Asia, religions of the Americas, and religion and nature.

**SLO 2** Knowledge

Students will translate one research language other than English as approved by their dissertation committees

**SLO 3** Skills

Students will articulate orally and in writing the results, significance, and applications of their scholarship and research.

**SLO 4** Skills

Students will teach in their particular sub-fields, as well as in the broad field of comparative religions.

**SLO 5** Professional Behavior

Students will produce original research and scholarship that meet the professional standards of the field.

**Religion (MA)**

**SLO 1** Knowledge

Students will identify, define, and describe classical and contemporary methods and theories in the study of religion and the sub-fields of religions of Asia, religions of the Americas, and religion and nature.

**SLO 2** Skills

Students will teach in their particular sub-fields, as well as in the broad field of comparative religions.

**SLO 3** Professional Behavior

Students will produce research and scholarship that meet the professional standards of the field.

### Sociology and Criminology & Law Department

Chair: Barbara Zsembik

Graduate Coordinator: Monika Ardelt
The Department of Sociology and Criminology & Law offers several programs of graduate study leading to the Ph.D. in Sociology, the Ph.D. in Criminology, Law and Society, the MA in Sociology, the MA in Criminology, Law and Society, and a Joint MA in Criminology/JD degree. The department also partners with the School of Natural Resources and Environment Department to offer the Ph.D. or MA in Interdisciplinary Ecology. Advanced undergraduate majors may complete a combined BA/MA degree in Sociology or a combined BA/MA degree in Criminology, Law and Society.

Combined BA/MA Degree Program in Criminology & Law

Requirements and Recommendations

What is the Combined BA/MA Degree Program?
The BA/MA program provides academically talented students an opportunity to complete a bachelor’s and a master’s degree in a shorter period of time. The program allows students to explore graduate work in criminology before entering a graduate program. If the student then applies and is accepted into the graduate program (see application procedures for the graduate program), 12 hours of graduate coursework will double-count toward both the B.A. and the M.A., thus reducing the time it would normally take to complete both degrees. Please note, however, if a student is not serious about pursuing an M.A. in criminology, the program is not recommended.

Minimum Requirements for Competitive Admission

- at least a 3.5 overall UF GPA
- completion of CCJ 3024 Advanced Principles of Criminal Justice (3 cr.), CCJ 3701 Research Methods in Criminalogy (4 cr.), CCJ 4014 Criminological Theory (3 cr.), and CJL 3038 Law and Society (3 cr.) with an overall GPA of 3.5 and no grade lower than a B in any criminology course
- one letter of recommendation from a criminology faculty member
- a personal statement of purpose

Note: meeting these minimum requirements does not guarantee admission into the combined degree program.

How to Apply

Students may apply for the combined BAMA program anytime from their second year forward, but students will most likely apply during the second semester of their junior year. We require undergraduate students to submit all application materials by October 15 for admission to the second semester of their junior year. We require undergraduate students to submit all application materials by October 15 for admission to the fall semester or March 15 for admission to the spring semester. Undergraduate students in the BA/MA program must apply for admission into the graduate program just like any other graduate applicant to continue their graduate work.

The following steps should help in the application process:

1. Plan ahead when scheduling courses through the junior year (see sample schedule below). All four of the criminology required courses and all of the student’s general education requirements should be completed by the end of the student’s junior year.
2. At the beginning of the semester in which the student is applying to the program, the student should approach a criminology faculty member about writing a letter of recommendation. The student should also begin working on a personal statement of purpose. The following guidelines should help with writing the statement.
   a. Length 2 to 4 pages
   b. The statement should describe:
      i. Applicant’s reasons for undertaking graduate study in criminology
      ii. Applicant’s future career plans
      iii. Planned area of concentration within criminology
3. By October 15th of the fall semester or March 15th of the spring semester the student must submit the following items to the Undergraduate Coordinator:
   a. Personal statement of purpose
   b. Letter of recommendation
   c. UF’s combined BA/MA application form (https://admissions.ufl.edu/pdf/combdegreerequest.pdf)

Requirements Once Admitted into the Combined BA/MA Program

Once admitted into the BA/MA program, students complete 12 graduate credit hours for the combined degree before graduation. Six of the 12 credits must be the required CLS courses of Seminar in Criminological Theory (CCJ 6920 Seminar in Criminological Theory (3 cr.)) and Introduction to Quantitative Methods (CCJ 5934 Contemporary Issues in Criminology and Law (3 cr.)). The remaining 6 graduate credits are based on the student’s interests. See a listing of graduate courses on our website (https://soccrim.clas.ufl.edu/graduate/criminology/). Again, keep in mind that acceptance into the combined BA/MA program does not mean automatic admittance into the Master's program upon graduation. The student must still take the GRE and submit an admission application for graduate study in Criminology and Law.

Model Plan of Study for BA/MA Program

(assuming fall entry in senior year)

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Apply for acceptance into CLS M.A. program by March 15 for fall.

Contact Us
If you have questions about this combined degree program, contact the undergraduate coordinator.

Majors

- Criminology, Law and Society (p. 414)
- Sociology (p. 415)

Faculty

Affiliated Faculty

- Adams, Alison Eve
  Assistant Professor
- Adams, Britni Leia
  Assistant Professor
- Ardelt, Monika
  Professor
- Beck, Brenden Emil
  Assistant Professor
- Borg, Marian J.
  Associate Professor
- Broad-Wright, Kendal L.
  Associate Professor
- Ceobanu, Alin-Mihai
  Associate Professor
- Ernst, Bonnie
  Assistant Professor
- Fagan, Abigail A.
  Associate Professor
- Gattone, Charles F.
  Associate Professor
- Gibson, Chris L.
  Associate Professor
- Hanson, Rebecca Annice
  Assistant Professor
- Jones, Nicole E.
  Assistant Professor
- Kahler, Jessica Siders
  Assistant Professor
- Koropeckyj-Cox, Tatyana M.
  Associate Professor
- Krohn, Marvin D.
  Professor
- Lanza Kaduce, Lonn M.
  Professor
- Levett, Lora M.
  Associate Professor
- Li, Yao
  Assistant Professor
- Marsiglio, William
  Professor
- Nicholson, Harvey Louis
  Assistant Professor
- Overdevest, Christine A.
  Associate Professor
- Peek, Charles W.
  Associate Professor
- Perz, Stephen George
  Professor
- Shehan, Constance L.
  Professor
- Sorek, Tamir
  Professor
- Vacca, Raffaele
  Research Assistant Professor
- Vargas, Nicholas
  Assistant Professor
- Wilson, Jodi Lane
  Professor
- Zsembik, Barbara Ann
  Associate Professor

Criminology, Law and Society

Program Information

Requirements for the M.A. and Ph.D. degrees are given in the Graduate Degrees (p. 48) section of this catalog. The graduate program in criminology and law has two areas of special emphasis: crime and justice, and law and society. The degree programs are research-based and prepare students to conduct original exploration into relevant problems, issues, and policies.

M.A. degree program: Admission to the master's degree program requires a bachelor’s degree from a criminology/criminal justice or relevant social science or humanities program (political science, sociology, anthropology, psychology, philosophy, history, women's studies, etc.). Qualified students may enter the master's program as undergraduates through the combined B.A./M.A. program. Both M.A. options (thesis and non-thesis) require satisfactory completion of at least 36 credit hours.

Ph.D. degree program: The Doctor of Philosophy program includes a minimum of 90 semester hours of credit beyond the B.A. Students with a criminology or closely related M.A. received in the last 7 years from an accredited U.S. university may request that up to 30 hours credit from their M.A. work be counted toward this total. Those with an M.A. from this department may apply 36 hours. The Department requires Ph.D. students to complete at least 66 hours of course work (excluding research credits), including the M.A. hours. Qualifying examinations take place at the end of a student’s course work.

Criminology, Law and Society/Law joint degree programs: The Department of Sociology and Criminology& Law (CLS) and the College of Law offer a joint degree program leading to an M.A. or a Ph.D. in Criminology, Law and Society and a J.D. in law. The joint degree programs enable students to earn both the degrees (the J.D. and the M.A. or the J.D. and the Ph.D.) in less time than would be required to earn both degrees consecutively. Students wishing to pursue the joint program must be admitted to both the Graduate School and the College of Law. These requirements include both the LSAT and GRE. Admission to one may precede the other. Students are encouraged to announce their intent to seek a joint degree as soon as possible. CLS allows 12 hours
of appropriate law school courses to be credited toward the CLS degree. The 12 credits selected from the law curriculum must be approved by the graduate coordinator on the recommendation of the student's supervisory committee. The College of Law will permit 12 hours of credit earned in graduate courses to be credited toward the J.D.

Prospective students should examine the research interests of the Criminology Graduate Faculty to obtain a more detailed sense of faculty expertise and research areas, see the department website: http://soccrim.clas.ufl.edu/graduate/. Applications for admission and fellowship support are due January 15 of each year. Students planning to apply for admission should take the Graduate Record Examination at the earliest possible date.

### Degrees Offered

**Degrees Offered with a Major in Criminology, Law and Society**

- Doctor of Philosophy
- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

#### Criminology, Law and Society Courses

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#### Sociology and Criminology & Law Departmental Courses

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### Student Learning Outcomes

#### Criminology, Law & Society (PHD)

**SLO 1** Knowledge
Identify, define and describe criminological and law and society theories and criminological and law and society research methods.

**SLO 2** Knowledge
Identify, define and describe their primary track of interest (either Crime & Justice or Law & Society)

**SLO 3** Professional Behavior
Prepare and produce documents professionally and ethically.

**SLO 4** Professional Behavior
Practice the role of the professional criminologist.

**SLO 5** Skills
Conduct independent empirical research with scientific integrity.

**SLO 6** Skills
Apply substantive criminological and law and society knowledge in critical thinking, analysis, and communication.

#### Criminology, Law, & Society (MA)

**SLO 1** Knowledge
Identify, define and describe criminological and law and society theories and criminological and law and society

**SLO 2** Skills
Identify, define and describe their primary track of interest (either Crime & Justice or Law & Society)

**SLO 3** Skills
Conduct independent empirical research with scientific integrity

**SLO 4** Professional Behavior
Prepare and produce documents professionally and ethically

**SLO 5** Professional Behavior
Practice role of professional criminologist

### Sociology

#### Program Information

Sociologists conduct research to understand the social forces that shape all of our lives, often in hopes of improving everyday life and the life chances of each person. Graduate studies in sociology provide the people skills and technical skills to organize information, communicate analytical research to academic and lay audiences, and prepare well-
reasoned and carefully-written reports and documents that contribute to societal well-being. Our award-winning and internationally-known faculty successfully mentor graduate students to complete their studies and become established in their professional academic and nonacademic careers.

We offer particular expertise in these areas: environment and resources, families, aging, gender, health, sexualities, life course, and race-ethnicity in US and global perspectives. There is also considerable expertise in: demography, social inequality, Latin American studies, Latino sociology, social psychology, deviance, and political sociology. We take great pride in the fact that our faculty are involved in interdisciplinary research projects that span nearly of all of the University’s colleges and academic programs, including: the School of Natural Resources and the Environment, the Water Institute, the Emerging Pathogens Institute, the Center for Latin American Studies, the Center for European Studies, the Center for Women’s Studies and Gender Research, the Health Science Center, and the Jewish Studies Center. Wherever you go on campus, you will most likely find at least one Sociologist from our department making major contributions.

Minimum requirements for the M.A. and Ph.D. degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Admission to either Sociology graduate program requires a bachelor’s degree in Sociology or related social science as approved by the Department. Current UF students may also enter the M.A. program through the combined B.A./M.A. program. The Sociology graduate programs look for mature students with outstanding potential and research interests that complement those of our faculty.

Prospective students should examine the research interests of the Sociology Graduate Faculty to obtain a more detailed sense of faculty expertise and research areas, see the department website: http://socrim.clas.ufl.edu/graduate/. Applications for admission and fellowship support are due January 15 of each year. Students planning to apply for admission should take the Graduate Record Examination at the earliest possible date.

Degrees Offered

Degrees Offered with a Major in Sociology

- Doctor of Philosophy
  - without a concentration
  - concentration in Tropical Conservation and Development
  - concentration in Women’s/Gender Studies

- Master of Arts
  - without a concentration
  - concentration in Tropical Conservation and Development

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Sociology Courses

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Sociology and Criminology & Law

Departmental Courses

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Student Learning Outcomes

Sociology (PHD)

SLO 1  Knowledge
Identify, define and describe sociological theories and sociological research methods

SLO 2  Knowledge
Define and describe one primary and one secondary specialty sub-field in sociology

SLO 3  Skills
Conduct independent empirical research with scientific integrity

SLO 4  Skills
Apply substantive sociological knowledge in critical thinking, analysis, and communication

SLO 5 Professional Behavior
Prepare and produce documents professionally and ethically

SLO 6 Professional Behavior
Practice the role of the professional sociologist

**Sociology (MA)**

SLO 1 Knowledge
Identify, define and describe sociological theories and sociological research methods

SLO 2 Knowledge
Define and describe one specialty sub-field in sociology

SLO 3 Skills
Conduct independent empirical research with scientific integrity

SLO 4 Skills
Demonstrate advanced competencies in applying substantive sociological knowledge in critical thinking, analysis, and communication

SLO 5 Professional Behavior
Prepare and produce documents professionally and ethically

SLO 6 Professional Behavior
Practice the role of the professional sociologist.

**Spanish and Portuguese Studies Department**

*Chair:* G. Lord  
*Graduate Coordinator:* L. Álvarez Castro

The Department of Spanish and Portuguese Studies offers a Master of Arts degree (M.A.) in Spanish (thesis and non-thesis options) and a Doctor of Philosophy degree (Ph.D.) in Romance Languages and Literatures, with a concentration in Spanish. Descriptions of the minimum requirements for both degrees are provided in the General Information section of this catalog. For specific information about the program, please visit the graduate section of the departmental webpage:

http://www.spanishandportuguese.ufl.edu/spanish/graduate.html

Candidates for graduate degrees (both M.A. and Ph.D.) in Spanish can choose between two specializations—literature/culture or linguistics. In conjunction with their master's or doctoral work, students may also earn a Certificate in Latin American Studies. Though a graduate degree is not offered in Portuguese, extensive course offerings at the graduate level permit students to develop a strong specialization in Portuguese language and Luso-Brazilian literature, film and culture.

The main prerequisite for admission to the M.A. program is an undergraduate major in Spanish, ideally including advanced courses in the proposed area of specialization. Applicants for the Ph.D. should hold an M.A. or equivalent degree in Spanish. At the discretion of the Graduate Studies Committee, candidates from related fields of study (History, Sociology...) may be offered a conditional admission into the Ph.D. program pending the passing of the M.A. Comprehensive Examination within the first year of study.

All M.A. and Ph.D. students in Spanish who are appointed as teaching assistants must take Romance Language Teaching Methods (FOL / FOL 6943 Romance Language Teaching Methods (3 cr.)). Besides, all M.A. and Ph.D. students specializing in literature and culture must take Introduction to Graduate Study and Research (SPW 6806 Introduction to Graduate Study and Research (3 cr.)). Other requirements vary with degree and specialization. For details, consult the graduate section of the departmental webpage (see above).

The Department is able to offer most students a teaching assistantship that provides a maintenance stipend and includes a tuition waiver. Contingent on positive performance in teaching and graduate work, M.A. students are guaranteed four semesters of support, and Ph.D. students are guaranteed eight semesters of support beyond the M.A. In addition, there are several fellowships, supplements and stipends for which students may apply, and summer teaching may be available.

Prospective students are encouraged to review the departmental webpage in order to familiarize themselves with the program and the application process. Only those applications including all required materials and submitted by the advertised deadlines will be considered. For any questions about the program or how to apply, please contact the graduate coordinator: grad-coord@spanish.ufl.edu.

Highly qualified UF undergraduate students majoring in Spanish may apply for a combined B.A./M.A. program in Spanish that allows up to 12 graduate credits to be counted toward fulfillment of both degrees. Contact the graduate coordinator for qualifications and details.

**Majors**
- Romance Languages (Spanish and Portuguese Studies) (p. 418)
- Spanish (p. 419)

**Faculty**

**Professor**
- Alvarez-Castro, Luis  
- Lord-Ward, Gillian E.

**Associate Professor**
- Aaron, Jessica Elana  
- Armon, Shifra  
- Ginway, Mary E.  
- Hind, Emily Ann  
- Sorbille, Martin E.

**Assistant Professor**
- De Prada Perez, Ana  
- Pascual Cabo, Diego  
- Suarez-Palma, Imanol  
- Uparela Reyes, Paola Andrea  
- Valdes Kroff, Jorge Rodrigo

**Lecturer**
- Marull, Crystal Helene
Affiliated Faculty

- Antes, Theresa A.
  Associate Professor
- Boxer, Diana
  Professor
- Pharies, David A.
  Professor

Romance Languages (Spanish and Portuguese Studies)

Program Information

The Department of Spanish and Portuguese Studies offers a graduate program leading to the degree of Ph.D. in Romance Languages and Literatures with a concentration in Spanish.

Students may choose a specialization in either literature/cultural studies or Hispanic linguistics. The program strives to achieve balance and depth. A minor is optional; it may be another Romance language or a different field related to the student’s major (such as English, History, Latin American Studies, Philosophy, Portuguese/Brazilian Literature, or Women’s Studies and Gender Research).

Ph.D. students determine their program of study in close consultation with their Supervisory Committee, which also prepares and administers the Qualifying Examination. Courses should be chosen to develop adequate background for teaching in the field as well as to prepare for more focused work in the area of the dissertation. In the literature/cultural studies track, all candidates must take two courses in literary theory, which will help them to achieve methodological coherence in their dissertations. In the language/linguistics track, students pursue course work in Spanish linguistics, including phonetics and phonology, morphology, syntax, sociolinguistics, historical linguistics and language acquisition. They complement these courses with work in the Linguistics Department. The Qualifying Examination normally covers the core areas listed above, the area of the anticipated dissertation, and any declared minor.

Most doctoral students will be given the opportunity to gain teaching experience through a teaching assistantship, dependent upon departmental need and availability of funds. Renewal of the assistantship is contingent upon satisfactory performance as a teaching assistant and as a graduate student.

For more information, go to: http://spanishandportuguese.ufl.edu/graduate-programs or contact the Graduate Coordinator at grad-coord@spanish.ufl.edu

Degrees Offered

Degrees Offered with a Major in Romance Languages

- Doctor of Philosophy
- concentration in Spanish

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Spanish and Portuguese Studies

Departmental Courses

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Spanish Courses

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A Master of Arts in Spanish may be earned in one of two ways:

- Assistantships. Qualified applicants to the M.A. program are eligible for teaching linguistics. A secondary specialization in Portuguese is also offered.
- A Master of Arts with thesis. This option prepares students for later work toward a Ph.D. Requirements: 30 credit hours, a comprehensive examination, and a thesis. (Internal candidates to the Ph.D. program at UF can submit an extended paper as an alternative to the thesis.)

For more information on the M.A. or M.A.T., go to: http://spanishandportuguese.ufl.edu/graduate-programs (http://spanishandportuguese.ufl.edu/graduate-programs/) or contact the Graduate Coordinator at grad-coord@spanish.ufl.edu.

### Degrees Offered

#### Degrees Offered with a Major in Spanish
- Master of Arts
- Master of Arts in Teaching

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

#### Spanish and Portuguese Studies

#### Departmental Courses

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### Spanish

#### Program Information

The Department of Spanish and Portuguese Studies offers a graduate program leading to the degrees of Master of Arts in Spanish or Master of Arts in Teaching in Spanish.

Students may choose to specialize in literature/culture or language/linguistics. A secondary specialization in Portuguese is also offered. Qualified applicants to the M.A. program are eligible for teaching assistantships.

A Master of Arts in Spanish may be earned in one of two ways:

- Non-thesis M.A. This is considered a terminal degree for those anticipating teaching careers in secondary schools or junior colleges, as well as employment in business, government, tourism, etc. Requirements: 30 credit hours and a comprehensive examination.
- M.A. with thesis. This option prepares students for later work toward a Ph.D. Requirements: 30 credit hours, a comprehensive examination, and a thesis. (Internal candidates to the Ph.D. program at UF can submit an extended paper as an alternative to the thesis.)
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SPW 6971 Research for Master's Thesis 1-15
SPW 7979 Advanced Research 1-12
SPW 7980 Research for Doctoral Dissertation 1-15

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<td>POW 6930</td>
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**Student Learning Outcomes**

**Spanish (MA)**

**SLO 1 Knowledge**
Identify, define, and describe the core areas of Hispanic linguistic and/or literary studies (with optional secondary-foci in Luso-Brazilian studies), as agreed upon by the faculty of the department.

**SLO 2 Skills**

Literary/Cultural Studies: Analyze and interpret Hispanic/Latino literary and cultural products (with optional secondary foci in Luso-Brazilian studies), apply results to broader context and engage in academic discourse via writing and oral presentation.

Hispanic Linguistics: Analyze and interpret Hispanic language and language-related data (with optional secondary foci in Portuguese), apply results to broader context and engage in academic discourse via writing and oral presentation.

**SLO 3 Professional Behavior**
Describe and apply ethical human data collection, professional conduct and ethical academic writing skills (as established by Linguistic Society of America Ethics Statement and/or Modern Language Association)

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**Statistics Department**

Chair: B.D. Presnell
Graduate Coordinator: J. P. Hobert

Graduate programs are available leading to Master of Science in Statistics, Master of Statistics, and Doctor of Philosophy degrees. Minimum requirements for these degrees are described in the General Information section of this catalog.

Both master's programs usually require 2 years of course work including material covered in:

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In addition to earning a “Ph.D. pass” on the first-year evaluation, requirements for the Ph.D. degree include:

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<td>STA 7346</td>
<td>Statistical Inference</td>
<td>3</td>
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</table>

**Interdisciplinary programs:** The Department offers a co-major program in conjunction with the Fisher School of Accounting leading to the Doctor of Philosophy degree in statistics and business administration accounting. The Department is also a partner in the interdisciplinary concentration in quantitative finance, along with the Departments of Mathematics; Industrial and Systems Engineering; and Finance, Insurance, and Real Estate. For information on these programs, consult the departmental graduate coordinator.

**Combined program:** The Department offers a bachelor’s/master’s degree program. Contact the graduate coordinator for information.

For more information, please visit [http://www.stat.ufl.edu/](http://www.stat.ufl.edu/).

**Professionals**

- Statistics (p. 421)
Faculty

Professor
- Daniels, Michael Joseph
- Doss, John
- Hobert, James P.

Associate Professor
- Dorazio, Robert Matthew
- Khare, Kshitij
- Presnell, Brett Douglas
- Su, Zhihua

Assistant Professor
- Antonelli, Joseph L.
- Betancourt, Brenda
- Duan, Li
- Karmakar, Bikram
- Karmakar, Sayar
- Molstad, Aaron J.
- Patra, Rohit Kumar
- Safikhani, Abolfazl

Lecturer
- Athienitis, Demetris
- Doss, Deborah Burr

Distinguished Professor
- Ghosh, Malay

Senior Lecturer
- Winner, Lawrence Herman

Affiliated Faculty
- Bliznyuk, Nikolay A.
- Brumback, Babette A.
- Michailidis, George
- Qiu, Peihua
- Vemuri, Baba C.
- Wu, Samuel Shangwu

Statistics

Degrees Offered

Degrees Offered with a Major in Statistics
- Doctor of Philosophy
  - without a concentration
  - concentration in Quantitative Finance
- Master of Science in Statistics
- Master of Statistics

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Statistics Departmental Courses

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<thead>
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<td>Applied Time Series Methods</td>
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<td>Applied Statistical Practice</td>
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<td>Regression Analysis</td>
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<td>Theory of Linear Models</td>
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<td>STA 6707</td>
<td>Analysis of Multivariate Data</td>
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<td>Monte Carlo Statistical Methods</td>
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<tr>
<td>STA 7980</td>
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<td>1-15</td>
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</table>

Student Learning Outcomes

Statistics (PHD)

SLO 1 Knowledge
Recognize and select appropriate results, models, and methods to solve a statistical problem

SLO 2 Skills
Solve problems in statistical theory and analyze statistical methods mathematically and logically

SLO 3   Skills
Review, synthesize, and explain a body of statistical literature, and propose new areas for research

SLO 4   Skills
Create, elaborate, and apply new statistical theory and/or methodology

SLO 5   Professional Behavior
Clearly and effectively present ideas in speech and writing concerning statistical theory, methodology, and applications

Statistics (MS)

SLO 1   Knowledge
Identify and select mathematical results and statistical models appropriate for an analysis

SLO 2   Knowledge
Use mathematical results to analyze statistical methods

SLO 3   Knowledge
Apply statistical methods and models to analyze data

SLO 4   Skills
Devise novel statistical methods or mathematical results, or a novel synthesis or application of existing methods and results

SLO 5   Professional Behavior
Clearly explain, both orally and in writing, statistical methods and their application to data

Statistics (MStat)

SLO 1   Knowledge
Identify and select mathematical results and statistical models appropriate for an analysis

SLO 2   Knowledge
Use mathematical results to analyze statistical methods

SLO 3   Knowledge
Apply statistical methods and models to analyze data

SLO 4   Skills
Independently acquire and synthesize new knowledge of statistical methods and the analysis of data

SLO 5   Professional Behavior
Clearly and effectively explain, both orally and in writing, statistical methods and their application to data

Interdisciplinary Department

Majors

• Genetics and Genomics (CLAS) (p. 422)

Genetics and Genomics (CLAS)

Program Information

Program Co-Directors: Doug Soltis and Maurice Swanson
Program Coordinator: Samantha Brooks

The University of Florida Genetics Institute is a multi-college, multifaceted research center which offers the a degree program leading to the Ph.D. in Genetics and Genomics. Minimum requirements for this degree are available in the Graduate Degrees (p. 48) section of this catalog.

What defines the Genetics & Genomics Graduate Program is the philosophy that good geneticists are integrative geneticists, who incorporate many different subfields of genetics into their work. Accordingly, faculty interests and graduate research opportunities include a wide range of areas: advances in gene therapy, understanding the maintenance of genetic variation, understanding plant immune responses, developing improved algorithms for identifying regulatory motifs in DNA sequences, and the challenges of bioethics to strategies for controlling malaria. Due to the fundamental nature of genetics in the life sciences, our training program is distributed across several colleges at UF, including but not limited to the College of Medicine (https://graduate.education.med.ufl.edu/), the College of Liberal Arts and Sciences (https://clas.ufl.edu/), the College of Agricultural and the Life Sciences (https://cals.ufl.edu/), and the Florida Museum of Natural History.

Graduate Program Overview

First Year:

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<td>GMS 6231</td>
<td>Genomics and Bioinformatics</td>
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<td>GMS 5905</td>
<td>Special Topics in Biomedical Sciences</td>
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<td>BCH 6415</td>
<td>Advanced Molecular and Cell Biology</td>
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<td>GMS 6221</td>
<td>Ethics in Genetics</td>
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<tr>
<td>GMS 6290</td>
<td>Genetics/Genomics Program Graduate Seminar (begins in the first semester and continues throughout students’ graduate careers)</td>
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<tr>
<td>ANG 7979</td>
<td>Advanced Research</td>
<td>1-12</td>
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</table>

The first year core training is the research rotation program, in which students “rotate” through three labs in a minimum of two colleges. Rotations are critical to selecting a graduate advisor: they provide a hands-on opportunity to participate in the research being conducted in a lab, and a mutual opportunity to evaluate fit between advisor and prospective student.

Second Year:

• Individual program of courses and requirements is developed in consultation with major professor and dissertation committee

Admission Standards: Prospective students should have strong backgrounds in biology and other hard sciences. Exceptional students with other backgrounds will also be considered. The research statement required as part of the application has a particularly important part in the admissions decision. Each applicant must describe his/her research interests, so that Graduate Faculty can evaluate knowledge of the discipline, fit to the program, and ability to articulate and motivate an interesting research problem. The required Letters of Recommendation are also extremely important in helping identify applicants with exceptional aptitude for genetics, and with research experience and promise.

Contact the Genetics and Genomics Graduate Program by email, UFGI-Info@ad.ufl.edu or by phone, 352-273-8100.
For more information, visit our website: http://www.ufgi.ufl.edu.

**Degrees Offered**

**Degrees Offered with a Major in Genetics and Genomics**
- Doctor of Philosophy
- Doctor of Philosophy - Clinical and Translational Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

### Genetics and Genomics (CLAS) Courses

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<th>Code</th>
<th>Title</th>
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</thead>
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</tr>
<tr>
<td>BCH 6415</td>
<td>Advanced Molecular and Cell Biology</td>
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<td>GMS 6012</td>
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<td>GMS 6013</td>
<td>Developmental Genetics</td>
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<td>HOS 6201</td>
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</tbody>
</table>

Minimum requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog. For more information, please see our website: http://graduate.education.med.ufl.edu/.

The interdisciplinary program (IDP) in biomedical sciences is the major focus leading to the Doctor of Philosophy degree. Other graduate courses and programs are listed under departmental headings. For further information, visit http://biomed.med.ufl.edu/.

### Departments

- Biochemistry and Molecular Biology (p. 425)
  - Biochemistry and Molecular Biology (p. 426)
- Biostatistics (p. 428)
  - Biostatistics (Medicine) (p. 429)
- Epidemiology (p. 430)
  - Epidemiology (Medicine) (p. 431)
- Health Outcomes and Biomedical Informatics (p. 433)
- Molecular Genetics and Microbiology (p. 434)
- Interdisciplinary (p. 434)
  - Anatomical Sciences Education (http://catalog.ufl.edu/graduate/colleges-departments/medicine/interdisciplinary-departments/anatomical-sciences-education/)
  - Genetics and Genomics (Medicine) (p. 434)
  - Medical Sciences (p. 436)

### Faculty

#### Professor
- Berceli, Scott A.
- Beyth, Rebecca J.
- Carek, Scott A.
- Canales, Muna Thalji
- Carek, Peter J.
- Clark, David J.
- Cruz-Almeida, Yenisel
- Carek, Scott A.
- Mehrad, Borna
- Okunieff, Paul Gerson
- Weiner, I. David
- Morris, John Glenn
- Vittor, Amy Yomiko

#### Associate Professor
- Byrd, H. Andrew
- Wang, Gary P.
- Byrd, H. Andrew
- Wang, Gary P.

#### Assistant Professor
- Brown, Ashley Nicole
- Canales, Muna Thalji
- Cruz-Almeida, Yenisel
- Kusmartsev, Sergei Alekseyevich
- Nelson, Eric Jorge
- Schaller, Matthew A.
- Scindia, Yogesh M.
- Sibille, Kimberly T.
- Vittor, Amy Yomiko

#### Eminent Scholar
- Wingard, John Reid

The College of Medicine offers training opportunities leading to either the Doctor of Philosophy or Master of Science degree in medical sciences.

Graduate Degrees and programs are listed under departmental headings. For further information, visit our website: http://graduate.education.med.ufl.edu/.

---

**College of Medicine**

Dean: M.L. Good

The College of Medicine offers training opportunities leading to either the Doctor of Philosophy or Master of Science degree in medical sciences.

---

**Code**

**Genetics and Genomics (CLAS) Courses**

<table>
<thead>
<tr>
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Clinical Assistant Professor
• Becker, Torben Kim

Clinical Associate Professor
• DeGennaro, Vincent
• Iovine, Nicole Marie
• Lewis, Carol

Clinical Professor
• Dang, Long Hoang

Research Assistant Professor
• Gibson, Daniel J.

Affiliated Faculty
• Al Mardini, Mamoun Tawfiq Hashim
  Assistant Professor
• Armstrong, Melissa Jo
  Associate Professor
• Arreola, Manuel Munoz
  Clinical Assistant Professor
• Barreto, Izabella Lipnarski
  Assistant Professor
• Bian, Jiang
  Assistant Professor
• Bolch, Wesley Emmett
  Professor
• Borchelt, David R.
  Professor
• Bova, Frank J.
  Professor
• Brusko, Todd Michael
  Associate Professor
• Byrne, Barry John
  Professor
• Cabrera, Roniel
  Associate Professor
• Cardel, Michelle I.
  Assistant Professor
• Chang, Lung-Ji
  Professor
• Coleman, Jason E.
  Research Assistant Professor
• Cusi, Kenneth
  Professor
• De Crecy, Valerie Anne
  Professor
• Dehoff, Rhonda Marsha
  Associate Professor
• Diamond, Gill
  Professor
• Dinculescu, Astra
  Assistant Professor
• Donahoo, William Troy
  Clinical Associate Professor
• Dore, Sylvain
  Professor
• Foster, Thomas C.
  Professor
• Frazier, Charles Jason
  Associate Professor
• George, Thomas J.
  Professor
• Gilland, David R.
  Senior Lecturer
• Goldberger, Bruce A.
  Clinical Professor
• Golde, Todd Eliot
  Professor
• Guo, Yi
  Research Assistant Professor
• Gurka, Matthew James
  Professor
• Hall, Jaclyn M.
  Assistant Scientist
• Harle, Christopher Albert William
  Professor
• Hicks, Amanda
  Assistant Professor
• Hogan, William
  Professor
• Hoh, Brian Lim
  Professor
• Keselowsky, Benjamin G.
  Professor
• Khoshbouei, Habibeh
  Associate Professor
• Kladde, Michael P.
  Professor
• Lakshmyya, Kesavalu Naidu
  Associate Professor
• Lauzardo, Michael
  Research Associate Professor
• Lemas, Dominick
  Research Assistant Professor
• Leon, Stephanie Marie
  Clinical Assistant Professor
• Lewin, Alfred S.
  Professor
• Li, Jonathan G.
  Clinical Professor
• Li, Zuofeng
  Clinical Professor
• Liao, Daiqing
  Associate Professor
• Liu, Chihray
  Professor
• Lu, Bo
  Clinical Associate Professor
• Lynne, Sarah Delphia
  Assistant Professor
• Maldonado Molina, Mildred Merisa
Professor
• Martindale, Mark Q.
  Professor
• McFarland, Nikolaus R.
  Clinical Assistant Professor
• McFetridge, Peter S.
  Associate Professor
• Mitchell, Gordon Stewart
  Professor
• Modave, Francois Paul Philippe
  Associate Professor
• Moroz, Leonid Leonidovich
  Distinguished Professor
• Muller, Keith E.
  Professor
• Nguyen, Cuong
  Associate Professor
• O’Dell, Walter G.
  Research Assistant Professor
• Oweiss, Karim
  Professor
• Petersen, Bryon E.
  Professor
• Progulske, Ann
  Distinguished Professor
• properzio, William S.
  Associate Professor
• Qiu, Yi
  Assistant Professor
• Ranum, Laura Page
  Professor
• Rathinasabapathi, Balasubramani
  Professor
• Renne, Rolf Friedrich
  Professor
• Rill, Lynn Neitzey
  Clinical Assistant Professor
• Sabo-Attwood, Tara L.
  Associate Professor
• Salek-Ardakani, Shahram
  Associate Professor
• Salloum, Ramzi George
  Assistant Professor
• Samant, Sanjiv Singh
  Clinical Professor
• Sayeski, Peter Paul
  Professor
• Schwarz, Bryan C.
  Clinical Assistant Professor
• Scott, Edward W.
  Professor
• Seaver, Elaine C.
  Professor
• Setlow, Barry
  Professor
• Shenkman, Elizabeth Ann
  Professor
• Srivastava, Arun
  Professor
• Staras, Stephanie Ann
  Associate Professor
• Su, Zhong
  Clinical Associate Professor
• Swanson, Maurice S.
  Professor
• Theis, Ryan P.
  Research Assistant Professor
• Thompson, Lindsay Acheson
  Clinical Associate Professor
• Tomar, Scott
  Professor
• Torres, Gonzalo E.
  Professor
• Urs, Nikhil Mahabir
  Assistant Professor
• Vogel, Walter B.
  Associate Professor
• Walker, Ashby Farmer
  Assistant Professor
• Wallet, Shannon Margaret
  Associate Professor
• Wang, Ka W.
  Associate Professor
• Wood, Charles E.
  Professor
• Wu, Lizi
  Associate Professor
• Wynn, James Lawrence
  Associate Professor
• Yan, Guanghua
  Clinical Associate Professor
• Zolotukhin, Serge
  Professor
• Zubcevic, Jasenka
  Assistant Professor

Biochemistry and Molecular Biology Department

Chair: James B. Flanegan
Graduate Coordinator: Andrew Berglund

Biochemistry and Molecular Biology Department faculty mentor M.S. and Ph.D. students in the College of Medicine interdisciplinary program (IDP) in medical sciences. Students interested in pursuing a doctoral degree can view specific features of the biochemistry and molecular biology concentration at http://biochem.med.ufl.edu/ and http://idp.med.ufl.edu. For admission information, visit the IDP website. Department faculty also mentor Ph.D. students in other college programs and participate actively in the research and teaching functions of various centers such as the Center for Epigenetics and the Center for Structural Biology.

The Biochemistry and Molecular Biology Department also offers a combined BS/MS program that allows students to earn both a Bachelor's
and Master's degree at an accelerated pace by counting 12 credit hours of approved courses towards both degrees. Students who are Interdisciplinary Science majors with a focus in Biochemistry or majoring in a related field and doing research with a faculty member in the Department of Biochemistry and Molecular Biology are eligible to apply. This program is considered to be a 4 + 1 program because students may finish both degrees within 5 years. To be considered with this program, students need to work with the department at the beginning of their junior year or earlier to identify courses that can count towards both degrees.

**Majors**
- Biochemistry and Molecular Biology (p. 426)

**Faculty**

**Professor**
- Agbandje-Mckenna, Mavis
- Bloom, Linda B.
- Bungert, Jorg
- Cain, Brian Dale
- Denslow, Nancy D.
- Flanagan, James B.
- Frost, Susan Cooke
- Huang, Suming
- Kilberg, Michael S.
- Kladde, Michael P.
- Long, Joanna R.
- Mareci, Thomas H.
- Mckenna, Robert
- Nick, Harry S.
- Purich, Daniel L.
- Stacpoole, Peter W.
- Wallace, Margaret R.
- Yang, Thomas P.

**Associate Professor**
- Brown, Kevin D.
- Bubb, Michael Raymond
- Lu, Jianrong J.
- Merritt, Matthew E.

**Assistant Professor**
- Caglayan, Melike
- Xie, Mingyi

**Research Associate Professor**
- Koroly, Mary J.

**Clinical Professor**
- Schultz, Gregory Scott

**Affiliated Faculty**
- Cousins, Robert J.
  Eminent Scholar

**Biochemistry and Molecular Biology**

**Program Information**

In addition to offering the Masters program in Biochemistry and Molecular Biology, the Biochemistry and Molecular Biology Department faculty mentor Ph.D. students in the College of Medicine interdisciplinary program (IDP) in medical sciences as well. Students interested in pursuing a doctoral degree can view specific features of the biochemistry and molecular biology concentration at [http://biochem.med.ufl.edu/](http://biochem.med.ufl.edu/) and [http://idp.med.ufl.edu](http://idp.med.ufl.edu). For admission information, visit the IDP website.

The Department offers a wide variety of courses for graduate students studying in the life sciences. The research expertise of the faculty spans the areas from cell biology, metabolism, and molecular biology to physical biochemistry/structural biology. Current research interests include viral protease inhibitors, viral RNA replication, bioenergetics and proton translocation, X-chromosome structure and function, cytoskeletal assembly and dynamics, enzyme mechanism and control, chromatin structure, gene expression and regulation, mitochondrial biogenesis and evolution, the genetics of inherited disease, nutrient membrane transporters, protein site-directed mutagenesis, ribosome structure and function, signal transduction, structural biology and dynamics of macromolecules, protein-nucleic acid interactions, transgenic animal models, and virus crystal structure.

Prospective graduate students should have adequate training in chemistry and biology. Minor deficiencies may be made up immediately after entering graduate school. Previous undergraduate experience in a research laboratory is highly recommended. Doctoral students are required to take a core IDP course in fall term of their first year; and beginning in spring term, students take advanced classes in areas of interest. Specific advanced-level courses may be recommended by the student’s supervisory chair and committee. Courses are open to all graduate students and advanced undergraduates. Additional courses may be listed in the Advanced Concentration in Biochemistry and Molecular Biology section under the major of Medical Sciences.

**Degrees Offered**

**Degrees Offered with a Major in Biochemistry and Molecular Biology**
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.
### Biochemistry and Molecular Biology Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BCH 5413</td>
<td>Mammalian Molecular Biology and Genetics</td>
<td>3</td>
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<tr>
<td>BCH 6040</td>
<td>Research Discussion in Biochemistry and Molecular Biology</td>
<td>1</td>
</tr>
<tr>
<td>BCH 6107</td>
<td>Biophysical Techniques in Proteomics and Protein Science</td>
<td>1</td>
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<tr>
<td>BCH 6206</td>
<td>Advanced Metabolism</td>
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<tr>
<td>BCH 6207</td>
<td>Advanced Metabolism: Role of Membranes in Signal Transduction and Metabolic Control</td>
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<tr>
<td>BCH 6208</td>
<td>Advanced Metabolism: Regulation of Key Reactions in Carbohydrate and Lipid Metabolism</td>
<td>1</td>
</tr>
<tr>
<td>BCH 6209</td>
<td>Advanced Metabolism: Regulation of Key Reactions in Amino Acid and Nucleotide Metabolism</td>
<td>1</td>
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<tr>
<td>BCH 6415</td>
<td>Advanced Molecular and Cell Biology</td>
<td>3</td>
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<tr>
<td>BCH 6740</td>
<td>Physical Biochemistry/Structural Biology</td>
<td>3</td>
</tr>
<tr>
<td>BCH 6741C</td>
<td>Magnetic Resonance Imaging and Spectroscopy in Living Systems</td>
<td>1-3</td>
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<tr>
<td>BCH 6744</td>
<td>Molecular Structure Determination by X-ray Crystallography</td>
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<tr>
<td>BCH 6744L</td>
<td>Molecular Structure Determination by X-Ray Crystallography Laboratory</td>
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<tr>
<td>BCH 6745</td>
<td>Molecular Structure and Dynamics of NMR Spectroscopy</td>
<td>1</td>
</tr>
<tr>
<td>BCH 6745L</td>
<td>Molecular Structure and Dynamics of NMR Spectroscopy Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>BCH 6746</td>
<td>Structural Biology: Macromolecular Structure Determination</td>
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<tr>
<td>BCH 6747</td>
<td>Structural Biology/Advanced Physical Biochemistry. Spectroscopy and Hydrodynamics</td>
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<tr>
<td>BCH 6749C</td>
<td>Numerical Methods in Structural Biology</td>
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<tr>
<td>BCH 6876</td>
<td>Recent Advances in Membrane Biology</td>
<td>1</td>
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<tr>
<td>BCH 6875</td>
<td>Crystallography and Cryo-Electron Microscopy</td>
<td>1</td>
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<tr>
<td>BCH 6877</td>
<td>Recent Advances in Structural Biology</td>
<td>1</td>
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<tr>
<td>BCH 6878</td>
<td>Recent Advances in Cytoskeletal Processes</td>
<td>1</td>
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<tr>
<td>BCH 6905</td>
<td>Independent Studies in Biochemistry and Molecular Biology</td>
<td>1-5</td>
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<tr>
<td>BCH 6910</td>
<td>Supervised Research</td>
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<tr>
<td>BCH 6936</td>
<td>Biochemistry Seminar</td>
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<tr>
<td>BCH 6971</td>
<td>Research for Master's Thesis</td>
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<tr>
<td>BCH 7410</td>
<td>Advanced Gene Regulation</td>
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<tr>
<td>BCH 7412</td>
<td>Epigenetics of Human Disease and Development</td>
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<tr>
<td>BCH 7414</td>
<td>Advanced Chromatin Structure</td>
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<tr>
<td>BCH 7515</td>
<td>Structural Biology/Advanced Physical Biochemistry. Kinetics and Thermodynamics</td>
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### College of Medicine Courses

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>GMS 5905</td>
<td>Special Topics in Biomedical Sciences</td>
<td>1-4</td>
</tr>
<tr>
<td>GMS 6001</td>
<td>Fundamentals of Biomedical Sciences I</td>
<td>5</td>
</tr>
<tr>
<td>GMS 6003</td>
<td>Fundamentals of Graduate Research and Professional Development</td>
<td>1</td>
</tr>
</tbody>
</table>

### Student Learning Outcomes

**Biochemistry & Molecular Biology (MS)**

**SLO1** Competency: Knowledge of Biochemistry & Molecular Biology
Students will identify and explain fundamental principles in biochemistry and molecular biology by applying this knowledge to solve problems, to explain the background to a research project, and to answer novel questions in a research setting.

**SLO2** Competency: Research Methods
Students will perform an independent research project that requires students to: develop technical expertise required to independently perform experimental work, independently analyze data, report key results from experiments in both written and oral formats, critically evaluate primary literature, and reproduce experimental methods from the literature.

**SLO3** Professionalism
Students will be professional in their conduct of research. They will adhere to and practice ethical conduct of research and implement established safety, regulatory, and administrative rules.
Biostatistics Department

Chair: Peihua Qiu
Associate Chair for Education: Babette Brumback
Graduate Coordinator: Kristen Cason

The Department of Biostatistics offers the Doctor of Philosophy degree in biostatistics (p. 429), the Master of Science degree in biostatistics (http://biostat.ufl.edu/education/ms-in-biostatistics/), and the Master of Public Health degree with concentration biostatistics, which is described in detail in the Public Health section of the catalog. These programs in the Department are designed to prepare students for research and faculty positions; careers in health agencies and health-related institutions; and for consultation, especially in the biomedical fields. Although each graduate program has a set of required courses, there is ample flexibility in the programs to allow each student to develop strengths and interests through elective courses, seminars, and tutorials.

Doctor of Philosophy

The biostatistics doctoral program requires a minimum of 90 semester credits beyond the bachelor's degree. All students must complete a minimum of 54 credits of biostatistics/statistics course work (30 credits can be transferred from a previously earned Master of Science program if applicable), 6 credits of public health course work, 3 credits of a consulting requirement, 6 credits of the cognate requirement, and 21 credits of dissertation work.

All graduates of the program are expected to be able to

- Conduct independent research in the development of new biostatistical methodology
- Engage in successful collaborations with investigators in new quantitative fields
- Write statistical methodology papers for peer-reviewed statistical and biostatistical journals
- Write collaborative papers for peer-reviewed subject matter journals
- Compete successfully for research and teaching positions in academic institutions, federal and state agencies, or private institutions

Specific course requirements are described at the program website http://biostat.ufl.edu/education/phd-in-biostatistics/.

Master of Science

The Master of Science in Biostatistics Program in the Department of Biostatistics requires a minimum of 36 post-baccalaureate credit hours. The program is designed to facilitate students’ development of a strong theoretical foundation in biostatistics, broad-based understanding of biostatistical methods, and expertise in a cognate field. A typical student will be enrolled full-time for two years. Upon successful completion of the program, graduates will be awarded an M.S. degree in biostatistics. We currently offer the Master of Science program in both traditional (campus) and online learning delivery methods.

The principal goal of the M.S. program is to prepare highly qualified individuals for future Ph.D. training and for careers in biostatistics practice. This training is conducted in the innovative and interdisciplinary public health culture of the college of public health and health professions and the college of medicine and will produce graduates who will help address the shortage of biostatisticians. We expect our graduates to be highly competitive in three primary settings: academic university-based settings, industry, and federal agencies that involve research and/or public health practice.

Specific course requirements are described at the program website http://biostat.ufl.edu/education/ms-in-biostatistics/ (Campus) and http://biostat.ufl.edu/education/msonline/ (Online).

Majors

- Biostatistics (Medicine) (p. 429)

Faculty

Professor

- Brumback, Babette A.
- Datta, Somnath
- Datta, Susmita
- Lee, Ji-Hyun
- Longini, Ira M.
- Lu, Qing Terry
- Qiu, Peihua
- Wu, Samuel Shangwu
- Zou, Fei

Associate Professor

- Guha, Subharup
- Kenah, Eben E.
- Li, Zhigang
- Yang, Yang

Assistant Professor

- Bacher, Rhonda L.
- Dean, Natalie E.
- Huo, Zhiguang

Research Associate Professor

- Chi, Yueh-Yun
- Kairalla, John Andrew

Clinical Assistant Professor

- Foti, Steven J.
- Parker, Robert L.
- Yu, Yichao

Research Assistant Professor

- Naranjo, Arlene H.
- Pei, Qinglin
- Zou, Baiming

Affiliated Faculty

- Doss, John
- Ghosh, Malay
  Distinguished Professor
All graduates of the program are expected to be able to take credits of dissertation work. Consulting requirement, 6 credits of the cognate requirement, and 21 credits beyond the bachelor’s degree. All students must complete a supervised teaching requirement.

The biostatistics doctoral program requires a minimum of 90 semester credits. The principal goal of the M.S. program is to prepare highly qualified individuals for future Ph.D. training and for careers in biostatistics. We expect our graduates to be highly competitive in three primary settings: academic institutions, federal and state agencies, or private industry. Compete successfully for research and teaching positions in peer-reviewed subject matter journals. Conduct independent research in the development of new biostatistical methodology.

Specific course requirements are described at the program website http://biostat.ufl.edu/education/phd-in-biostatistics/.

The Master of Science in Biostatistics Program in the Department of Biostatistics requires a minimum of 36 post-baccalaureate credit hours. The program is designed to facilitate students’ development of a strong theoretical foundation in biostatistics, broad-based understanding of biostatistical methods, and expertise in a cognate field. A typical student will be enrolled full-time for two years. Upon successful completion of the program, graduates will be awarded an M.S. degree in biostatistics. We currently offer the Master of Science program in both traditional (campus) and online learning delivery methods.

Specific course requirements are described at the program website http://biostat.ufl.edu/education/ms-in-biostatistics/ (Campus) and http://biostat.ufl.edu/education/msonline/ (Online).

Degrees with a Major in Biostatistics

- Doctor of Philosophy
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.
PHC 6051 Biostatistical Methods II 3
PHC 6055 Biostatistical Computing Using R 1
PHC 6059 Introduction to Applied Survival Analysis 3
PHC 6063 Biostatistical Consulting 3
PHC 6068 Biostatistical Computing 3
PHC 6075 Biostatistical Literacy 3
PHC 6080 SAS for Public Health - Data 1
PHC 6081 SAS for Public Health - Analysis 1
PHC 6088 Statistical Analysis of Genetic Data 3
PHC 6089 Public Health Computing 3
PHC 6092 Introduction to Biostatistical Theory 3
PHC 6790 Biostatistical Methods Using SAS 3
PHC 6937 Special Topics in Public Health 1-6
PHC 7013 Bias in Observational Research 3
PHC 7056 Analysis of Longitudinal Data 3
PHC 7066 Large Sample Theory 3
PHC 7090 Advanced Biostatistical Methods I 3
PHC 7091 Advanced Biostatistical Methods II 3
PHC 7925 Biostatistics Journal Club 1-3
PHC 7979 Advanced Research 1-12
PHC 7980 Research for Doctoral Dissertation 1-15
STA 6177 Applied Survival Analysis 3
STA 6707 Analysis of Multivariate Data 3
STA 7179 Survival Analysis 3

**College of Medicine Courses**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>GMS 5905</td>
<td>Special Topics in Biomedical Sciences</td>
<td>1-4</td>
</tr>
<tr>
<td>GMS 6001</td>
<td>Fundamentals of Biomedical Sciences I</td>
<td>5</td>
</tr>
<tr>
<td>GMS 6003</td>
<td>Fundamentals of Graduate Research and Professional Development</td>
<td>1</td>
</tr>
<tr>
<td>GMS 6004</td>
<td>IDP Practical Laboratory</td>
<td>2</td>
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<tr>
<td>GMS 6008</td>
<td>Fundamentals of Physiology and Functional Genomics</td>
<td>2</td>
</tr>
<tr>
<td>GMS 6009</td>
<td>Principles of Drug Action and Therapeutics</td>
<td>3</td>
</tr>
<tr>
<td>GMS 6090</td>
<td>Research in Medical Sciences</td>
<td>1-10</td>
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<tr>
<td>GMS 6096</td>
<td>Introduction to NIH Grant Writing for Biomedical Sciences</td>
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<tr>
<td>GMS 6160</td>
<td>Introduction to Oral Biology I</td>
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<tr>
<td>GMS 6161</td>
<td>Introduction to Oral Biology II</td>
<td>2</td>
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<tr>
<td>GMS 6193</td>
<td>Research Conference in Oral Biology</td>
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<tr>
<td>GMS 6405</td>
<td>Fundamentals of Endocrine Physiology</td>
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<tr>
<td>GMS 6406</td>
<td>Fundamentals of Pulmonary/Respiratory Physiology</td>
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</tr>
<tr>
<td>GMS 6408</td>
<td>Fundamentals of Renal Physiology</td>
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</tr>
<tr>
<td>GMS 6411</td>
<td>Fundamentals of Cardiovascular Physiology</td>
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<tr>
<td>GMS 6415</td>
<td>Fundamentals of Gastrointestinal Physiology</td>
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<tr>
<td>GMS 6491</td>
<td>Journal Club in Physiology</td>
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<tr>
<td>GMS 6780</td>
<td>Addiction: Neuroscience and Trends</td>
<td>3</td>
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<tr>
<td>GMS 6845</td>
<td>Clinical &amp; Translational Research Practicum</td>
<td>3</td>
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<tr>
<td>GMS 6865</td>
<td>Quantitative Literacy for Translational Research</td>
<td>2</td>
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<tr>
<td>GMS 6875</td>
<td>Ethical and Policy Issues in Clinical Research</td>
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<tr>
<td>GMS 6895</td>
<td>CTS Journal Club</td>
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<tr>
<td>GMS 6903</td>
<td>Manuscript and Abstract Writing for Clinician/Scientists</td>
<td>2</td>
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<tr>
<td>GMS 6905</td>
<td>Independent Studies in Medical Sciences</td>
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<tr>
<td>GMS 6910</td>
<td>Supervised Research</td>
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<td>GMS 6940</td>
<td>Supervised Teaching</td>
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<td>GMS 6971</td>
<td>Research for Master's Thesis</td>
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<tr>
<td>GMS 7093</td>
<td>Introduction to Clinical and Translational Research</td>
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<td>GMS 7777</td>
<td>Responsible Conduct of Biomedical Research</td>
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<tr>
<td>GMS 7944</td>
<td>Practicum in Biomedical Science Education</td>
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<td>GMS 7950</td>
<td>Fundamentals of Biomedical Science Education</td>
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<tr>
<td>GMS 7979</td>
<td>Advanced Research</td>
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<tr>
<td>GMS 7980</td>
<td>Research for Doctoral Dissertation</td>
<td>1-15</td>
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</tbody>
</table>

**Student Learning Outcomes**

**Biostatistics (PHD)**

SLO 1 Knowledge
Communicate the underpinning of biostatistics concepts and methods

SLO 2 Skills
Identify, research, and acquire new biostatistical concepts and methods on one's own

SLO 3 Skills
Develop and apply new biostatistical concepts and methods independently

SLO 4 Professional Behavior
Display ethical behaviors, cultural sensitivity, teamwork, conduct and communications

SLO 5 Professional Behavior
Participation in academic conferences to disseminate knowledge and represent the university

**Biostatistics (MS)**

SLO 1 Knowledge
Communicate the underpinning of biostatistics concepts and methods

SLO 2 Skills
Apply biostatistical concepts and methods, interpret results, communicate

SLO 3 Professional Behavior
Display ethical behaviors, cultural sensitivity, teamwork, conduct and communications

**Epidemiology Department**

*Chair:* Linda Cottler  
*Ph.D. Program Director:* Cindy Prins  
*M.S. Program Director:* Catherine Woodstock Striley

The Department of Epidemiology – jointly governed by both the College of Public Health and Health Professions and the College of Medicine – offers the Doctor of Philosophy degree in epidemiology, Masters of Science in epidemiology, as well as the Master of Public Health degree with a concentration in epidemiology (described here (p. 484)). Minimum requirements for these degrees are described in the Graduate Degrees (p. 48) section of this catalog. The programs in the Department are designed to prepare students for careers in academic research environments, careers in public health agencies and health-related institutions, and for consultation, especially in the biomedical fields.

More information on these programs is available at the program page below and at the department website: http://epidemiology.phhp.ufl.edu.
### Faculty

#### Professor
- Chen, Xinguang
- Cottler, Linda B.
- Pearson, Thomas A.
- Zhao, Jinying

#### Associate Professor
- Mai, Volker
- Prosperi, Mattia

#### Assistant Professor
- Cheng, Ting-Yuan
- Gurka, Kelly
- Hu, Hui
- Wang, Yan
- Yaghjian, Lusine

#### Other
- Shapiro, Jerne J.

#### Research Associate Professor
- Striley, Catherine L.

#### Clinical Assistant Professor
- Lopez-Quintero, Catalina

#### Clinical Associate Professor
- Prins, Cindy A.

#### Research Professor
- Sheps, David Samuel

#### Research Assistant Professor
- Qin, Huaizhen
- Varma, Deepthi Satheesa

#### Affiliated Faculty
- Beyth, Rebecca J. Professor
- Brumback, Babette A. Professor
- Canales, Muna Thalji Assistant Professor
- Carek, Peter J. Professor
- Cook, Robert L. Professor
- Cruz-Almeida, Yenisel Assistant Professor
- Cummings, Derek Adam Professor
- Kwara, Awewura Associate Professor
- Lauzardo, Michael Research Associate Professor
- Longini, Ira M. Professor
- Maldonado Molina, Mildred Merisa Professor
- Manini, Todd M. Associate Professor
- Morris, John Glenn Professor
- Perri, Michael G. Professor
- Rasmussen, Sonja A. Professor
- Shorr, Ronald I. Research Professor
- Staras, Stephanie Ann Associate Professor
- Tomar, Scott Professor
- Vaddiparti Ananth, Srinivasa Krishna Research Assistant Professor
- Winterstein, Almut Gertrud Professor

### Epidemiology (Medicine)

#### Program Information

The Ph.D. in Epidemiology program is in the Department of Epidemiology, which is jointly governed by both the College of Public Health and Health Professions and the College of Medicine. The program requires a minimum of 90 semester credits beyond the bachelor’s degree. All students must complete at least 36 credits of epidemiology core courses, 6 credits of statistics electives, 18 credits of epidemiology electives, 15 credits of general electives, and 15 credits of dissertation research. Students may also apply to graduate with a concentration in up to two 9-credit concentration areas. All entering students who do not hold MPH or equivalent degrees are also required by the College of Public Health and Health Professions to complete an Introduction to Public Health course.

All students admitted to the Ph.D. program in Epidemiology are fully funded for four years, including a tuition waiver and a stipend. Depending on a student’s source of funding, the student may work for up to 20 hours per week as a research assistant, a teaching assistant, or some combination of the both. Funding sources for students may include the student’s research mentor, the department, the college, the Graduate School, or external fellowships or scholarships pursued by the student.

The core course work is designed to incorporate competencies recommended in the report of the 2002 workshop on doctoral education in epidemiology from the American College of Epidemiology and the Association of Schools and Programs of Public Health, and criteria for applied epidemiology competencies. The overall outcomes expected of all graduates are as follows:
1. Apply epidemiological methods to address critical and/or emerging public health issues through the use of:
   • Appropriate epidemiological research designs
   • Advanced statistical analysis methods for health studies
   • Data structures and measurement methods for health research
   • Biological, behavioral and social theory applied to the understanding and prevention of contemporary threats to health and well-being
   • Depth of knowledge in an area of specialization
2. Assimilate the history, philosophy, and ethical principles of epidemiology into current research
3. Develop grant proposals and manage research projects
4. Write scientific papers for publication in peer-reviewed journals, and communicate research results to scientists, policy makers, and the public
5. Compete successfully for research and teaching positions in academic institutions, federal or state agencies, or private institutions.

Students in the Ph.D. program in Epidemiology may apply to graduate with a concentration in up to two of the following areas:

• Cancer Epidemiology
• Genetic Epidemiology
• Gero-Epidemiology
• Infectious Disease Epidemiology
• Psychiatric Epidemiology
• Clinical and Translational Science

Concentrations allow PhD students to focus their elective coursework toward a single content area that interests them. All concentrations offered by the Department of Epidemiology are completely optional, and students may enroll in up to two concentrations. Enrollment in a concentration requires the approval of the student’s academic advisor, research mentor, PhD Program Director, and Curriculum Committee Chair.

All concentrations require that students submit either (a) a dissertation aims or (b) a first-authored publication that documents research in the area of the concentration in addition to the required courses.

The overarching goal of each concentration is to provide learners with advanced training in each respective field. This training will help prepare researchers for the frontlines of interdisciplinary team science targeted towards improving the quality of life, health, and society using epidemiologic tools and methods.

Details of the Ph.D. in Epidemiology program and application information are available at our website: http://epidemiology.phhp.ufl.edu/about/ph-d-in-epidemiology-2/.

The thesis is required to demonstrate skill in independent inquiry and investigation, under the tutelage of a mentor. All students must complete at least 15 credits of epidemiology core courses, 8 credits of biostatistics courses, 4 credits of professional development courses, 5 credits of electives, and 4 credits of thesis research.

Graduates of the MS in Epidemiology program will be able to:

• Apply surveillance, assessment, evaluation, and other foundational epidemiological research designs to all areas of interest,
• Choose appropriate measurement and analytic methods to study health and disease in a population,
• Utilize biological, behavioral and social theory to understand how to prevent and intervene to promote the public health.

Details of the Master of Science in Epidemiology program and application information are available at our website: https://epidemiology.phhp.ufl.edu/academics/mse/.

Degrees Offered with a Major in Epidemiology

• Doctor of Philosophy
  • without a concentration
  • concentration in Clinical and Translational Science
  • concentration in Gero-Epidemiology
• Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Epidemiology (PHHP/COM) Departmental Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tr>
<td>PHC 6008</td>
<td>Cardiovascular Epidemiology</td>
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<tr>
<td>PHC 6009</td>
<td>Biology and Epidemiology of HIV/AIDS</td>
<td>3</td>
</tr>
<tr>
<td>PHC 6014</td>
<td>Epidemiology, Prevention, and Control of Chronic Diseases II</td>
<td>3</td>
</tr>
<tr>
<td>PHC 6034</td>
<td>Epidemic Investigation</td>
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<td>PHC 6041</td>
<td>Landmarks in Psychiatric Epidemiology</td>
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<td>PHC 6517</td>
<td>Public Health Concepts in Infectious Diseases</td>
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<tr>
<td>PHC 6598</td>
<td>Foundations in Precision Medicine: Genetic Epidemiology</td>
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<td>PHC 6711</td>
<td>Measurement in Epidemiology and Outcomes Research</td>
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<td>PHC 6932</td>
<td>Psychiatric Epidemiology Online Seminar Series</td>
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<td>PHC 6937</td>
<td>Special Topics in Public Health</td>
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<tr>
<td>PHC 6939</td>
<td>CPE Psychiatric Grand Rounds</td>
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<tr>
<td>PHC 6971</td>
<td>Research for Master’s Thesis</td>
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<tr>
<td>PHC 7000</td>
<td>Epidemiology Seminar II: Critical Evaluation, Research Proposals, and Methods</td>
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<tr>
<td>PHC 7007</td>
<td>Cancer Epidemiology</td>
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<tr>
<td>PHC 7017</td>
<td>Advanced Epidemiologic Methods III</td>
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</tr>
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<td>PHC 7038</td>
<td>Psychiatric Epidemiology</td>
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<tr>
<td>PHC 7065</td>
<td>Critical Skills in Epidemiological Data Management</td>
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### College of Medicine Courses

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<tr>
<td>GMS 6001</td>
<td>Fundamentals of Biomedical Sciences I</td>
<td>5</td>
</tr>
<tr>
<td>GMS 6003</td>
<td>Fundamentals of Graduate Research and Professional Development</td>
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</tr>
<tr>
<td>GMS 6004</td>
<td>IDP Practical Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>GMS 6008</td>
<td>Fundamentals of Physiology and Functional Genomics</td>
<td>2</td>
</tr>
<tr>
<td>GMS 6009</td>
<td>Principles of Drug Action and Therapeutics</td>
<td>3</td>
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<tr>
<td>GMS 6090</td>
<td>Research in Medical Sciences</td>
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<tr>
<td>GMS 6096</td>
<td>Introduction to NIH Grant Writing for Biomedical Sciences</td>
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<td>GMS 6160</td>
<td>Introduction to Oral Biology I</td>
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</tr>
<tr>
<td>GMS 6161</td>
<td>Introduction to Oral Biology II</td>
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<td>GMS 6193</td>
<td>Research Conference in Oral Biology</td>
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<td>GMS 6405</td>
<td>Fundamentals of Endocrine Physiology</td>
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<td>GMS 6406</td>
<td>Fundamentals of Pulmonary/Respiratory Physiology</td>
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</tr>
<tr>
<td>GMS 6408</td>
<td>Fundamentals of Renal Physiology</td>
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<tr>
<td>GMS 6411</td>
<td>Fundamentals of Cardiovascular Physiology</td>
<td>1</td>
</tr>
<tr>
<td>GMS 6415</td>
<td>Fundamentals of Gastrointestinal Physiology</td>
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<tr>
<td>GMS 6491</td>
<td>Journal Club in Physiology</td>
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<td>GMS 6780</td>
<td>Addiction: Neuroscience and Trends</td>
<td>3</td>
</tr>
<tr>
<td>GMS 6845</td>
<td>Clinical &amp; Translational Research Practicum</td>
<td>3</td>
</tr>
<tr>
<td>GMS 6865</td>
<td>Quantitative Literacy for Translational Research</td>
<td>2</td>
</tr>
<tr>
<td>GMS 6875</td>
<td>Ethical and Policy Issues in Clinical Research</td>
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<tr>
<td>GMS 6895</td>
<td>CTS Journal Club</td>
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<tr>
<td>GMS 6903</td>
<td>Manuscript and Abstract Writing for Clinician/Scientists</td>
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<tr>
<td>GMS 6905</td>
<td>Independent Studies in Medical Sciences</td>
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<tr>
<td>GMS 6910</td>
<td>Supervised Research</td>
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</tr>
<tr>
<td>GMS 6940</td>
<td>Supervised Teaching</td>
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<td>GMS 6971</td>
<td>Research for Master's Thesis</td>
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<tr>
<td>GMS 7093</td>
<td>Introduction to Clinical and Translational Research</td>
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<td>GMS 7877</td>
<td>Responsible Conduct of Biomedical Research</td>
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<td>GMS 7944</td>
<td>Practicum in Biomedical Science Education</td>
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<tr>
<td>GMS 7950</td>
<td>Fundamentals of Biomedical Science Education</td>
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<tr>
<td>GMS 7980</td>
<td>Research for Doctoral Dissertation</td>
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### Student Learning Outcomes

#### Epidemiology (PHD)

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<tr>
<td>SLO 2</td>
<td>Independent Research</td>
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<tr>
<td>SLO 3</td>
<td>Epidemiology Concepts</td>
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<tr>
<td>SLO 4</td>
<td>Professional Behavior</td>
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#### Epidemiology (MS)

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<th>SLO</th>
<th>Description</th>
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<td>SLO 1</td>
<td>MSE Knowledge</td>
</tr>
<tr>
<td>SLO 2</td>
<td>MSE Skills</td>
</tr>
<tr>
<td>SLO 3</td>
<td>MSE Skills Choose appropriate measurement and analytic methods to study health and disease in a population</td>
</tr>
<tr>
<td>SLO 4</td>
<td>MSE Professional Behavior</td>
</tr>
</tbody>
</table>

#### Health Outcomes and Biomedical Informatics Department

*Chair: Betsy Shenkman*  
*Graduate Coordinator/Director: Matthew Gurka*

Students can pursue a Ph.D., a Master of Science degree, or a Graduate Certificate.

There is increasing emphasis on assessing health outcomes throughout the lifespan in a variety of healthcare and community settings. Nationally, the National Institute of Health and other federal and state agencies focus on the development of evidence-based programs to promote health, improve health care delivery, and enhance health outcomes.

Outcomes research generates evidence that informs health care program design in clinical and community settings, the promotion of effective clinical and community interventions, quality of care, cost-effective and clinically appropriate choices for patients in the allocation of healthcare resources (clinical effectiveness), and incorporation of best practice models into health-related programs and policies. Outcomes research also provides mechanisms to understand how to translate research into practice and policy, how to improve the quality and efficiency of health programs, and how to achieve equitable and appropriate delivery.
of health programs and clinical care, particularly for underserved and vulnerable populations.

Our graduate programs are designed to train professionals in the health care and health research fields about the science that supports the development and evaluation of evidence-based clinical and community-based programs focused on improving health outcomes. Further, our programs emphasize methods for translating research into practice and policy. The unique combination of courses offered through these graduate programs will give trainees the tools needed to examine health outcomes and policies in a variety of settings across different age spans and to examine the individual, social, health system, and health policy factors that influence health outcomes.

In addition to traditional graduate students, both programs are available to medical students, post-doctoral students, fellows, residents, Ph.D. students, and junior faculty.

For more information, please visit https://hobi.med.ufl.edu.

**Faculty**

*Complete faculty listing by department: Follow this link (https://gradschool.ufl.edu/GimsPublic/Acalog/Faculty.aspx).*

**Molecular Genetics and Microbiology Department**

*Chair: H. V. Baker*
*Graduate Coordinator: A. S. Lewin*

The Graduate Faculty of the Department of Molecular Genetics and Microbiology participate in the interdisciplinary program (IDP) in medical sciences, leading to the Doctor of Philosophy degree, with specialization in one of the six advanced concentration areas of the IDP (see Medical Sciences). Departmental areas of research associated with the IDP focus on topical problems in molecular genetics, viral genetics, and viral and bacterial pathogenesis. Faculty in the Department of Molecular Genetics and Microbiology also participate in the M.S. programs (see Medical Sciences). In addition to courses associated with the IDP, the Department of Molecular Genetics and Microbiology maintains the courses listed below.

**Biotechnology:** This Master of Science program is for students seeking careers in the biomedical industry as research or managerial associates; students seeking careers as teachers or educators at any level, but primarily high school or junior college; or students seeking an in-depth understanding of modern biology and scientific research as an end in itself or in preparation for further graduate study. The foundation of the M.S. program is a basic understanding of molecular and cell biology and the performance of a high-quality research project, culminating in a thesis, under the direction of a skilled mentor, with supervision by a committee composed of members of the Graduate Faculty. Specialization may be in any of the fields of research being pursued at the College of Medicine including but not limited to molecular genetics, gene therapy, bacterial or viral pathogenesis, protein structure, toxicology, mammalian genetics, wound healing, and congenital eye diseases.

For more information contact the:

Master's Program Coordinator
Molecular Genetics and Microbiology
P.O. Box 100266
College of Medicine

Gainesville, FL 32610
Telephone (352)392-3314 or visit http://mgm.ufl.edu/

**Faculty**

**Interdisciplinary Departments**

**Majors**

- Anatomical Sciences Education (http://catalog.ufl.edu/graduate/colleges-departments/medicine/interdisciplinary-departments/anatomical-sciences-education/)
- Genetics and Genomics (Medicine) (p. 434)
- Medical Sciences (p. 436)

**Genetics and Genomics (Medicine)**

**Program Information**

*Program Co-Directors: Doug Soltis and Maurice Swanson*
*Program Coordinator: Samantha Brooks*

The University of Florida Genetics Institute is a multi-college, multi-faceted research center which offers a degree program leading to the Ph.D. in Genetics and Genomics. Minimum requirements for this degree are available in the Graduate Degrees (p. 48) section of this catalog.

What defines the Genetics & Genomics Graduate Program is the philosophy that good geneticists are integrative geneticists, who incorporate many different subfields of genetics into their work. Accordingly, faculty interests and graduate research opportunities include a wide range of areas: advances in gene therapy, understanding the maintenance of genetic variation, understanding plant immune responses, developing improved algorithms for identifying regulatory motifs in DNA sequences, and the challenges of bioethics to strategies for controlling malaria. Due to the fundamental nature of genetics in the life sciences, our training program is distributed across several colleges at UF; including but not limited to the College of Medicine (https://graduate.education.med.ufl.edu/), the College of Liberal Arts and Sciences (https://clas.ufl.edu/), the College of Agricultural and the Life Sciences (https://cals.ufl.edu/), and the Florida Museum of Natural History.

**Graduate Program Overview**

**First Year:**

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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</thead>
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<tr>
<td>PCB 5065</td>
<td>Advanced Genetics</td>
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</tr>
<tr>
<td>GMS 6231</td>
<td>Genomics and Bioinformatics</td>
<td>3</td>
</tr>
<tr>
<td>GMS 5905</td>
<td>Special Topics in Biomedical Sciences</td>
<td>1-4</td>
</tr>
<tr>
<td>BCH 6415</td>
<td>Advanced Molecular and Cell Biology</td>
<td>3</td>
</tr>
<tr>
<td>GMS 6221</td>
<td>Ethics in Genetics</td>
<td>1</td>
</tr>
<tr>
<td>GMS 6290</td>
<td>Genetics/Genomics Program Graduate Seminar</td>
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</tr>
<tr>
<td>ANG 7979</td>
<td>Advanced Research</td>
<td>1-12</td>
</tr>
</tbody>
</table>

The first year core training is the research rotation program, in which students “rotate” through three labs in a minimum of two colleges. Rotations are critical to selecting a graduate advisor: they provide a hands-on opportunity to participate in the research being conducted.
in a lab, and a mutual opportunity to evaluate fit between advisor and prospective student.

**Second Year:**

- Individual program of courses and requirements is developed in consultation with major professor and dissertation committee

Admission Standards: Prospective students should have strong backgrounds in biology and other hard sciences. Exceptional students with other backgrounds will also be considered. The research statement required as part of the application has a particularly important part in the admissions decision. Each applicant must describe his/her research interests, so that Graduate Faculty can evaluate knowledge of the discipline, fit to the program, and ability to articulate and motivate an interesting research problem. The required Letters of Recommendation are also extremely important in helping identify applicants with exceptional aptitude for genetics, and with research experience and promise.

Contact the Genetics and Genomics Graduate Program by email, UFGI-Info@ad.ufl.edu or by phone, 352-273-8100.

For more information, visit our website: http://www.ufgi.ufl.edu.

### Degrees Offered

#### Degrees Offered with a Major in Genetics and Genomics

- Doctor of Philosophy
- Doctor of Philosophy - Clinical and Translational Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

#### Genetics and Genomics (Medicine)

<table>
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<td>ANG 6532</td>
<td>Molecular Genetics of Disease</td>
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<td>ANG 7979</td>
<td>Advanced Research</td>
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<td>ANG 7980</td>
<td>Research for Doctoral Dissertation</td>
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</tr>
<tr>
<td>BCH 6415</td>
<td>Advanced Molecular and Cell Biology</td>
<td>3</td>
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<tr>
<td>BCH 7410</td>
<td>Advanced Gene Regulation</td>
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<tr>
<td>CAP 5510</td>
<td>Bioinformatics</td>
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<td>CAP 5515</td>
<td>Computational Molecular Biology</td>
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<td>CIS 6930</td>
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<td>COT 5405</td>
<td>Analysis of Algorithms</td>
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<td>FOR 6934</td>
<td>Topics in Forest Resources and Conservation</td>
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<td>FOR 7979</td>
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<td>GMS 6012</td>
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<td>GMS 6013</td>
<td>Developmental Genetics</td>
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<td>GMS 6014</td>
<td>Applications of Bioinformatics to Genetics</td>
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<td>GMS 6015</td>
<td>Human Genetics II</td>
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<td>GMS 6920</td>
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<td>HOS 6201</td>
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<td>PCB 5615</td>
<td>Molecular Evolution and Systematics</td>
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<td>PCB 6528</td>
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<td>STA 5325</td>
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<td>STA 5328</td>
<td>Fundamentals of Statistical Theory</td>
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<td>STA 6166</td>
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<tr>
<td>STA 6167</td>
<td>Statistical Methods in Research II</td>
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<td>STA 6208</td>
<td>Basic Design and Analysis of Experiments</td>
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<td>STA 6329</td>
<td>Matrix Algebra and Statistical Computing</td>
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### College of Medicine Courses

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<tr>
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<td>Fundamentals of Biomedical Sciences I</td>
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<td>Principles of Drug Action and Therapeutics</td>
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<td>GMS 6090</td>
<td>Research in Medical Sciences</td>
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<td>Introduction to NIH Grant Writing for Biomedical Sciences</td>
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<td>GMS 6160</td>
<td>Introduction to Oral Biology I</td>
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<td>Introduction to Oral Biology II</td>
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<td>GMS 6193</td>
<td>Research Conference in Oral Biology</td>
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<td>GMS 6406</td>
<td>Fundamentals of Pulmonary/Respiratory Physiology</td>
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<td>GMS 6408</td>
<td>Fundamentals of Renal Physiology</td>
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<td>GMS 6411</td>
<td>Fundamentals of Cardiovascular Physiology</td>
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<td>GMS 6415</td>
<td>Fundamentals of Gastrointestinal Physiology</td>
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<td>GMS 6780</td>
<td>Addiction: Neuroscience and Trends</td>
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<td>GMS 6845</td>
<td>Clinical &amp; Translational Research Practicum</td>
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<td>GMS 6865</td>
<td>Quantitative Literacy for Translational Research</td>
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<td>Ethical and Policy Issues in Clinical Research</td>
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<td>Supervised Research</td>
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<td>Supervised Teaching</td>
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<td>Research for Master's Thesis</td>
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</table>
The Graduate Faculty of the biochemistry and molecular biology advanced concentration share an interest in the relationships between the structure of a biological macromolecule and the function of that molecule in the cell. The structure (encoded ultimately by the genome) sets the phenotype of the organism. The unifying theme among the Graduate Faculty is their approach to research: Each uses the techniques of biochemistry and molecular biology/genetics to characterize the function of a macromolecule and show how function (and the process it is part of) is determined by the structure of that molecule and its interactions with other macromolecules. Specific research directions range from physical determination of the molecular structure of proteins to regulation of cellular processes to the genetic mapping of disease loci.

For information about other programs and courses in this field, see the Department of Biochemistry and Molecular Biology (p. 425) listing.

Advanced Concentration in Cancer Biology

Directors: Dietmar Siemann and Maria Zajac-Kaye

The Cancer Biology Concentration (CBC) provides training opportunities in cancer research ranging from basic to translational. The program spans many disciplines, including molecular and cell biology, genetics and epigenetics, biochemistry, microbiology, pharmacology, anatomy, pathology, epidemiology, bioinformatics, immunology and many others involved in the understanding of the development, progression, dissemination, and treatment of cancer.

Students in the will have opportunities to work with outstanding cancer investigators in state of the art facilities. Through combinations of courses, seminars, small group discussions, and an interdisciplinary approach to research, the program allows students to gain a unique understanding of cancer and to build a firm foundation upon which they can build careers in academia, government, and biotech and pharmaceutical industry.

For more information please see our website: http://idp.med.ufl.edu/about/cancer-biology-concentration (http://idp.med.ufl.edu/about/cancer-biology-concentration/)

Advanced Concentration in Clinical and Translational Science

Director: Wayne McCormack

The Clinical & Translational Science PhD program provides graduate students with knowledge and skills required to develop a career in multidisciplinary clinical and translational research. This program uses a team-science approach to provide didactic training and mentoring for predoctoral students performing clinical and/or translational research in health-related fields at UF. Completion of program requirements results in the award of an interdisciplinary concentration in Clinical & Translational Science. Doctoral students from all UF doctoral graduate programs who are interested in health-related research are eligible to apply.

For more information contact:

Susan Gardner
Program Coordinator
sgard@ufl.edu

Dr. Wayne McCormack
Program Director
mccormac@ufl.edu
The concentration in genetics offers graduate training in all facets of modern molecular genetics including bacterial, viral, lower eukaryotic, mouse, developmental, and human genetics. The courses listed are taught in a 5-week modular format, ranging from 1-3 modules.

Advanced Concentration in Health Outcomes and Policy
The University of Florida’s Master of Science in Medical Sciences, with a concentration in Health Outcomes and Policy, is a specialized degree designed to put its graduates at the forefront of innovative research to develop, implement, and evaluate clinical and community-based programs that promote health and health outcomes. Throughout the curriculum, special emphasis is placed on health disparities and vulnerable populations. In addition to traditional graduate students, our program is available to medical students, post-doctoral researchers, fellows, residents, Ph.D. students, and junior faculty.

We also offer a 16-credit graduate certificate designed to complement other concurrent courses of study and to provide continuing education opportunities for faculty. The certificate can be completed in one year on a part-time basis.

Advanced Concentration in Immunology and Microbiology
The concentration in immunology and microbiology offers graduate training in cellular and molecular immunology (including immunopathology, immunogenetics, and autoimmunity) and in microbiology (including virology, bacteriology, microbial genetics, and microbial pathogenesis). The courses listed are taught in a 5-week modular format, ranging from 1-3 modules.

Advanced Concentration in Molecular Cell Biology
The advanced concentration in molecular cell biology (MCB) prepares investigators for careers in biomedical research in academic or industrial settings. This multidisciplinary specialization has more than 50 participating faculty members and offers an extraordinary range of opportunities for advanced study of life at the molecular and cellular levels. The Graduate Faculty share common interests in the molecular interactions that account for functionally integrated subcellular, cellular, and tissue organization found in living organisms. The model systems in use range from yeast and cellular slime molds through Drosophila to birds and mammals. These systems are manipulated and analyzed using a wide range of powerful molecular, genetic, protein chemical, immunological, pharmacological, nuclear magnetic resonance (NMR), and microscopic imaging strategies. Students who select MCB take advanced course work and initiate independent research during the second year. This approach provides broad-based vision early in the program and the appropriate degree of specialization later on.

Advanced Concentration in Neuroscience
The Graduate Faculty associated with the neuroscience advanced concentration have expertise in neuroanatomy, molecular and cellular neurobiology, neurodevelopment and aging, neurotransmitter chemistry and pharmacology, neuroendocrinology and neuroimmunology, cellular and molecular neuro-oncology, cellular and membrane neurophysiology, somatosensory and motor systems, transplantation neurobiology, injury and repair of the CNS, and neurobehavioral sciences. Study in marine vertebrate and invertebrate neurobiology is available through Graduate Faculty at the Whitney Laboratory.

Advanced Concentration in Oral Biology
The Department of Oral Biology, a unit of the College of Dentistry, offers graduate study leading to the degree of Doctor of Philosophy as part of the College of Medicine’s Interdisciplinary Program (IDP) in Biomedical Sciences. The work is designed to provide the degree candidate with a strong background in basic biological principles relevant to the various subspecialties of oral biology, as well as specialized training in various aspects of the diseases and disorders of the oral cavity.

Areas of emphasis include application of microbiological, immunological, cellular, and molecular biological concepts and technologies to answer questions about host-pathogen interactions in oral disease; vaccine development; oral microbial physiology; oral bacterial biofilm biology; saliva and salivary gland biology; microbial antibiotic resistance; and autoimmune diseases. More information is available at http://dental.ufl.edu/departments/oral-biology/.

Prerequisites for admission in addition to those of the Graduate School include a broad base of courses in mathematics, physics, organic and analytic chemistry, advanced biology, biochemistry, molecular biology, and statistical methods. Specific requirements can be obtained from the Graduate Coordinator or the IDP office.

Advanced Concentration in Physiology and Pharmacology
The Graduate Faculty associated with this advanced concentration have expertise in a variety of disciplines, including molecular and cellular biology, pharmacology, physiology, neuroscience, and biochemistry. These faculty bring together unique strengths to provide the students with diverse training. Students may train in laboratories involved in cardiovascular, neuro, endocrine, and developmental physiology; pharmacology; and toxicology. Students conduct research at the molecular, cellular, and integrative levels. Many of the faculty are involved in multidisciplinary, collaborative research efforts that aim to understand basic physiological mechanisms and pathophysiological processes (e.g., cardiovascular, neurodegenerative, and neoplastic diseases).

Other Interdisciplinary Doctoral Concentrations Offered
The interdisciplinary emphasis on vision sciences is also discussed in the Interdisciplinary Graduate Studies section. The program director is:

Dr. W. Clay Simith
P.O. Box 100284
College of Medicine
Gainesville, FL 32610
or (352) 392-0476.
Interdisciplinary study in toxicology is coordinated by the Center for Environmental and Human Toxicology and is concerned with the effects of chemicals on human and animal health. Additional information is given in the Interdisciplinary Graduate Studies section of this catalog or may be obtained from the codirector:

Dr. Colin Sumners
P.O. Box 100215
College of Medicine
Gainesville, FL 32610
or (352) 392-0740.

### Degrees Offered

#### Degrees Offered with a Major in Medical Sciences

- **Doctor of Philosophy**
  - without a concentration
  - concentration in Biochemistry and Molecular Biology
    - optional second concentration in Clinical and Translational Science
    - optional second concentration in Health Outcomes and Implementation Science
  - concentration in Biomedical Informatics
  - concentration in Cancer Biology
    - optional second concentration in Clinical and Translational Science
    - concentration in Clinical and Translational Science
    - optional second concentration in Health Outcomes and Implementation Science
  - concentration in Genetics
    - optional second concentration in Clinical and Translational Science
    - optional second concentration in Health Outcomes and Implementation Science
  - concentration in Health Outcomes and Implementation Science
    - optional second concentration in Clinical and Translational Science
  - concentration in Imaging Science and Technology
  - concentration in Immunology and Microbiology
    - optional second concentration in Clinical and Translational Science
    - optional second concentration in Health Outcomes and Implementation Science
  - concentration in Medical Physics
  - concentration in Molecular Cell Biology
    - optional second concentration in Clinical and Translational Science
    - optional second concentration in Health Outcomes and Implementation Science
  - concentration in Neuroscience
    - optional second concentration in Clinical and Translational Science
    - optional second concentration in Health Outcomes and Implementation Science
  - concentration in Pharmacology & Therapeutics
    - optional second concentration in Clinical and Translational Science
  - concentration in Physiology and Functional Genomics
  - concentration in Toxicology
  - Master of Science
    - without a concentration
    - concentration in Aging and Geriatric Practice
    - concentration in Biomedical Informatics
    - concentration in Biomedical Neuroscience
    - concentration in Forensic Medicine
    - concentration in Genetics and Genomics
    - concentration in Gerontology
    - concentration in Health Outcomes and Implementation Science
    - concentration in Medical Physics
    - concentration in Medical Physiology and Pharmacology
    - concentration in Molecular Cell Biology
    - concentration in Neuroscience
    - concentration in Pharmacology
    - concentration in Translational Biotechnology

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

#### Core Courses-IDP

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<td>GMS 6007</td>
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<td>Fundamentals of Physiology and Functional Genomics</td>
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<td>Principles of Drug Action and Therapeutics</td>
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<td>GMS 605</td>
<td>Fundamentals of Cancer Biology</td>
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<td>GMS 7593</td>
<td>Topics in Pharmacology and Toxicology</td>
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#### General and Advanced Courses

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<td>GMS 6090</td>
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<td>GMS 6622</td>
<td>Mitochondrial Biology in Aging and Disease</td>
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<td>Independent Studies in Medical Sciences</td>
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### Advanced Concentration Courses

#### Advanced Concentration in Biochemistry and Molecular Biology Courses

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<td>BCH 6040</td>
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<td>BCH 6107</td>
<td>Biophysical Techniques in Proteomics and Protein Science</td>
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<td>BCH 6206</td>
<td>Advanced Metabolism</td>
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<td>BCH 6207</td>
<td>Advanced Metabolism: Role of Membranes in Signal Transduction and Metabolic Control</td>
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<td>BCH 6208</td>
<td>Advanced Metabolism: Regulation of Key Reactions in Carbohydrate and Lipid Metabolism</td>
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<td>BCH 6209</td>
<td>Advanced Metabolism: Regulation of Key Reactions in Amino Acid and Nucleotide Metabolism</td>
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<td>BCH 6415</td>
<td>Advanced Molecular and Cell Biology</td>
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<td>BCH 6740</td>
<td>Physical Biochemistry/Structural Biology</td>
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<td>BCH 6741C</td>
<td>Magnetic Resonance Imaging and Spectroscopy in Living Systems</td>
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<td>BCH 6744</td>
<td>Molecular Structure Determination by X-ray Crystallography</td>
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<td>BCH 6745</td>
<td>Molecular Structure and Dynamics of NMR Spectroscopy</td>
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<td>BCH 6746</td>
<td>Structural Biology: Macromolecular Structure Determination</td>
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<td>BCH 6747</td>
<td>Structural Biology/Advanced Physical Biochemistry, Spectroscopy and Hydrodynamics</td>
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<td>BCH 6749C</td>
<td>Numerical Methods in Structural Biology</td>
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<td>BCH 6876</td>
<td>Recent Advances in Membrane Biology</td>
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<td>BCH 6877</td>
<td>Recent Advances in Structural Biology</td>
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<td>BCH 6878</td>
<td>Recent Advances in Cytoskeletal Processes</td>
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<td>Biochemistry Seminar</td>
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<td>BCH 7412</td>
<td>Epigenetics of Human Disease and Development</td>
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<td>BCH 7515</td>
<td>Structural Biology/Advanced Physical Biochemistry, Kinetics and Thermodynamics</td>
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### Advanced Concentration in Genetics Courses

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<td>GMS 6012</td>
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<td>Developmental Genetics</td>
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<td>GMS 6014</td>
<td>Applications of Bioinformatics to Genetics</td>
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<td>GMS 6015</td>
<td>Human Genetics II</td>
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<td>GMS 6034</td>
<td>Advanced Virology I: Genetics and RNA</td>
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<td>GMS 6038</td>
<td>Bacterial Genetics and Physiology</td>
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<td>GMS 6151</td>
<td>Genetic Analysis Using Model Systems</td>
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<td>GMS 6153</td>
<td>Advanced Bacterial Genetics</td>
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<td>GMS 6155</td>
<td>DNA Microarray Data Analysis</td>
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<td>GMS 6231</td>
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<td>GMS 6232</td>
<td>Advanced Applications of Bioinformatics in Genetics</td>
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<td>GMS 6506</td>
<td>Biologic Drug Development</td>
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<td>GMS 6920</td>
<td>Genetics Journal Colloquy</td>
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<td>Journal Colloquy</td>
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### Advanced Concentration in Health Outcomes and Policy Courses

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<td>Health Outcomes Research for Chronic Diseases</td>
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<td>GMS 6803</td>
<td>Data Science for Clinical Research</td>
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<td>GMS 6804</td>
<td>Translational Bioinformatics</td>
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<td>GMS 6812</td>
<td>Health Outcomes Research in Cancer</td>
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<td>GMS 6816</td>
<td>Pediatric Child Health Outcomes Assessment</td>
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<td>Measuring and Analyzing Health Outcomes I</td>
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<td>Measuring and Analyzing Health Outcomes II</td>
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<td>GMS 6826</td>
<td>Advanced Design and Methodology for Case-Control Studies in Clinical Research</td>
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<td>GMS 6829</td>
<td>Longitudinal Research Design</td>
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<td>GMS 6830</td>
<td>Health Outcomes Research and Policy</td>
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<td>GMS 6832</td>
<td>Economic Methods for Evaluating Value in Health</td>
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<td>Health Outcomes Research in Vulnerable Populations</td>
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<td>Health Policy and Formulation of Payment for Health Care</td>
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<td>GMS 6835</td>
<td>Health Outcomes Research in Children</td>
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<td>GMS 6842</td>
<td>Translational Research Methods</td>
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<td>GMS 6844</td>
<td>Time Series and Quasi-Experimental Design for Health Outcomes Research</td>
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Advanced Concentration in Immunology and Microbiology Courses

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<td>Advanced Virology I: Genetics and RNA</td>
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<td>Advanced Virology II: RNA Viruses</td>
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<td>GMS 6036</td>
<td>Molecular Virology III: DNA Viruses</td>
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<td>GMS 6038</td>
<td>Bacterial Genetics and Physiology</td>
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<td>GMS 6198</td>
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<td>GMS 6337</td>
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<td>GMS 6921</td>
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Advanced Concentration in Molecular Cell Biology Courses

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<td>GMS 6062</td>
<td>Protein Trafficking</td>
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<td>GMS 6063</td>
<td>Cell Biology of Aging</td>
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<td>GMS 6064</td>
<td>Tumor Biology</td>
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<td>GMS 6065</td>
<td>Fundamentals of Cancer Biology</td>
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<td>GMS 6331</td>
<td>Stem Cell Biology</td>
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<td>GMS 6335</td>
<td>Advanced Stem Cell Biology: Tissue Engineering</td>
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<td>GMS 6336</td>
<td>Advanced Stem Cell Biology: Regenerative Medicine</td>
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<td>GMS 6417</td>
<td>Integrative Aging Physiology</td>
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<td>Cell Biology</td>
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<tr>
<td>GMS 6622</td>
<td>Mitochondrial Biology in Aging and Disease</td>
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Advanced Concentration in Neuroscience Courses

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<td>Principles of Neuroscience I: Organization and Development of the Nervous System</td>
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<td>GMS 6022</td>
<td>Principles of Neuroscience II: Cellular and Molecular Neuroscience</td>
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<td>GMS 6023</td>
<td>Principles of Neuroscience III: Molecular Neuropharmacology and its Clinical Application</td>
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<td>GMS 6029</td>
<td>Brain Journal Club</td>
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<td>GMS 6073</td>
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<td>GMS 6074</td>
<td>Comparative and Evolutionary Neurobiology</td>
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<td>GMS 6078</td>
<td>Synaptic Function and Plasticity</td>
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<td>GMS 6079</td>
<td>Computers in Biology</td>
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<td>GMS 6080</td>
<td>Basic Magnetic Resonance Imaging</td>
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<td>Ion Channels Journal Club: Pharmacology, Biophysics, and Neuroscience of Excitable Membranes</td>
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<td>GMS 6705</td>
<td>Functional Human Neuroanatomy</td>
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<td>GMS 6162</td>
<td>Principles and Craniofacial Biology and Emerging Therapies</td>
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Advanced Concentration in Physiology and Pharmacology Courses

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<td>Physiology of the Circulation of Blood</td>
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<td>Fundamentals of Gastrointestinal Physiology</td>
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<td>GMS 6419</td>
<td>Medical Endocrinology and Reproduction</td>
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### Advanced Concentration in Clinical and Translational Science Courses

#### College of Medicine Courses

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<td>Fundamentals of Graduate Research and Professional Development</td>
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<td>GMS 6004</td>
<td>IDP Practical Laboratory</td>
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<td>GMS 6008</td>
<td>Fundamentals of Physiology and Functional Genomics</td>
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<td>GMS 6009</td>
<td>Principles of Drug Action and Therapeutics</td>
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<td>Research in Medical Sciences</td>
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<td>Addiction: Neuroscience and Trends</td>
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<td>GMS 6845</td>
<td>Clinical &amp; Translational Research Practicum</td>
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<td>GMS 6865</td>
<td>Quantitative Literacy for Translational Research</td>
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<td>GMS 6875</td>
<td>Ethical and Policy Issues in Clinical Research</td>
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<td>Supervised Research</td>
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### Student Learning Outcomes

#### Medical sciences (PHD)

**SLO1 Knowledge**

Students will identify and explain the core knowledge for the Interdisciplinary Program (genetics, cell biology, biochemistry/molecular biology) followed by concentration-specific core knowledge (genetics, molecular cell biology, immunology/microbiology, physiology/pharmacology, biochemistry/molecular biology, or neuroscience).

At the most basic level, this will include recognizing and explaining fundamental facts in the disciplines. At the intermediate level this will include explaining relationships between facts and explanation of mechanisms of biological processes. At the most advanced level this will include interpreting experimental data and designing experiments.

**SLO2 Research Skills**

Students will read, interpret and critically analyze published literature in their field to formulate hypotheses; design a technically sound and up-to-date experimental plan with appropriate controls; execute the experimental plan in a technically proficient manner; interpret the data; and then reformulate the hypotheses.

**SLO3 Professional Behavior**

Students apply professional behavior in their conduct of research, specifically identification and illustration of ethical conduct, including employment of appropriate safety, administrative, and regulatory rules.

#### Medical Sciences (MS)

**SLO1 Knowledge**

Identifies, describes, and explains key concepts, study designs, and research methodologies necessary to conduct research in medical and health care disciplines.

**SLO2 Research**

Explains research ideas, designs, and produces a scientifically sound clinical/translational research project in an ethically sound manner, which includes testable hypotheses and specific aims, presenting scientific relevancy, stating appropriate statistical and ethical considerations, detailing subject enrollment, data collection and analysis, and reporting how the project will lead to improvement of human health.

**SLO3 Professionalism**

Organize activities that promote self-improvement, scientific teamwork, and improvement in human health.

### College of Nursing

**Dean: A.M. McDaniel**

The nationally ranked College of Nursing offers the graduate degree of Doctor of Philosophy in Nursing Sciences. Requirements for this degree are given in the Graduate Degrees (p. 48) section of this catalog. Students may request special review by the College of Nursing Admissions Committee if they believe they are strong candidates for graduate study but do not fully meet all criteria.

The College also offers the professional degree of Doctor of Nursing Practice. The degree is a practice-focused doctorate designed to prepare expert nurses in specialized advanced practice. The DNP is an advanced educational credential for those who desire advanced practice knowledge but do not need or want a research focus. The focus of DNP program is on innovative and evidence-based practice. The DNP prepares advanced practice nurses with the knowledge, skills and abilities needed in today's
and tomorrow’s complex health care environment, and to provide advanced practice nurses with educational backgrounds comparable to health care practitioners in other fields. As a professional degree, the rules and regulations as well as the courses for the DNP are not covered under this Catalog; please see the College of Nursing website for more information: http://academics.nursing.ufl.edu/doctor-of-nursing-practice/.

For additional information about the Nursing programs, please see the programs listed below and our website: http://www.nursing.ufl.edu or call (352) 273-6331.

Programs
- Nursing Sciences (p. 442)

Faculty

Professor
- Elder, Jennifer Harrison
- Keenan, Gail Mary
- Lyon, Debra
- McDaniel, Anna M.
- Weaver, Michael
- Wilkie, Diana J.

Associate Professor
- Carrington, Jane M.
- Dungan, Jennifer Rene
- Ezenwa, Miriam O.
- Horgas, Ann L.
- Johnson-Mallard, Versie Mae
- Krueger, Charlene Ann
- Lucero, Robert J.
- Parker, Leslie Ann
- Stacciarini, Jeanne-Marie R.
- Stechmiller, Joyce K.
- Yoon, Saun-Joo

Assistant Professor
- Cho, Hwayoung
- Domenico, Lisa
- Ingibjargardottir, Ragnhildur
- Kelly, Debra
- Scarton, Lisa

Research Associate Professor
- Yao, Yingwei

Clinical Assistant Professor
- Firpi Figueroa, Cynthia Lou
- Reed, Karen Simon

Clinical Associate Professor
- City, Sandra Wolfe
- Curry, Kim
- Hartjes, Tonja Michelle

Nursing Sciences
Program Information
Ph.D. Program Director: Jennifer Harrison Elder

Complete faculty listing by department: Follow this link (https://gradschool.ufl.edu/GimsPublic/Acalog/Faculty.aspx).

The College of Nursing’s Ph.D. program prepares scientists, scholars, advanced practitioners, and leaders in nursing. Comprehensive research and practice preparation is achieved by pairing students with faculty. Students have access to an array of faculty members for interdisciplinary study, clinical practice, and research. Individually directed dissertation research is a major aspect of the Ph.D. program. Research in the College includes aging and health, women’s health, bio-behavioral interventions, and health policy.

Progression in the program depends on the student’s ability to meet academic standards and clinical competencies as defined by College policy.

To be considered for admission to the Ph.D. program, students must meet the following minimum requirements:
- A BSN or master’s degree in nursing from a CCNE/NLN AC accredited program.
- A master’s program GPA of 3.5 on a 4.0 scale and a score of 500 or higher on each of the verbal and quantitative sections in the prior version of the Graduate Record Examination (GRE) General Test. In the current version of the GRE a minimum score of 153 in the verbal section and 144 in the quantitative section. or
- A master’s program GPA of 3.2 on a 4.0 scale and a score of 600 or higher on each of the verbal and quantitative sections in the prior version of the Graduate Record Examination General Test. In the current version of the GRE a score a minimum score of 160 in the verbal section and 148 in the quantitative section.
- BSN/PhD Applicant Criteria: A baccalaureate degree GPA of 3.5 on a 4.0 scale in the most recent 60 credits taken toward the bachelor's degree and a score of 600 or higher on each of the verbal and quantitative sections in the prior version of the GRE General Test. In the current version of the GRE a minimum score of 160 in the verbal section and 148 in the quantitative section.
- Completion of the GRE Analytic or the Analytical Writing Measure.
- International students or students whose native language is not English are required to pass one of the following tests with a satisfactory score of:
  - Test of English as a Foreign Language (TOEFL):
    - Computer-based: 213
    - Paper-based: 550
    - Web-based: 80
    - iBT Speaking Component: 26
  - International English Language Testing System (IELTS):
    - Overall score: 6.5
    - Speaking Component: 7
- Michigan English Language Assessment Battery (MELAB):
  - Overall score: 79
- Successful completion of the University of Florida English Language Institute Program.
- International students or students whose native language is not English with unsatisfactory scores on the TOEFL, and TOEFL iBT Speaking Component, IELTS, or MELAB; unsuccessful completion of the UF English Language Institute Program; or an unacceptable score on the verbal part of the GRE must achieve an acceptable score on an essay administered by the Academic Written English Program at UF.
- Current licensure (or eligibility) as a Registered Nurse in the State of Florida.
- Availability of a primary mentor who is a College of Nursing faculty member with expertise consistent with the students’ research focus area.
- Students must be either a U.S. citizen, legal U.S. resident or hold a valid visa.

Please see our website for more information: http://admissions.nursing.ufl.edu/degrees/phd/.

### Degrees Offered with a Major in Nursing Sciences

#### Degrees Offered

- Doctor of Philosophy
  - without a concentration
  - concentration in Clinical and Translational Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

#### College of nursing courses

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<td>NGR 6054C</td>
<td>Advanced Neonatal Health Assessment and Diagnostic Reasoning</td>
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<td>NGR 6101</td>
<td>Theory and Research for Nursing</td>
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<td>NGR 6104</td>
<td>State of the Science in Nursing</td>
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NGR 7816 Quantitative Research Design and Measurement in Nursing 3
NGR 7827 Outcomes Research and Evaluation 3
NGR 7831 Quality Indicators in Nursing Systems 3
NGR 7835 Nurse Scientist and Scholar II 1
NGR 7871 Nursing Informatics and Data 3
NGR 7882 Ethical Theories and Rational Decision Making in Health 3
NGR 7891 Health Policy and Finance in Advanced Nursing Practice 3
NGR 7979 Advanced Research 1-12
NGR 7980 Research for Doctoral Dissertation 1-15

Student Learning Outcomes

Nursing sciences
SLO 1 Knowledge
Synthesize knowledge from nursing and other disciplines.

SLO 2 Skills
Generate knowledge for the discipline of nursing.

SLO 3 Skills
Disseminate findings to researchers, practitioners, and other stakeholders in health care.

SLO 4 Professional Behavior
Synthesize ethical issues and standards related to science and knowledge development.

SLO 5 Professional Behavior
Develop and engage with interdisciplinary teams within the scientific and health care practice communities.

College of Pharmacy

Dean: J. Johnson

The College of Pharmacy offers the Doctor of Philosophy and the Master of Science in Pharmacy degrees in the pharmaceutical sciences, with concentrations in medicinal chemistry, pharmacodynamics, pharmaceutical outcomes and policy, and pharmacy which includes pharmaceutics. There are additional concentrations in the Master of Science in Pharmacy program in pharmaceutical sciences offered in a distance-learning, nonthesis format: forensic science, forensic drug chemistry, forensic serology and DNA, clinical toxicology, pharmaceutical chemistry, medication therapy management and clinical pharmacy. Complete descriptions of the minimum requirements for the M.S.P. and Ph.D. degrees are provided in the Graduate Degrees (p. 48) section of this catalog.

The Graduate Faculty and courses offered are listed under department headings in this catalog. The courses listed below consist of seminar, supervised teaching and research, and research for thesis or doctoral dissertation. These courses are offered in each of the departments.

Inquiries regarding applications and general information about the graduate programs are processed through the College of Pharmacy Graduate Programs Office at graduateadmissions@cop.ufl.edu.

For more information, please see the program pages listed below and our website: http://pharmacy.ufl.edu.

Departments

- Medicinal Chemistry (p. 444)
  - Pharmaceutical Sciences (Medicinal Chemistry) (p. 445)
- Pharmaceutical Outcomes and Policy (p. 448)
  - Pharmaceutical Sciences (Pharmaceutical Outcomes and Policy) (p. 449)
- Pharmaceutics (p. 451)
  - Pharmaceutical Sciences (Pharmaceutics) (p. 452)
- Pharmacodynamics (p. 454)
  - Pharmaceutical Sciences (Pharmacodynamics) (p. 455)
- Pharmacotherapy and Translational Research (p. 457)
  - Pharmaceutical Sciences (Pharmacotherapy and Translational Research) (p. 458)

Faculty

Professor
- Frye, Reginald F.

Assistant Professor
- Duarte, Julio David

Distinguished Professor
- Johnson, Julie Ann

Affiliated Faculty
- Derendorf, Hartmut C. Distinguished Professor
- Hochhaus, Guenther Professor
- Lamba, Jatinder Kaur Associate Professor
- Langae, Taimour Research Associate Professor
- Mobley, William C. Clinical Associate Professor
- Song, Sihong Associate Professor
- Sullivan, Sean M. Associate Professor
- Xing, Chengguo Professor

Medicinal Chemistry Department

Chair: Hendrik Luesch
Graduate Coordinator: Chenglong Li

The mission of the department of Medicinal Chemistry is to conduct basic research in chemistry and biochemistry as it relates to drug
discovery, to teach these principles in the professional and graduate programs, and to provide service to the scientific community.

The Department of Medicinal Chemistry is located in the College of Pharmacy, and is an integral part of the University of Florida’s Health Science Center. Medicinal Chemistry is a unique blend of the physical and biological sciences. The scope of the field is sufficiently broad to give students with many different science backgrounds a rewarding and challenging program of study. Areas of active interest include drug discovery, organic synthesis of medicinal agents, natural products chemistry, prodrugs, topical drug delivery, peptide chemistry, molecular modeling, drug metabolism and molecular toxicology. The department has excellent facilities for research in the major areas of Medicinal Chemistry and faculty have been highly successful in attracting extramural research support for the past several years. The Department faculty members are involved in teaching, research and service.

Medicinal Chemistry areas of research in drug design, marine natural products and toxicology are a unique blend of the physical and biological sciences. The scope of the field is sufficiently broad to give students with many different science backgrounds a rewarding and challenging program of study. Areas of active interest include drug discovery, organic synthesis of medicinal agents, natural products chemistry, prodrugs, topical drug delivery, peptide chemistry, molecular modeling, drug metabolism and molecular toxicology.

The Department participates in the interdisciplinary concentration in toxicology. For more information, see the Interdisciplinary Graduate Studies section of this catalog.

For more information, please visit our website: http://pharmacy.ufl.edu/mc (http://pharmacy.ufl.edu/mc/).

**Majors**

- Pharmaceutical Sciences (Medicinal Chemistry) (p. 445)

**Faculty**

**Professor**

- Aldrich, Jane V.
- James, Margaret O.
- Li, Chenglong
- Luesch, Hendrik
- McCurdy, Christopher R.
- Xing, Chengguo

**Associate Professor**

- Zheng, Guangrong

**Assistant Professor**

- Cui, Lina
- Ding, Yousong
- Huigens, Robert W.

**Research Associate Professor**

- Wielbo, Donna

---

**Clinical Associate Professor**

- Grundmann, Oliver

**Research Professor**

- Tebbett, Ian R.

**Research Assistant Professor**

- Ratnayake, Ranjala

**Affiliated Faculty**

- Dang, Long Hoang
  - Clinical Professor

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**Pharmaceutical Sciences (Medicinal Chemistry)**

**Program Information**

The College of Pharmacy offers the Doctor of Philosophy degree in Pharmaceutical Sciences with a concentration in Medicinal Chemistry. Medicinal chemistry is a unique blend of the physical and biological sciences. The scope of the field is sufficiently broad to give students with many different science backgrounds a rewarding and challenging program of study. Areas of active research include organic synthesis of medicinal agents, metal chelate design, prodrugs and topical drug delivery, drug metabolism, molecular toxicology, molecular biology, combinatorial chemistry, neurochemistry, analytical chemistry, molecular modeling, natural products, and drug discovery.

The College also offers the Master of Science in Pharmacy degree in Pharmaceutical Sciences (non-thesis option) with concentrations in both forensic drug chemistry and forensic serology and DNA in a distance learning format. Minimum requirements for the M.S.P. and Ph.D. degrees are described in the Graduate Degrees (p. 48) section of this catalog.

The applicant should have an undergraduate degree in pharmacy, chemistry, biology, or premedical sciences. A background in calculus and physical and organic chemistry is required. In addition to graduate medicinal chemistry courses in the College of Pharmacy, graduate courses in chemistry and biochemistry are required for the program.

For more information, please see our websites: http://pharmacy.ufl.edu/education/graduate-programs (http://pharmacy.ufl.edu/education/graduate-programs/) and http://pharmacy.ufl.edu/mc (http://pharmacy.ufl.edu/mc/)

**Degrees Offered**

**Degrees Offered With a Major in Pharmaceutical Sciences**

- Doctor of Philosophy
  - concentration in Medicinal Chemistry
  - optional second concentration in Clinical and Translational Science
  - concentration in Toxicology
- Master of Science in Pharmacy
  - concentration in Clinical Toxicology
  - concentration in Forensic Drug Chemistry
- concentration in Forensic Serology and DNA
- concentration in Forensic Science
- concentration in Medicinal Chemistry
- concentration in Pharmaceutical Chemistry

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Medicinal Chemistry Courses

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<td>Natural Medicinal Products</td>
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<td>PHA 6356</td>
<td>Structure Determination of Complex Natural Products</td>
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<td>Drug Biotrans and Molecular Mechanisms of Toxicity</td>
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<td>PHA 6432</td>
<td>Fundamentals of Pharmaceutical Chemistry</td>
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<tr>
<td>PHA 6435</td>
<td>Biosynthetic Logic of Medicinal Natural Products</td>
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<td>PHA 6444</td>
<td>Pharmaceutical Chemistry I</td>
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<td>PHA 6447</td>
<td>Drug Design</td>
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<td>PHA 6448</td>
<td>High Throughput Drug Discovery</td>
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<td>PHA 6471</td>
<td>Synthetic Medicinal Chemistry</td>
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<td>Organic Synthesis of Drug Molecules</td>
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<td>Advanced Combinatorial Chemistry in Drug Discovery</td>
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<td>PHA 6534</td>
<td>Toxicology of Chemical Weapons</td>
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<td>PHA 6535</td>
<td>Principles of Nucleotide Activity</td>
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<td>PHA 6556</td>
<td>Introduction to Clinical Toxicology</td>
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<td>Clinical Toxicology I</td>
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<td>Medicinal Chemistry of Drugs of Abuse</td>
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<td>Forensic Analysis of DNA</td>
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<td>Forensic Immunology</td>
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<td>Blood Spatter and Distribution</td>
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<td>Mammalian Molecular Biology</td>
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<td>General Toxicology</td>
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<td>Toxic Substances</td>
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<td>VME 6766</td>
<td>Laboratory Quality Assurance/Quality Control</td>
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### Pharmaceutical Outcomes and Policy Courses

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<td>Health Care Risk Management</td>
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<td>Risk Management, Liability and Compliance</td>
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<td>PHA 6227</td>
<td>Institutional Pharmacy Leadership I</td>
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<td>PHA 6235</td>
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<td>PHA 6250</td>
<td>Patient Responsibility in Health Care</td>
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<td>Structure, Process and Outcomes of Regulation II</td>
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<td>PHA 6264</td>
<td>Pharmacoeconomics and Health Technology Assessment</td>
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<td>Pharmaceutical Products and Public Policy</td>
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<td>Structure, Process and Outcomes of Regulation I</td>
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<td>Federal Regulations of Drugs and Pharmacy</td>
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<td>Federal Regulations of Controlled Substances</td>
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<td>Pharmacy Benefit Design &amp; Management</td>
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<td>Ethics in Drug Development Production and Use</td>
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<td>State Regulation of Drugs and Pharmacy</td>
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<td>PHA 6280</td>
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<td>PHA 6281</td>
<td>Practices and Procedures of Administrative Agencies</td>
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<td>Commercial Applications of Pharmacoeconomics</td>
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<td>PHA 6286</td>
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<td>Regulating Clinical Research</td>
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<td>Pharmaceutical Fraud and Abuse</td>
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<td>Pharmaceutical Health Care Systems</td>
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<td>Study Design in Pharmaceutical Outcomes &amp; Policy Research</td>
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<td>The Use and Abuse of Statistics in Drug Regulation</td>
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<td>Patient Safety Program Evaluation</td>
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<td>Applied Data Interpretation and Reporting of Findings in Pharmacy</td>
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<td>Prevention of Pharmaceutical Crimes</td>
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<td>Research Ethics</td>
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### Pharmacodynamics Courses

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College of Pharmacy Courses

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Student Learning Outcomes

Pharmaceutical Sciences (MSP) - Medicinal Chemistry - Forensic Sciences, Pharmaceutical Chemistry, Clinical Toxicology

SLO 1  Knowledge
Identify, explain, describe, and apply comprehensive knowledge related to a specific discipline within the forensic or pharmaceutical sciences.

SLO 2  Problem-Solving/Critical Thinking
Evaluate case studies associated with each course.

Pharmaceutical Sciences - Medicinal Chemistry (MSP) Online

SLO 1  Knowledge
Identify, explain, describe, and apply comprehensive knowledge related to a specific discipline within the forensic or pharmaceutical sciences.

SLO 2  Problem-Solving/Critical Thinking
Evaluate case studies associated with each course.

SLO 3  Communication
Demonstrate the ability to effectively convey information when talking about a topic that is related to a discipline within the pharmaceutical sciences.

Pharmaceutical Sciences - Medicinal Chemistry (MSP)

SLO 1  Knowledge
Demonstrate comprehensive knowledge related to a specific discipline within the pharmaceutical sciences.

Pharmaceutical Outcomes and Policy Department

Chair: A. Winterstein
Interim Graduate Coordinator: R. Segal

Integral to the University of Florida's Health Science Center, the Department of Pharmaceutical Outcomes and Policy offers a unique blend of research and training in patient safety, pharmacoepidemiology, pharmacoeconomics, and social-behavioral issues surrounding medication use.

Pharmaceutical Outcomes and Policy offers a broad spectrum of opportunities for training, including a residential PhD and a residential MS program, for students in the health and related sciences. Students can choose between several specialty areas and have the opportunity to immerse themselves in research early in their training with ongoing faculty research programs.

The Ph.D. degree provides individuals with the credentials to develop and direct clinical research units in universities, pharmaceutical companies and contract research organizations, and government organizations. Successful graduates have a range of technical and disciplinary competencies in research design, measurement, inferential statistics, the communication and evaluation of research, research ethics, healthcare delivery and the medication use system, the drug product, and behavioral and policy issues surrounding medication use. Those successful graduates of the residential MS degree who have a desire to continue their studies can apply for the Ph.D. program, with MS course work and other scholastic requirements applicable.

The Department has excellent facilities for quantitative and qualitative research, and faculty have been highly successful in attracting extramural research support. Qualitative research infrastructure includes conference facilities with state-of-the-art equipment for focus groups or patient interviews. Quantitative research facilities include computer labs for students, a department-owned secure research server that houses various population-based datasets, and a variety of software packages.

For more information, please see the program page below and visit our website: http://pop.pharmacy.ufl.edu.

Majors

- Pharmaceutical Sciences (Pharmaceutical Outcomes and Policy) (p. 449)

Faculty

Professor
- Odedina, Folakemi G.
- Segal, Richard
- Winterstein, Almut Gertrud

Associate Professor
- Park, Haesuk

Assistant Professor
- Brown, Joshua D.
- Diaby, Vakaramoko
- Goodin, Amie J.
- Hampp, Christian
- Hincapie Castillo, Juan Manuel
- Lo Ciganic, Wei Hsuan Jenny
- Shao, Hui
- Wei, Yu-Jung

Clinical Assistant Professor
- Vouri, Scott M.

Clinical Professor
- Navarro, Robert P.

Affiliated Faculty
- Beck, Diane Elizabeth
  Clinical Professor
- Smith, Steven M.
  Assistant Professor
Pharmaceutical Sciences (Pharmaceutical Outcomes and Policy)

Program Information

The College of Pharmacy offers the Master of Science in Pharmacy and Doctor of Philosophy degrees in Pharmaceutical Sciences with a concentration in Pharmaceutical Outcomes and Policy, and an additional concentration in Medication Therapy Management in the M.S.P. Minimum requirements for these degrees are provided in the Graduate Degrees section of this catalog.

Research in the department emphasizes the epidemiological, socio-behavioral, administrative, regulatory, and economic aspects of drug therapy and pharmaceutical services, including assessment of safety, effectiveness, efficiency and quality aspects of patient-oriented pharmaceutical services and medication use.

The department offers both a research-oriented residential M.S.P. and Ph.D. degree programs as well as an online M.S.P. program. For the research oriented degree programs, graduate studies include core curricula and four specializations in patient safety and program evaluation, pharmacoconomics, pharmacoepidemiology and socio-behavioral research in medication use. Electives and required courses draw from the resources of the entire University. Graduates are prepared for leadership positions in academia, public service, pharmaceutical industry, and health service industry with a focus on the evaluation of drugs and related services.

The online non-thesis M.S.P. program is designed for working professionals, and focuses on pharmaceutical regulation and outcomes. Prior pharmacy experience/knowledge is not required and the program is available to persons located in the United States only. Coursework is delivered in both asynchronous and live, synchronous sessions. Students may choose among six specialty tracks including Pharmacy Regulation & Policy, Applied Pharmacoconomics, Drug Regulatory Affairs, Clinical Research Regulation in Pharmacy, Patient Safety & Medication Risk Management, and Institutional Pharmacy Leadership.

For more information, please visit our websites: http://pop.pharmacy.ufl.edu/education/prospective-students/ and http://pop.pharmacy.ufl.edu.

Degrees Offered

Degrees Offered With a Major in Pharmaceutical Sciences

- Doctor of Philosophy
  - concentration in Pharmaceutical Outcomes and Policy
    - optional second concentration in Clinical and Translational Science
  - Master of Science in Pharmacy
    - concentration in Medication Therapy Management
    - concentration in Pharmaceutical Outcomes and Policy

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Pharmaceutical Outcomes and Policy Courses

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<td>Organic Synthesis of Drug Molecules</td>
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PHA 6892 Practices and Procedures of the IRB 3
PHA 6893 Research Ethics 3
PHA 6899 Advanced OB/GYN and Pediatric Pharmacoe pidemiology 3
PHA 6937 Topics in Pharmaceutical Administration 2

Medicinal Chemistry Courses

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<td>Drug Bioreactors and Molecular Mechanisms of Toxicity</td>
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<td>PHA 6432</td>
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<td>GMS 6592</td>
<td>Ion Channels Journal Club: Pharmacology, Biophysics, and Neuroscience of Excitable Membranes</td>
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<td>Translational Research and Therapeutics: Bench, Bedside, Community, &amp; Policy</td>
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### College of Pharmacy Courses

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<td>PHA 6910</td>
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### Student Learning Outcomes

**Pharmaceutical Outcomes and Policy (MSP) - Applied Pharmacoeconomics (revised), Patient Safety in Medication Use, Pharmaceutical Regulation**

- **SLO 1** Knowledge
  - Identifies, describes, and explains concepts, theories, and methodologies in the specific area of pharmaceutical outcomes and policy
- **SLO 2** Problem Solving/Critical Thinking
  - Evaluate a problem that is related to the specific area of pharmaceutical outcomes and policy

**Pharmaceutical Sciences - Pharmaceutical Outcomes & Policy (MSP)**

- **SLO 1** Knowledge
  - Demonstrate comprehensive knowledge related to a specific discipline within the pharmaceutical sciences
- **SLO 2** Problem-Solving/Critical Thinking
  - Demonstrate the ability to evaluate a research problem that is related to a discipline within the Pharmaceutical Sciences
- **SLO 3** Communication
  - Demonstrate the ability to effectively convey information when talking about a topic that is related to a discipline within the pharmaceutical sciences

### Pharmaceutics Department

**Chair:** H. C. Derendorf  
**Graduate Coordinator:** S. Song

The focus of the Department of Pharmaceutics, which houses the Center for Drug Discovery, differs sufficiently from that of other College of Pharmacy departments as to justify a specialization. The uniqueness of the department is evident in present research activities which encompass basic, applied and clinical investigations in the areas of...
Biopharmaceutics and Pharmacokinetics, Pharmaceutical Biotechnology, Pharmaceutical Analysis, Drug Delivery, and Drug Discovery.

In addition to teaching, faculty members in the Department of Pharmaceutics are involved in collaborative research projects with clinical and other basic scientists within the Health Center or on campus. Many maintain collaborative ties with scientists in other universities and the pharmaceutical industry worldwide.

Currently, the Department of Pharmaceutics offers a Ph.D. in Pharmaceutical Sciences with a concentration in Pharmacy. A foundation in physical chemistry, chemistry, mathematics, and in the life sciences is required for applicants to be successful in the program. Many graduates of the Ph.D. program have built international careers in drug discovery and in the pharmaceutical industry. Please note that all students enter directly into the Ph.D. program as the department does not accept student applications for an M.S. degree.

The Department of Pharmaceutics is located in the University of Florida J. Hillis Miller Health Science Center complex, which includes colleges of Dentistry (https://dental.ufl.edu/), Medicine (https://med.ufl.edu/), Nursing (https://nursing.ufl.edu/), Pharmacy (https://pharmacy.ufl.edu/), Public Health and Health Professions (https://phhp.ufl.edu/), and Veterinary Medicine (https://www.vetmed.ufl.edu/). The UF&Shands system also encompasses six research institutes: the Clinical and Translational Science Institute, the McKnight Brain Institute, the Genetics Institute, the UF&Shands Cancer Center, the Institute on Aging and the Emerging Pathogens Institute. The location of the College of Pharmacy in this complex offers a broad variety of opportunities for learning and research collaboration.

For more information, please visit our website: http://pharmacy.ufl.edu/pc (http://pharmacy.ufl.edu/pc/).

Majors

- Pharmaceutical Sciences (Pharmaceutics) (p. 452)

Faculty

Professor

- Hochhaus, Guenther
- Schmittgen, Thomas D.
- Turgeon, Jacques

Associate Professor

- Baughman, Robert A.
- Bulitta, Jurgen Bernd
- Dehoff, Rhonda Marsha
- Schmidt, Stephan
- Song, Sihong
- Sullivan, Sean M.

Assistant Professor

- Cristofoletti, Rodrigo
- Moya Canellas, Bartolome
- Vozmediano Esteban, Valvanera

Research Associate Professor

- Langae, Taimour

Clinical Associate Professor

- Mobley, William C.

Clinical Professor

- Avery, Bonnie A.
- Seubert, Christoph N.

Affiliated Faculty

- Brown, Ashley Nicole
- Dore, Sylvain
- Frye, Reginald F.
- Johnson, Julie Ann
- King, Michael A.
- Lamba, Jatinder Kaur
- Markowitz, John S.
- Okunieff, Paul Gerson
- Peloquin, Charles A.
- Whisler, Yan G.

Pharmaceutical Sciences (Pharmaceutics)

Program Information

The College of Pharmacy offers the Doctor of Philosophy degree in Pharmaceutical Sciences with / without a concentration in Pharmacy, and the Master of Science in Pharmacy (M.S.P) in Pharmaceutical Sciences with / without a concentration in Pharmacy. The minimum requirements for these degrees are listed in the Graduate Degrees (p. 48) section of this Catalog.

Pharmaceutics is the scientific endeavor concerned with the design, formulation, evaluation, and use of drug delivery systems. Its domain extends from studies of the physiochemical properties of drugs and related molecules to investigations of the mechanisms of physiological processes affecting drug delivery and therapeutic effectiveness.

The Department’s general focus involves studying the design and evaluation of traditional and novel dosage forms for delivering drug molecules and macromolecules. The design involves physical chemical studies and development of analytical techniques involving spectroscopy and chromatography. Evaluation includes development of sensitive
analytical techniques for the drug in biological fluids and subsequent biopharmaceutical and clinical pharmacokinetic studies.

Applicants are required to have a foundation in physical chemistry, chemistry, mathematics, and in the life sciences. Please note that all students enter directly into the Ph.D. program as the department does not accept student applications for an M.S. degree.

For more information, please see our websites: [http://pharmacy.ufl.edu/pc/education/phd](http://pharmacy.ufl.edu/pc/education/phd) and [http://pharmacy.ufl.edu/pc](http://pharmacy.ufl.edu/pc/).

### Degrees Offered

#### Degrees Offered With a Major in Pharmaceutical Sciences

- Doctor of Philosophy
  - without a concentration
  - concentration in Clinical and Translational Science
  - concentration in Pharmaceutics
    - optional second concentration in Clinical and Translational Science
- Master of Science in Pharmacy
  - without a concentration
  - concentration in Pharmaceutics

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

#### Medicinal Chemistry Courses

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#### Pharmaceutical Outcomes and Policy Courses

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<td>PHA 6852</td>
<td>Mammalian Molecular Biology</td>
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<td>VME 6650</td>
<td>Principles of Mammalian Pharmacology</td>
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<td>Laboratory Quality Assurance/Quality Control</td>
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For more information, please see our websites: [http://pharmacy.ufl.edu/pc/education/phd](http://pharmacy.ufl.edu/pc/education/phd) and [http://pharmacy.ufl.edu/pc](http://pharmacy.ufl.edu/pc/).
Pharmacodynamics Courses

Code | Title | Credits
--- | --- | ---
PHA 6717 | Measurement in Pharmacy Administration Research | 3
PHA 6793 | Evidentiary Basis of Pharmaceutical Use | 3
PHA 6796 | Study Design in Pharmaceutical Outcomes & Policy Research | 3
PHA 6798 | The Use and Abuse of Statistics in Drug Regulation | 3
PHA 6799 | Patient Safety Program Evaluation | 3
PHA 6805 | Applied Data Interpretation and Reporting of Findings in Pharmacy | 3
PHA 6860 | Prevention of Pharmaceutical Crimes | 3
PHA 6891 | Introduction to Pharmacoepidemiology | 3
PHA 6892 | Practices and Procedures of the IRB | 3
PHA 6893 | Research Ethics | 3
PHA 6899 | Advanced OB/GYN and Pediatric Pharmacoepidemiology | 3
PHA 6937 | Topics in Pharmaceutical Administration | 2

Pharmacodynamics Courses

Code | Title | Credits
--- | --- | ---
PHA 5531 | Organic Synthesis of Drug Molecules | 3
PHA 6472 | Advanced Combinatorial Chemistry in Drug Discovery | 3
PHA 6508 | Systems Physiology and Pathophysiology I | 5
PHA 6509 | Systems Physiology and Pathophysiology II | 5
PHA 6512L | Experiential Research Training in Pharmacodynamics | 1-4
PHA 6521C | Research Techniques in Pharmacodynamics | 1
PHA 7939 | Journal Colloquy in Pharmacodynamics | 1

Pharmacology Courses

Code | Title | Credits
--- | --- | ---
GMS 6563 | Molecular Pharmacology | 1-3
GMS 6590 | Seminar in Pharmacology | 1
GMS 6592 | Ion Channels Journal Club: Pharmacology, Biophysics, and Neuroscience of Excitable Membranes | 1
GMS 6847 | Translational Research and Therapeutics: Bench, Bedside, Community, & Policy | 3
GMS 7593 | Topics in Pharmacology and Toxicology | 1-3

Pharmaceutics Department Courses

Code | Title | Credits
--- | --- | ---
PHA 6116 | In Vivo and In Vitro Stability of Drugs | 3
PHA 6125 | Pharmacokinetics and Biopharmaceutics | 3
PHA 6131 | Pharmacometrics and Systems Pharmacology | 3
PHA 6133 | Translational Clinical Pharmacology | 3
PHA 6170C | Pharmaceutical Product Formulation | 3
PHA 6183 | Pharmaceutical Gene Delivery | 3
PHA 6185 | Pharmaceutical Drug Development | 3
PHA 6416 | Pharmaceutical Analysis I | 3
PHA 6418 | Applied Translational Systems Pharmacology | 3
PHA 6449 | Pharmacogenomics | 3
PHA 6476 | Advanced Combinatorial Chemistry in Drug Discovery | 3
PHA 6630 | Medication Therapy Management: A Hematologic Focus | 3
PHA 6631 | Foundations of Medication Therapy Management I | 3
PHA 6632 | Foundations of Medication Therapy Management II | 3
PHA 6633 | Medication Therapy Management: A Cardiovascular Focus | 3
PHA 6634 | Medication Therapy Management: An Endocrine Focus | 3
PHA 6635 | Medication Therapy Management: A Renal Focus | 3
PHA 6636 | Medication Therapy Management: A Gastrointestinal Focus | 3
PHA 6637 | Medication Therapy Management: A Psychiatric Focus | 3
PHA 6638 | Medication Therapy Management: A Neurologic Focus | 3
PHA 6639 | Medication Therapy Management: A Respiratory Focus | 3
PHA 6894 | Introduction to Graduate Studies | 1
PHA 6896 | Preclinical Drug Evaluation | 2
PHA 6910 | Supervised Research | 1-5
PHA 6935 | Selected Topics in Pharmacy | 1-4
PHA 6936 | Advanced Topics in Pharmaceutical Sciences | 1-2
PHA 6938 | Research Seminar | 1
PHA 6940 | Supervised Teaching | 1-5
PHA 6971 | Research for Master’s Thesis | 1-15
PHA 7979 | Advanced Research | 1-12
PHA 7980 | Research for Doctoral Dissertation | 1-15

College of Pharmacy Courses

Student Learning Outcomes

Pharmaceutical Sciences - Pharmaceutics (MSP)

SLO 1 Knowledge
Demonstrate comprehensive knowledge related to a specific discipline within the pharmaceutical sciences

Pharmacodynamics Department

Chair: M. Keller-Wood
Graduate Coordinator: C. Frazier

The Department of Pharmacodynamics offers a Doctor of Philosophy degree in Pharmaceutical Sciences with a concentration in Pharmacodynamics, and the Master of Science in Pharmacy (M.S.P) in Pharmaceutical Sciences with a concentration in Pharmacodynamics. The minimum requirements for these degrees are listed in the Graduate Degrees (p. 48) section of this Catalog. The department also participates in the Interdisciplinary Toxicology concentration. Please note that all students enter directly into the Ph.D. program as the department does not accept student applications for an M.S. degree.

Pharmacodynamics is an integrated field of study involving pharmacology, physiology, and toxicology in a holistic approach to drug action in living systems. The Department of Pharmacodynamics focuses on neuroendocrinology, cardiovascular pharmacology, and neuropharmacology with diverse research interests in aging, hypertension, reproduction, glaucoma, neurotoxicity, and environmental physiology. Students graduating with a Ph.D. in Pharmacodynamics can...
compete for jobs in the areas of academia, industry, research institutes, and government laboratories/regulatory agencies.

An undergraduate degree in pharmacy, chemistry, biology, or related sciences is required for students to be successful in the program. In addition to graduate courses in pharmacy, courses are taken in the College of Medicine and in statistics in the College of Liberal Arts and Sciences.

The Department of Pharmacodynamics is located in the University of Florida J. Hillis Miller Health Science Center complex, which includes colleges of Dentistry (https://dental.ufl.edu/), Medicine (https://med.ufl.edu/), Nursing (https://nursing.ufl.edu/), Pharmacy (https://pharmacy.ufl.edu/), Public Health and Health Professions (https://php.h.ufl.edu/), and Veterinary Medicine (https://www.vetmed.ufl.edu/). The UF&Shands system also encompasses six research institutes: the Clinical and Translational Science Institute, the McKnight Brain Institute, the Genetics Institute, the UF&Shands Cancer Center, the Institute on Aging and the Emerging Pathogens Institute. The location of the College of Pharmacy in this complex offers a broad variety of opportunities for learning and research collaboration.

For more information, please see the program page below and visit our website: http://pharmacy.ufl.edu/pd (http://pharmacy.ufl.edu/pd/).

**Majors**
- Pharmaceutical Sciences (Pharmacodynamics) (p. 455)

**Faculty**

**Professor**
- Keller Wood, Maureen
- McMahon, Lance

**Associate Professor**
- Frazier, Charles Jason
- Krause, Eric
- Liu, Bin
- Malany, Siobhan
- McLaughlin, Jay Patrick
- Peris, Joanna

**Assistant Professor**
- De Lartigue, Guillaume
- Warren, Brandon Lee

**Pharmaceutical Sciences (Pharmacodynamics)**

**Program Information**

The College of Pharmacy offers the Doctor of Philosophy in Pharmaceutical Sciences with a concentration in Pharmacodynamics, and the Master of Science in Pharmacy (M.S.P) in Pharmaceutical Sciences with a concentration in Pharmacodynamics. The minimum requirements for these degrees are listed in the Graduate Degrees (p. 48) section of this Catalog. The department also participates in the Interdisciplinary Toxicology concentration.

**Pharmacodynamics is an integrated field of study involving pharmacology, physiology, and toxicology in a holistic approach to drug action in living systems. The department focuses on neuroendocrinology, cardiovascular pharmacology, and neuropharmacology with diverse research interests in aging, hypertension, reproduction, glaucoma, neurotoxicity, and environmental physiology.**

The program is designed for students committed to pursuing a career in the basic and health related sciences. In addition to graduate courses in pharmacy, courses are taken in the College of Medicine and in statistics in the College of Liberal Arts and Sciences. Please note that all students enter directly into the Ph.D. program, as the department does not accept students who wish to receive only the M.S. degree. An undergraduate degree in pharmacy, chemistry, biology, or related sciences is required of applicants.

For more information, please visit our websites: http://pharmacy.ufl.edu/pd/education/phd/prospective-students-3/ and http://pharmacy.ufl.edu/pd/education/phd/prospective-students-3/.

**Degrees Offered**

**Degrees Offered With a Major in Pharmaceutical Sciences**
- Doctor of Philosophy
  - concentration in Pharmacodynamics
    - optional second concentration in Clinical and Translational Science
  - Master of Science in Pharmacy
    - concentration in Pharmacodynamics

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

**Pharmacodynamics Courses**

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<td>PHA 6476</td>
<td>Advanced Combinatorial Chemistry in Drug Discovery</td>
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<td>PHA 6508</td>
<td>Systems Physiology and Pathophysiology I</td>
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<td>PHA 6512L</td>
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**Medicinal Chemistry Courses**

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<td>PHA 6356</td>
<td>Structure Determination of Complex Natural Products</td>
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<td>Herbal &amp; Dietary Supplements</td>
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<td>PHA 6417</td>
<td>Pharmaceutical Analysis II</td>
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<td>PHA 6425</td>
<td>Drug Biotrans and Molecular Mechanisms of Toxicity</td>
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### Pharmaceutical Sciences (Pharmacodynamics)

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<td>PHA 6471</td>
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<td>PHA 6534</td>
<td>Toxicology of Chemical Weapons</td>
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### Pharmaceutical Outcomes and Policy Courses

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### Pharmacology Courses

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### Pharmacodynamics Departmental Courses

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## College of Pharmacy Courses

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### Student Learning Outcomes

**Pharmaceutical Sciences - Pharmacodynamics (MSP)**

**SLO 1** Knowledge

Demonstrate comprehensive knowledge related to a specific discipline within the pharmaceutical sciences

**Pharmacotherapy and Translational Research Department**

Chair: R. Frye  
Graduate Coordinator: J. Lamba

The Department of Pharmacotherapy and Translational Research provides classroom and clinical instruction for pharmacy students and trains graduate students in clinical translational research. The department is proud of its national reputation as a leader in the areas of pharmacy practice, education and clinical translational research. Faculty members in the department are successful in obtaining research funding from numerous sources, including the National Institutes of Health.

The Department of Pharmacotherapy and Translational Research offers a variety of excellent clinical residencies and research fellowships, and offers a PhD program in Clinical Pharmaceutical Science. The goal of the Clinical Pharmaceutical Sciences training program is to prepare motivated individuals to pursue independent research careers in academia, industry, or government. The current research focus of the program is on understanding genetic and non-genetic factors that contribute to variability in drug response.

The Department of Pharmacotherapy and Translational Research is located in the University of Florida J. Hillis Miller Health Science Center complex, which includes colleges of Dentistry, Medicine, Nursing, Pharmacy, Public Health and Health Professions, Veterinary Medicine, the UF&Shands Cancer Center, the Institute on Aging and the Emerging Pathogens Institute. The UF&Shands system also encompasses six research institutes: the Clinical and Translational Science Institute, the McKnight Brain Institute, the Genetics Institute, the UF&Shands Cancer Center, the Institute on Aging and the Emerging Pathogens Institute. The location of the College of Pharmacy in this complex offers a broad variety of opportunities for learning and research collaboration.

For more information, please see the program page below and visit our website: [http://ptr.pharmacy.ufl.edu](http://ptr.pharmacy.ufl.edu)

**Majors**

- Pharmaceutical Sciences (Pharmacotherapy and Translational Research) (p. 458)
Pharmaceutical Sciences (Pharmacotherapy and Translational Research)

Program Information

The College of Pharmacy offers the Doctor of Philosophy degree in Pharmaceutical Sciences with a concentration in Clinical Pharmaceutical Sciences and the Master of Science in Pharmacy (M.S.P) in Pharmaceutical Sciences with a concentration in Clinical Pharmacy.

The minimum requirements for these degrees are listed in the Graduate Degrees (p. 48) section of this Catalog.

The Clinical Pharmaceutical Sciences training program is a collaborative effort between the Departments of Pharmacotherapy and Translational Research and Pharmaceutics with the goal of preparing motivated individuals to pursue independent research careers in academia, industry, or government. The current research focus of the program is on understanding genetic and non-genetic factors that contribute to variability in drug response.

Students in the program conduct hypothesis-driven clinical research that includes a strong laboratory component. Excellent research facilities are available including state-of-the art bioanalytical and pharmacogenomics laboratories, and an NIH-funded Clinical Translational Science Institute (CTSI) and Clinical Research Center (UF CRC) for clinical study conduction. Upon completion of the core/elective curriculum and dissertation, the Doctor of Philosophy (Ph.D.) Degree is awarded.

Graduate students in the Clinical Pharmaceutical Sciences program are expected to actively participate in clinical practice experiences and are required to spend 200 hours (minimum) to 600 hours (recommended) in a clinical practice setting. These experiences strengthen clinical background and foster development of the student as a translational research scientist. Preference will be given to candidates who have earned a PharmD degree from an accredited school of pharmacy.

For more information, please see our websites: http://ptr.pharmacy.ufl.edu/education/clinical-pharmaceutical-sciences and http://ptr.pharmacy.ufl.edu.

Degrees Offered

Degrees Offered With a Major in Pharmaceutical Sciences

- Doctor of Philosophy
  - without a concentration
  - concentration in Clinical Pharmaceutical Sciences
- Master of Science in Pharmacy
  - without a concentration
  - concentration in Clinical Pharmaceutical Sciences
  - concentration in Personalized Medicine

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Medicinal Chemistry Courses

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Pharmacotherapy and Translational Research Courses

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<td>Research for Master’s Thesis</td>
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<td>PHA 7979</td>
<td>Advanced Research</td>
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<td>PHA 7980</td>
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<tr>
<td>PHC 6001</td>
<td>Principles of Epidemiology in Public Health</td>
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</table>

College of Pharmacy Courses

Student Learning Outcomes

Pharmaceutical Sciences - Pharmacotherapy and Translational Research (MSP)

SLO 1 Knowledge
Demonstrate comprehensive knowledge related to a specific discipline within the pharmaceutical sciences.

SLO 2 Problem-Solving/Critical Thinking
Demonstrate the ability to evaluate a research problem that is related to a discipline within the Pharmaceutical Sciences.

SLO 3 Communication
Demonstrate the ability to effectively convey information when writing or speaking about a topic that is related to a discipline within the pharmaceutical sciences.

College of Public Health and Health Professions

Dean: Michael G. Perri
Executive Associate Dean: Stephanie L. Hanson

The University of Florida College of Public Health and Health Professions has established a new educational model that focuses on the integration...
of public health problem-solving and individual patient care. The college’s mission is to preserve, promote and improve the health and well-being of populations, communities and individuals. To fulfill this mission, we foster collaborations among public health and the health professions in education, research and service.

For more information, please see our website: http://phhp.ufl.edu (http://phhp.ufl.edu/)

**Departments**

- Behavioral Science and Community Health (p. 462)
  - Public Health (Ph.D. - Social and Behavioral Sciences) (p. 462)
- Biostatistics (p. 463)
  - Biostatistics (PHHP) (p. 465)
- Clinical and Health Psychology (p. 465)
  - Psychology (Clinical and Health Psychology - PHHP) (p. 466)
- Environmental and Global Health (p. 468)
  - Environmental and Global Health (M.H.S. - One Health) (p. 469)
  - Public Health (Ph.D. - Environmental and Global Health) (p. 470)
  - Public Health (Ph.D. - One Health) (p. 471)
- Epidemiology (p. 471)
  - Epidemiology (PHHP) (p. 472)
  - Health Services Research, Management and Policy (p. 474)
  - Health Administration (p. 475)
- Occupational Therapy (p. 478)
  - Occupational Therapy (p. 479)
- Speech, Language, and Hearing Sciences (p. 480)
  - Audiology (p. 481)
  - Communication Sciences and Disorders (p. 482)
- Interdisciplinary (p. 484)
  - Public Health (M.P.H.) (p. 484)
  - Public Health (Ph.D.) (p. 488)
  - Rehabilitation Science (p. 489)

**Faculty**

**Professor**

- Cook, Robert L.
- Mitchell, Gordon Stewart

**Assistant Professor**

- Ross, Kathryn Marie

**Research Associate Professor**

- Ali, Afsar

**Clinical Assistant Professor**

- Hart, Mark W.
- Wood, Elizabeth A.

**Clinical Associate Professor**

- Hack, George O.

**Clinical Professor**

- Blue, Amy Victoria
- Hanson, Stephanie Lee

**Research Professor**

- Lednicky, John

**Research Assistant Professor**

- Christie, Juliette
- Heil, Gary Lee

**Affiliated Faculty**

- Beau De Rochars, Valery E.
  - Assistant Professor
- Brumback, Babette A.
  - Professor
- Chi, Yueh-Yun
  - Research Associate Professor
- Cottler, Linda B.
  - Professor
- Datta, Santanu K.
  - Associate Professor
- Devidas, Meenakshi
  - Research Professor
- Dodd, Virginia Jones
  - Associate Professor
- Duncan, R.P.
  - Professor
- Hong, Young-Rock
  - Assistant Professor
- Janicke, David
  - Professor
- Jo, Ara
  - Clinical Assistant Professor
- Kairalla, John Andrew
  - Research Associate Professor
- Kane, Andrew S.
  - Associate Professor
- Kates, Frederick Richard
  - Clinical Assistant Professor
- King, Lindsey Marie
  - Clinical Assistant Professor
- Lauzardo, Michael
  - Research Associate Professor
- Lewis, Carol
  - Clinical Associate Professor
- Mai, Volker
  - Associate Professor
- Mainous, Arch G.
  - Professor
- Marlow, Nicole Marguerite
  - Clinical Assistant Professor
- Moorhouse, Michael D.
  - Clinical Assistant Professor
- Morris, John Glenn
Behavioral Science and Community Health Department

Interim Chair: Amy Blue
Graduate Coordinator: Amanda Glynn

The Department of Behavioral Science & Community Health (BSCH) is one of nine academic departments housed in the School of Public Health and Health Professions at the University of Florida. The department offers programs leading to the Master of Public Health (M.P.H.) with a concentration in Social and Behavioral Sciences, as well as the Doctor of Philosophy (Ph.D.) in Public Health with a concentration in Social and Behavioral Sciences. The official minimum requirements for these degrees are available in the Graduate Degrees (p. 48) section of this catalog.

For more information, please see the program pages below and our website: http://bsch.phhp.ufl.edu.

Affiliated Faculty
• Blue, Amy Victoria
  Clinical Professor
• Christie, Juliette
  Research Assistant Professor
• Hart, Mark W.
  Clinical Assistant Professor
• Ross, Kathryn Marie
  Assistant Professor
• Sibille, Kimberly T.
  Assistant Professor

Public Health (Ph.D. - Social and Behavioral Sciences)

Program Information

Social & Behavioral Sciences

The PhD in Public Health-Social and Behavioral Sciences (SBS) Track is targeted to individuals who wish to develop advanced knowledge and skills in the social and behavioral sciences theories and methods used in public health. Training is designed for those who desire public health careers in research, academics, government, or related health organizations. A prior graduate degree in public health or a related field is strongly preferred.

The program is focused upon the assumption that health and health behavior are impacted by multiple psychological, behavioral, social, and cultural factors. Central to addressing health problems and eliminating health disparities and inequalities, these factors must be understood and addressed at multiple social-ecological levels (individual, interpersonal, organizational, community, and population).

PhD students who concentrate in social and behavioral sciences explore the unique issues faced by diverse groups and populations and acquire skills to achieve social and behavioral change.

Contact
Dr. Mark Hart
Social & Behavioral Sciences Program Director
kramtrah@phhp.ufl.edu

Degrees Offered

Degrees Offered with a Major in Public Health
• Doctor of Philosophy
  concentration in Social and Behavioral Sciences
  *optional secondary concentration in Clinical and Translational Science*

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.
The Department are designed to prepare students for research and faculty in detail in the Public Health section of the catalog. These programs in Public Health degree with concentration biostatistics, which is described in biostatistics.

The Department of Biostatistics offers the Master of Science degree in biostatistics (http://biostat.ufl.edu/education/ms-in-biostatistics/), and the Master of Public Health degree with concentration biostatistics, which is described in detail in the Public Health section of the catalog. These programs in the Department are designed to prepare students for research and faculty positions; careers in health agencies and health-related institutions; and for consultation, especially in the biomedical fields. Although each graduate program has a set of required courses, there is ample flexibility in the programs to allow each student to develop strengths and interests through elective courses, seminars, and tutorials.

Doctor of Philosophy

The biostatistics doctoral program requires a minimum of 90 semester credits beyond the bachelor’s degree. All students must complete a minimum of 54 credits of biostatistics/statistics course work (30 credits can be transferred from a previously earned Master of Science program if applicable), 6 credits of public health course work, 3 credits of a consulting requirement, 6 credits of the cognate requirement, and 21 credits of dissertation work.

All graduates of the program are expected to be able to

- Conduct independent research in the development of new biostatistical methodology
- Engage in successful collaborations with investigators in new quantitative fields
- Write statistical methodology papers for peer-reviewed statistical and biostatistical journals
- Write collaborative papers for peer-reviewed subject matter journals
- Compete successfully for research and teaching positions in academic institutions, federal and state agencies, or private institutions

Specific course requirements are described at the program website http://biostat.ufl.edu/education/phd-in-biostatistics/curriculum-overview/.

Master of Science

The Master of Science in Biostatistics Program in the Department of Biostatistics requires a minimum of 36 post-baccalaureate credit hours. The program is designed to facilitate students’ development of a strong theoretical foundation in biostatistics, broad-based understanding of biostatistical methods, and expertise in a cognate field. A typical student will be enrolled full-time for two years. Upon successful completion of the program, graduates will be awarded an M.S. degree in biostatistics. We currently offer the Master of Science program in both traditional (campus) and online learning delivery methods.

The principal goal of the M.S. program is to prepare highly qualified individuals for future Ph.D. training and for careers in biostatistics practice. This training is conducted in the innovative and interdisciplinary public health culture of the college of public health and health professions and the college of medicine and will produce graduates who will help address the shortage of biostatisticians. We expect our graduates to be highly competitive in three primary settings: academic university-based settings, industry, and federal agencies that involve research and/or public health practice.

Specific course requirements are described at the program website http://biostat.ufl.edu/education/ms-in-biostatistics/(Campus) and http://biostat.ufl.edu/education/msonline/(Online).

Biostatistics Department

Chair: Peihua Qiu
Associate Chair for Education: Babette Brumback
Graduate Coordinator: Kristen Cason

The Department of Biostatistics offers the Doctor of Philosophy degree in biostatistics (p. 463), the Master of Science degree in biostatistics (http://biostat.ufl.edu/education/ms-in-biostatistics/), and the Master of Public Health degree with concentration biostatistics, which is described in detail in the Public Health section of the catalog. These programs in the Department are designed to prepare students for research and faculty
Faculty

Professor
- Brumback, Babette A.
- Datta, Somnath
- Datta, Susmita
- Lee, Ji-Hyun
- Longini, Ira M.
- Lu, Qing Terry
- Qiu, Peihua
- Wu, Samuel Shangwu
- Zou, Fei

Associate Professor
- Guha, Subharup
- Kenah, Eben E.
- Li, Zhiqiang
- Yang, Yang

Assistant Professor
- Bacher, Rhonda L.
- Dean, Natalie E.
- Huo, Zhiguang

Research Associate Professor
- Chi, Yueh-Yun
- Kairalla, John Andrew

Clinical Assistant Professor
- Foti, Steven J.
- Parker, Robert L.
- Yu, Yichao

Research Assistant Professor
- Naranjo, Arlene H.
- Pei, Qinglin
- Zou, Baiming

Affiliated Faculty
- Doss, John
- Ghosh, Malay
  Distinguished Professor

Courses

BIOSTATISTICS

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<td>GMS 6819</td>
<td>Design and Conduct Clinical Trials II</td>
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<td>Advanced Clinical Trial Methods</td>
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<td>GMS 6861</td>
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<td>GMS 6862</td>
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<td>PHC 6063</td>
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<td>PHC 6081</td>
<td>SAS for Public Health - Analysis</td>
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<td>PHC 6088</td>
<td>Statistical Analysis of Genetic Data</td>
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<td>PHC 6089</td>
<td>Public Health Computing</td>
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<td>PHC 6092</td>
<td>Introduction to Biostatistical Theory</td>
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<td>PHC 6937</td>
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<td>Bias in Observational Research</td>
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<td>PHC 7056</td>
<td>Analysis of Longitudinal Data</td>
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<td>Regression Methods for the Health and Life Sciences</td>
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<td>PHC 6210</td>
<td>Community Assessment and Partnerships</td>
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<td>PHC 6193</td>
<td>Qualitative Data Analysis</td>
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<td>PHC 6195</td>
<td>Health information for Diverse Populations: Theory &amp; Methods</td>
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<td>PHC 6316</td>
<td>Health, Risk, and Crisis Communication</td>
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<td>PHC 6447</td>
<td>Ecology of HIV/Aids in the Rural South</td>
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<td>PHC 6607</td>
<td>Critical Issues in Public Health</td>
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<td>PHC 6917</td>
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<td>Public Health Practicum</td>
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<td>PHC 6946</td>
<td>Public Health Internship</td>
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<td>PHC 7587</td>
<td>Theory Development and Testing in Behavioral &amp; Community Public Health</td>
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<td>PHC 7752</td>
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Biostatistics (PHHP)

Program Information

Doctor of Philosophy
The biostatistics doctoral program requires a minimum of 90 semester credits beyond the bachelor’s degree. All students must complete a minimum of 54 credits of biostatistics/statistics coursework (30 credits can be transferred from a previously earned Master of Science program if applicable), 6 credits of public health course work, 3 credits of a consulting requirement, 6 credits of the cognate requirement, and 21 credits of dissertation work.

All graduates of the program are expected to be able to

- Conduct independent research in the development of new biostatistical methodology
- Engage in successful collaborations with investigators in new quantitative fields
- Write statistical methodology papers for peer-reviewed statistical and biostatistical journals
- Write collaborative papers for peer-reviewed subject matter journals
- Compete successfully for research and teaching positions in academic institutions, federal and state agencies, or private institutions

Specific course requirements are described at the program website http://biostat.ufl.edu/education/phd-in-biostatistics/.

Master of Science
The Master of Science in Biostatistics Program in the Department of Biostatistics requires a minimum of 36 post-baccalaureate credit hours. The program is designed to facilitate students’ development of a strong theoretical foundation in biostatistics, broad-based understanding of biostatistical methods, and expertise in a cognate field. A typical student will be enrolled full-time for two years. Upon successful completion of the program, graduates will be awarded an M.S. degree in biostatistics. We currently offer the Master of Science program in both traditional (campus) and online learning delivery methods.

The principal goal of the M.S. program is to prepare highly qualified individuals for future Ph.D. training and for careers in biostatistics practice. This training is conducted in the innovative and interdisciplinary public health culture of the college of public health and health professions and the college of medicine and will produce graduates who will help address the shortage of biostatisticians. We expect our graduates to be highly competitive in three primary settings: academic university-based settings, industry, and federal agencies that involve research and/or public health practice.

Specific course requirements are described at the program website http://biostat.ufl.edu/education/ms-in-biostatistics/ (Campus) and http://biostat.ufl.edu/education/msonline/ (Online).

Degrees Offered

Degrees Offered with a Major in Biostatistics
- Doctor of Philosophy
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Biostatistics Departmental Courses

College of Public Health and Health Professions Courses

Student Learning Outcomes

Biostatistics (PHD)

SLO 1 Knowledge
Communicate the underpinning of biostatistics concepts and methods

SLO 2 Skills
Identify, research, and acquire new biostatistical concepts and methods on one’s own

SLO 3 Skills
Develop and apply new biostatistical concepts and methods independently

SLO 4 Professional Behavior
Display ethical behaviors, cultural sensitivity, teamwork, conduct and communications

SLO 5 Professional Behavior
Participation in academic conferences to disseminate knowledge and represent the university

Biostatistics (MS)

SLO 1 Knowledge
Communicate the underpinning of biostatistics concepts and methods.

SLO 2 Skills
Apply biostatistical concepts and methods, interpret results, communicate.

SLO 3 Professional Behavior
Display ethical behaviors, cultural sensitivity, teamwork, conduct and communications

Clinical and Health Psychology Department

Department Chair: Glenn Smith
Program Director and Graduate Coordinator: David Janicke
Academic Coordinator: Melissa Naidu
The Department of Clinical and Health Psychology is a unit of the College of Public Health and Health Professions. The department's programs are its doctoral clinical psychology studies leading to the Ph.D. degree in psychology; doctoral internship program; and postdoctoral studies and research all accredited by the American Psychological Association. Requirements for the Ph.D. degree is given in the Graduate Degrees (p. 48) section of this catalog.

The clinical psychology doctoral curriculum adheres to the scientist-practitioner model of education and training. Program strengths include research, education, and professional training in health care psychology, with organized areas of concentration in clinical health psychology, clinical child/pediatric psychology, neuropsychology, neurorehabilitation and clinical neuroscience, and cognitive and emotion neuroscience. Education and training experiences are also available in rural psychology. Interested students can also apply for acceptance into the Public Health Program and obtain dual M.P.H./Ph.D. degrees.

Progress in the program is determined by departmental policies which are consistent with American Psychological Association accreditation standards. The doctoral curriculum has been continuously accredited by the American Psychological Association since 1953.

Admission to the Department is through appropriate application to the Department's admission committee. A bachelor's degree is generally adequate preparation for graduate admission. It should include undergraduate courses in both experimental psychology and statistics, along with at least two courses from the following psychology areas: developmental, social, affective, biological, and cognitive.

For more information, please see the program page below and our website: http://chp.phhp.ufl.edu.

Majors
• Psychology (Clinical and Health Psychology - PHHP) (p. 466)

Faculty

Professor
• Bauer, Russell M.
• Bowers, Dawn
• Bussing, Regina
• Janicke, David
• Perri, Michael G.
• Robinson, Mike E.
• Smith, Glenn Eric

Associate Professor
• Anton, Stephen D.
• Driscoll, Kimberly Ann
• Mccrae, Christina Smith
• Pereira, Deidre B.
• Perlstein, William Michael
• Price, Catherine Elizabeth

Assistant Professor
• Boissoneault, Jeffrey
• Ennis, Nicole
• Fedele, David Andrew

Clinical Assistant Professor
• Gylys, Julius A.
• Holgerson, Allison Amelia
• Levy, Shellie-Anne

Clinical Associate Professor
• Ashkanazi, Glenn Steven
• Choi, Chun-Chung
• Durning, Patricia Ellen
• Heaton, Shelley C.
• Wiens, Brenda A.

Clinical Professor
• Dede, Duane E.
• Guenther, Robert Thomas
• Waxenberg, Lori B.

Research Assistant Professor
• Tanner, Jared J.

Graduate Research Professor
• Lang, Peter J.

Affiliated Faculty
• Cohen, Ronald A.
• Marsiske, Michael
• McNamara, Joseph P.
• Nadeau, Stephen E.
• Ross, Kathryn Marie
• Williamson, John Bonar

Psychology (Clinical and Health Psychology - PHHP)

Program Information
The department of Clinical and Health Psychology is an academic and professional unit in the College of Public Health and Health Professions at the Health Science Center on the University of Florida campus in Gainesville. The doctoral program in clinical psychology has been accredited by the American Psychological Association since 1953 and adheres to the Scientist-Practitioner Model of education and training. The Clinical Psychology Doctoral program is unique in the country in that it is housed in an independent department of Clinical and Health Psychology in a major academic health science setting along with an APA accredited internship and postdoctoral program. These features foster program
strengths in research, teaching, and professional training in health care psychology.

The Scientist-Practitioner Model allows the student to obtain broad clinical, academic, and research training that readies them for careers anywhere along the science-practice continuum. The student obtains focused research mentorship in a faculty member’s laboratory and obtains broad training in clinical assessment and intervention both in and outside of their designated area of concentration.

The Doctoral Program provides the student with training in the concepts, tools, roles, and functions of the clinical psychologist. The overall goals of the graduate program are to prepare the student to:

1. investigate meaningful, empirically testable questions in the quest for understanding a behavioral process, a patient’s problem, or a professional issue;
2. function as a professional psychologist;
3. practice competently in the applied areas of psychological assessment/diagnosis, intervention/therapy, and consultation; and
4. contribute to the advancement of psychological knowledge through research or other creative scholarly activity.

Through a combination of general and specialized experiences in the classroom, laboratory, and clinic students develop knowledge and skills as scientist-practitioners. Attitudes are developed toward the practice of psychology and toward related professions which enable effective personal interaction and participation in the interdisciplinary approach to problems of research and practice. As students progress in the program, they develop professional identity through acceptance of increased responsibility for professional decisions, through the execution of significant research projects, and through their contributions to the understanding of psychological problems and processes.

For more information please see our website: http://chp.phhp.ufl.edu

Degrees Offered

Degrees Offered with a Major in Psychology (Clinical and Health Psychology - PHHP)

- Doctor of Philosophy
  - concentration in Clinical and Health Psychology
    - optional second concentration in Clinical and Translational Science
  - Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Clinical and Health Psychology Departmental Courses

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<td>Psychological Treatment I</td>
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<td>Measurement, Research Design, and Statistical Analysis in Clinical Psychology I</td>
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<td>Advanced Practicum in Neuropsychology</td>
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Clinical & Health Psychology

SLO 1 Knowledge
Students will analyze and discuss selected topic areas in general clinical psychology and in the student’s area of specialization

SLO 2 Skills
Students will deliver a broad variety of assessment, intervention, and consultation service

SLO 3 Professional Behavior
Students will deliver professional services to patients in a manner that shows dedication to applicable ethical, professional practice, and legal standards

Environmental and Global Health Department

Chair: Tara Sabo-Attwood
Ph.D. Program Director: Joseph Bisesi
Graduate Coordinator: Victoria Houghton

The Department of Environmental and Global Health offers graduate work leading to the degrees of Doctor of Philosophy, Master of Health Science, and Master of Public Health. The official minimum requirements for these degrees are listed in the Graduate Degrees (p. 48) section of this catalog.

The Department of Environmental and Global Health conducts cutting edge research at the nexus of human and environmental systems, blending research focused on how emerging pathogens, chemical contaminants, climate change, nutrition, and socio-economic factors influence the health of humans and animals on a global scale. Department faculty, scientists, and students employ numerous disciplines in studying these environmental exposure-health links and prevention/control measures: virology, bacteriology, parasitology, entomology, toxicology, epidemiology, water sciences, veterinary health, environmental engineering, aerosol biology, etc. A central theme for the department is the interdisciplinary thinking called One Health (https://www.youtube.com/watch?v=66ewI8Sbypl) which reflects the collaborations necessary to tackle public health's most difficult problems. Faculty, students and staff often perform research in the laboratories in the Emerging Pathogens Institute (http://www.epi.ufl.edu/), the Center for Environmental and Human Toxicology (https://toxicology.vetmed.ufl.edu/), the Center for African Studies (https://africa.ufl.edu/), or the Aquatic Pathobiology Laboratory (https://aquaticpath.phhp.ufl.edu/).

For more information, please see the program pages below and our website: http://egh.phhp.ufl.edu.
Environmental and Global Health (M.H.S. - One Health)

Degrees Offered

Degrees Offered With a Major in Environmental and Global Health

- Master of Health Science
  - concentration in One Health

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Environmental and Global Health Departmental Courses

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**Student Learning Outcomes**

**Environmental & Global Health (MHS)**

**SLO 1 Knowledge**
Students discuss the One Health concept and how it is used to tackle complex public health problems.

**SLO 2 Skills**
Students will apply problem-solving skills analyzing and synthesizing content knowledge in One Health concept.

**SLO 3 Professional Behavior**
Students will display professional behavior, cultural sensitivity, teamwork and appropriate communication when criticizing or defending scientific research.

---

**Public Health (Ph.D. - Environmental and Global Health)**

**Degrees Offered**

**Degrees Offered With a Major in Public Health**
- Doctor of Philosophy
  - concentration in Environmental Health
  - optional secondary concentration in Clinical and Translational Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

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Public Health (Ph.D. - One Health)

Degrees Offered

Degrees Offered With a Major in Public Health

- Doctor of Philosophy
  - concentration in One Health
  - optional secondary concentration in Clinical and Translational Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Environmental and Global Health

Departmental Courses

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<td>PHC 6512</td>
<td>Environmental Management of Vector-Borne Diseases</td>
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<td>Introduction to Entomology Zoonotic Diseases and Food Safety</td>
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<td>Foodborne Diseases</td>
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<td>PHC 6561</td>
<td>Public Health Laboratory Techniques</td>
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<td>PHC 6671</td>
<td>Emerging Infectious Diseases in One Health</td>
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<td>PHC 6702</td>
<td>Environmental Monitoring and Exposure Assessment</td>
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<td>PHC 6706</td>
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<td>PHC 6947</td>
<td>Occupational Health Field Research Experience</td>
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<td>PHC 7307</td>
<td>Quantitative Assessment of Environmental Health Impacts</td>
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<td>PHC 7980</td>
<td>Research for Doctoral Dissertation</td>
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College of Public Health and Health Professions Courses

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<td>Overview of Geriatric Care Management</td>
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<td>GEY 6306</td>
<td>Interpersonal Communication Within the Aging Network</td>
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<td>PHC 6053</td>
<td>Regression Methods for the Health and Life Sciences</td>
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<td>PHC 6120</td>
<td>Community Assessment and Partnerships</td>
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<td>PHC 6193</td>
<td>Qualitative Data Analysis</td>
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<td>PHC 6195</td>
<td>Health information for Diverse Populations: Theory &amp; Methods</td>
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<td>PHC 6316</td>
<td>Health, Risk, and Crisis Communication</td>
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<td>PHC 6447</td>
<td>Ecology of HIV/AIDS in the Rural South</td>
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<td>Public Health Internship</td>
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<td>PHC 7587</td>
<td>Theory Development and Testing in Behavioral &amp; Community Public Health</td>
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<td>Research for Doctoral Dissertation</td>
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</table>

Epidemiology Department

Chair: Stephen Kimmel
Ph.D. Program Director: Deepthi S. Varma
M.S. Program Director: Catherine W. Striley

The Department of Epidemiology – jointly governed by both the College of Public Health and Health Professions and the College of Medicine – offers the Doctor of Philosophy degree in epidemiology, Masters of Science degree in epidemiology (MSE), the Certificate in Psychiatric Epidemiology (CPE), and the Master of Public Health degree with a concentration in epidemiology (described here (p. 484)). Minimum requirements for these degrees are described in the Graduate Degrees (p. 48) section of this catalog. The programs in the department are designed to prepare students for careers in academic research.
environments, public health agencies and health-related institutions, and consultation, especially in the biomedical fields.

More information on these programs is available at the program page below and at the department website: http://epidemiology.phhp.ufl.edu.

Majors
• Epidemiology (PHHP) (p. 472)

Faculty

Professor
• Chen, Xinguang
• Cottler, Linda B.
• Pearson, Thomas A.
• Zhao, Jinying

Associate Professor
• Mai, Volker
• Prosperi, Mattia

Assistant Professor
• Cheng, Ting-Yuan
• Gurka, Kelly
• Hu, Hui
• Wang, Yan
• Yaghjyan, Lusine

Other
• Shapiro, Jerne J.

Research Associate Professor
• Striley, Catherine L.

Clinical Assistant Professor
• Lopez-Quintero, Catalina

Clinical Associate Professor
• Prins, Cindy A.

Research Professor
• Sheps, David Samuel

Research Assistant Professor
• Qin, Huazheng
• Varma, Deepthi Satheesa

Affiliated Faculty
• Beyth, Rebecca J.
• Brumbauck, Babette A.
• Canales, Muna Thalji
• Carek, Peter J.
• Cook, Robert L.
• Cruz-Almeida, Yenisel
• Cummings, Derek Adam
• Kwara, Awewura
• Lauzardo, Michael
• Longini, Ira M.
• Maldonado Molina, Mildred Merisa
• Manini, Todd M.
• Morris, John Glenn
• Perri, Michael G.
• Prins, Cindy A.
• Rasmussen, Sonja A.
• Shorr, Ronald I.
• Staras, Stephanie Ann
• Tomar, Scott
• Vaddiparti Ananth, Srinivasa Krishna
• Winterstein, Almut Gertrud

Epidemiology (PHHP)

Program Information

The Ph.D. in Epidemiology program is in the Department of Epidemiology, which is jointly governed by both the College of Public Health and Health Professions and the College of Medicine. The program requires a minimum of 90 semester credits beyond the bachelor's degree. All students must complete at least 36 credits of epidemiology core courses, 6 credits of statistics electives, 18 credits of epidemiology electives, 15 credits of general electives, and 15 credits of dissertation research. Students may also apply to graduate with a concentration in up to two 9-credit concentration areas. All entering students who do not hold MPH or equivalent degrees are also required by the College of Public Health and Health Professions to complete an Introduction to Public Health course.

All students admitted to the Ph.D. program in Epidemiology are fully funded for four years, including a tuition waiver and a stipend. Depending on a student's source of funding, the student may work for up to 20 hours per week as a research assistant, a teaching assistant, or some combination of the both. Funding sources for students may include the student's research mentor, the department, the college, the Graduate School, or external fellowships or scholarships pursued by the student.
The core course work is designed to incorporate competencies recommended in the report of the 2002 workshop on doctoral education in epidemiology from the American College of Epidemiology and the Association of Schools and Programs of Public Health, and criteria for applied epidemiology competencies. The overall outcomes expected of all graduates are as follows:

1. Apply epidemiological methods to address critical and/or emerging public health issues through the use of:
   - Appropriate epidemiological research designs
   - Advanced statistical analysis methods for health studies
   - Data structures and measurement methods for health research
   - Biological, behavioral and social theory applied to the understanding and prevention of contemporary threats to health and well-being
   - Depth of knowledge in an area of specialization
2. Assimilate the history, philosophy, and ethical principles of epidemiology into current research
3. Develop grant proposals and manage research projects
4. Write scientific papers for publication in peer-reviewed journals, and communicate research results to scientists, policy makers, and the public
5. Compete successfully for research and teaching positions in academic institutions, federal or state agencies, or private institutions.

Students in the Ph.D. program in Epidemiology may apply to graduate with a concentration in up to two of the following areas:

- Cancer Epidemiology
- Genetic Epidemiology
- Gero-Epidemiology
- Infectious Disease Epidemiology
- Psychiatric Epidemiology
- Clinical and Translational Science

Concentrations allow PhD students to focus their elective coursework toward a single content area that interests them. All concentrations offered by the Department of Epidemiology are completely optional, and students may enroll in up to two concentrations. Enrollment in a concentration requires the approval of the student’s academic advisor, research mentor, PhD Program Director, and Curriculum Committee Chair.

All concentrations require that students submit either (a) dissertation aims or (b) a first-authored publication that documents research in the area of the concentration in addition to the required courses.

The overarching goal of each concentration is to provide learners with advanced training in each respective field. This training will help prepare researchers for the frontlines of interdisciplinary team science targeted towards improving the quality of life, health, and society using epidemiologic tools and methods.

Details of the Ph.D. in Epidemiology program and application information are available at our website: http://epidemiology.phhp.ufl.edu/about/ph-d-in-epidemiology-2/.

The Master of Science in Epidemiology (MSE) program is a 36-credit program that prepares students for careers in the public health arena that are focused on the surveillance and prevention of illnesses among diverse populations around the world. Students will be trained in the foundational aspects of epidemiology, including person, place, and time; risk and protective factors; and the social determinants of health. Areas of focus may include chronic disease, infectious disease, geriatric, environmental, psychiatric, social, cancer, and maternal and child health epidemiology.

The thesis is required to demonstrate skill in independent inquiry and investigation, under the tutelage of a mentor. All students must complete at least 15 credits of epidemiology core courses, 8 credits of biostatistics courses, 4 credits of professional development courses, 5 credits of electives, and 4 credits of thesis research.

Graduates of the MS in Epidemiology program will be able to:

- Apply surveillance, assessment, evaluation, and other foundational epidemiological research designs to all areas of interest,
- Choose appropriate measurement and analytic methods to study health and disease in a population,
- Utilize biological, behavioral and social theory to understand how to prevent and intervene to promote the public health.

Details of the Master of Science in Epidemiology program and application information are available at our website: https://epidemiology.phhp.ufl.edu/academics/mse/.

### Degrees Offered

#### Degrees Offered with a Major in Epidemiology

- Doctor of Philosophy
  - without a concentration
  - concentration in Cancer Epidemiology
  - concentration in Clinical and Translational Science
  - concentration in Genetic Epidemiology
  - concentration in Gero-Epidemiology
  - concentration in Infectious Disease Epidemiology
  - concentration in Psychiatric Epidemiology
  - Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

#### Epidemiology (PHHP/COM) Departmental Courses

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<thead>
<tr>
<th>Code</th>
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<tr>
<td>PHC 6008</td>
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<td>PHC 6009</td>
<td>Biology and Epidemiology of HIV/AIDS</td>
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<td>PHC 6014</td>
<td>Epidemiology, Prevention, and Control of Chronic Diseases II</td>
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<td>PHC 6034</td>
<td>Epidemic Investigation</td>
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<td>PHC 6041</td>
<td>Landmarks in Psychiatric Epidemiology</td>
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<td>PHC 6517</td>
<td>Public Health Concepts in Infectious Diseases</td>
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<tr>
<td>PHC 6598</td>
<td>Foundations in Precision Medicine: Genetic Epidemiology</td>
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<tr>
<td>PHC 6711</td>
<td>Measurement in Epidemiology and Outcomes Research</td>
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</table>
PHC 6932 Psychiatric Epidemiology Online Seminar Series 1
PHC 6937 Special Topics in Public Health 1-6
PHC 6939 CPE Psychiatric Grand Rounds 1
PHC 6971 Research for Master’s Thesis 1-4
PHC 7000 Epidemiology Seminar II: Critical Evaluation, Research Proposals, and Methods 2
PHC 7007 Cancer Epidemiology 3
PHC 7017 Advanced Epidemiologic Methods III 3
PHC 7038 Psychiatric Epidemiology 3
PHC 7065 Critical Skills in Epidemiological Data Management 2
PHC 7083 Computational Epidemiology in Population Science 2
PHC 7199 Topics in Precision Medicine and Public Health Informatics 1
PHC 7427 Ethics in Population Science 2
PHC 7594 Genetic Epidemiology 3
PHC 7595 Introduction to Molecular Epidemiology 3
PHC 7727 Grant Writing for Population Health Research 2
PHC 7901 Epidemiology Literature Review and Critique (Journal Club) 1
PHC 7902 Scientific Writing for Peer Reviewed Publications for Popular Science 1
PHC 7910 International Field Epidemiology 3
PHC 7916 National Field Epidemiology 1-3
PHC 7918 Independent Study 1-3
PHC 7934 Seminar I: Epidemiology Past, Present, and Future 2
PHC 7979 Advanced Research 1-12
PHC 7980 Research for Doctoral Dissertation 1-15

**Student Learning Outcomes**

**Epidemiology (PHD)**

**SLO 1: Skills**
Design epidemiologic research studies and analyze data to answer health-related research questions that are currently relevant to the population.

**SLO 2: Skills**
Prepare to become an independent researcher in the field of Epidemiology.

**SLO 3: Knowledge**
Illustrate a thorough understanding of epidemiology concepts.

**SLO 4: Professional Behavior**
Display ethical behaviors, cultural sensitivity, teamwork, professional conduct and communication, and build academic skills such as grant writing.

**Epidemiology (MS)**

**SLO 1: Knowledge**
Apply surveillance, assessment, evaluation, and other foundational epidemiological research designs to all areas of interest.

**SLO 2: Skills**
Choose appropriate measurement and analytic methods to study health and disease in a population.

**SLO 3: Skills**
Utilize biological, behavioral and social theory to understand how to prevent and intervene to promote the public health.

**SLO 4: Professional Behavior**
Display ethical behavior, cultural sensitivity, integrity in research conduct, honesty, and teamwork.

**Health Services Research, Management and Policy Department**

Chair: Arch G. Mainous, III  
Graduate Coordinator: Ikiah Young

The Department of Health Services Research, Management and Policy offers degree programs at both the master’s and doctoral level. The Master of Health Administration (M.H.A.) prepares individuals for management positions in the health care field. The Department also
participates in the Master of Public Health (M.P.H.) degree by offering a concentration in Public Health Management and Policy (more information available here (p. 484)).

At the doctoral level, the Department offers the Ph.D. degree in Public Health, Health Services Research Concentration. This full-time program prepares graduates to investigate and evaluate the complexities of health care systems in the U.S. and elsewhere. Health services research is a multidisciplinary field that examines the delivery, organization, financing, and outcomes of health care services.

Minimum requirements for these degrees are available in the Graduate Degrees (p. 48) section of this catalog.

For more information, please see the program pages below and our website: http://hsrmp.phhp.ufl.edu.

### Majors

- Health Administration (p. 475)

### Faculty

**Professor**

- Duncan, R.P.
- Mainous, Arch G.

**Associate Professor**

- Datta, Santanu K.

**Assistant Professor**

- Beau De Rochars, Valery E.
- Hong, Young-Rock
- Walker, Ashby Farmer

**Clinical Assistant Professor**

- Jo, Ara
- Kates, Frederick Richard
- King, Lindsey Marie
- Marlow, Nicole Marguerite

### Health Administration

#### Program Information

The Master of Health Administration (M.H.A.) is a two-year, lock-step program with a summer internship between the first and second years. Small class size permits individual attention and guidance from faculty members. The program prepares qualified individuals motivated by a social mission and responsibility to the community for various management positions in the health services industry. Organizations seek individuals who have the ability to solve business problems and build strategic relationships in a climate of continuous change.

The UF M.H.A. program develops engaged early health care careerrists to use evidence-based strategies to improve healthcare quality, affordability, and access. We provide students with fundamental knowledge using a cohort model in a campus-based setting that emphasizes experiential learning and data-driven problem solving both in the classroom and in the practice environment. Students will develop proficiency to detect, analyze, manage and respond to critical administrative issues in both provider and non-provider healthcare organizations. Our program embraces ethical conduct and professionalism, diversity and inclusion, practitioner involvement and team-based learning. Faculty inform practice with research and service to the community.

Applicants from any undergraduate major are considered. For more information about our program, please see our website: http://hsrmp.phhp.ufl.edu/academic-programs/master-of-health-administration (http://hsrmp.phhp.ufl.edu/academic-programs/master-of-health-administration/).

### Degrees Offered

#### Degrees Offered with a Major in Health Administration

- Master of Health Administration

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

#### Health Administration Program Courses

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<td>HSA 6114</td>
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<td>HSA 6115</td>
<td>Introduction to Management of Health Services Organizations</td>
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<td>HSA 6198</td>
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<td>Capstone Seminar in Health Administration</td>
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#### Health Services Research, Management, and Policy Departmental Courses

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College of Public Health and Health Professions Courses

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<td>HSA 7437</td>
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PHC 6946 | Public Health Internship                      | 1-9     |

PHC 7587 | Theory Development and Testing in Behavioral & Community Public Health | 2       |

PHC 7752 | Seminar in Instrument Development for Public Health | 2       |

PHC 7907 | Social and Behavioral Science Journal Club | 1       |

RCS 6036 | Or to Forensic VT P                           | 3       |

RCS 6601 | Forensic Rehabilitation Consultation I        | 3       |

RCS 6602 | Forensic Rehabilitation Consultation II       | 3       |

RCS 6905 | Individual Work                              | 1-4     |

RCS 6931 | Special Topics                               | 1-3     |

RSD 6110 | Rehabilitation Science Theory and Application | 3       |

RSD 6905 | Individual Work                              | 1-4     |

RSD 6910 | Supervised Research                          | 1-5     |

RSD 6930 | Special Topics in Rehabilitation Science     | 1-4     |

RSD 6940 | Supervised Teaching                          | 1-3     |

RSD 7979 | Advanced Research                            | 1-12    |

RSD 7980 | Research for Doctoral Dissertation           | 1-15    |

Student Learning Outcomes

**Health Administration (MHA)**

**SLO 1  Knowledge and Skill**
- Students will apply in-depth knowledge and skill in the healthcare delivery, organization, and financing, and management

**SLO 2  Skills**
- Students will exhibit mastery of a set of 16 competencies in 4 domains (healthcare environment and community; healthcare organizations and performance; business analysis and techniques; leadership and professionalism)

**SLO 3  Professional Behavior**
- Students will gain experience in healthcare management and develop professional behavior skills in a summer internship

**Health Services Research**

**Program Information**

The Department of Health Services Research, Management and Policy offers a doctoral degree in Public Health, Health Services Research Concentration. Health services research is a multidisciplinary field of inquiry, both basic and applied, that examines the use, costs, quality, accessibility, delivery, organization, financing, and outcomes of healthcare services. The objective is to increase knowledge and understanding of the structure and processes of the healthcare system, and to assess subsequent effects on individuals and populations. Health services research draws on a variety of disciplines, and integrates their conceptual frameworks and methods to provide new ways of studying and understanding the health care system.

The Ph.D. Program in Public Health-Health Services Research prepares individuals to conduct inquiry that will inform government officials, corporate leaders, clinicians, health plan managers, and others making decisions about complex health-related problems and issues. Students in this Ph.D. Program learn to apply research methods and scientific knowledge to the study of health services organizations and systems.

Graduates of the Ph.D. Program in Public Health-Health Services Research will find career opportunities in academic, private sector, and public service settings. For example, some graduates will combine
research interests with a teaching career and accept academic appointments in a wide range of health-related departments in the nation’s colleges and universities. Other graduates will pursue health services research in the context of healthcare delivery and choose employment opportunities with hospitals and health systems, managed care companies, the pharmaceutical industry and consulting firms. Finally, graduates may pursue careers in government or other public service entities (such as private foundations), whose programs are increasingly dependent upon the findings and methodologies of health services research.

For more details about our program, please see our website: https://hsrmp.phhp.ufl.edu/academic-programs/phd-in-ph-hsr/.

Degrees Offered with a Major in Health Services Research

- Doctor of Philosophy

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Health Services Research Program Courses

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College of Public Health and Health Professions Courses

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<td>Overview of Geriatric Care Management</td>
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<td>Interpersonal Communication Within the Aging Network</td>
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<td>GEY 6646</td>
<td>Issues and Concepts in Gerontology</td>
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<td>GEY 6936</td>
<td>Professional Development in Gerontology/ Geriatrics</td>
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<td>Independent Study</td>
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<td>PHC 6053</td>
<td>Regression Methods for the Health and Life Sciences</td>
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<tr>
<td>PHC 6120</td>
<td>Community Assessment and Partnerships</td>
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<tr>
<td>PHC 6193</td>
<td>Qualitative Data Analysis</td>
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<tr>
<td>PHC 6195</td>
<td>Health information for Diverse Populations: Theory &amp; Methods</td>
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Health Services Research, Management, and Policy Departmental Courses

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<td>HSA 6105</td>
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<td>HSA 6114</td>
<td>U.S. Health Care System</td>
<td>3</td>
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<tr>
<td>HSA 6115</td>
<td>Introduction to Management of Health Services Organizations</td>
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</table>
The Department of Occupational Therapy offers graduate programs in occupational therapy leading to the Master of Health Science (M.H.S.) degree and the entry-level Master of Occupational Therapy (M.O.T.) degree. However, we are no longer admitting students into these programs because the Department is transitioning to the Doctor of Occupational Therapy (O.T.D.) degree. Please see the Department website at http://www.ot.phhp.ufl.edu for more information. Complete descriptions of the requirements for the M.H.S. and M.O.T. degrees are provided in the Graduate Degrees (p. 48) section of this catalog.

Master of Health Science: This program is designed for students who have earned an undergraduate degree in Occupational therapy. The thesis option requires four semesters of course work and a formal research thesis, while the non-thesis option requires three semesters of course work and a research project. The program emphasizes research and advanced theories related to occupational therapy practice.

Additional information about the Master of Health Science is available at http://www.ot.phhp.ufl.edu or http://gradschool.rgp.ufl.edu or by telephone at (352) 273-6817.

Master of Occupational Therapy: This entry-level degree program is designed for students who do not have an undergraduate degree in occupational therapy. The program provides students with a holistic perspective, including an understanding of the philosophical and theoretical bases for practice in the current health care environment. The M.O.T. program provides a strong background in theory, assessment, and therapeutic interventions. Before their professional preparation in the M.O.T. program, students receive a liberal education in their pre-professional baccalaureate studies, including several courses specifically focused for students planning to enter the M.O.T. program. Students complete these courses in the Bachelor of Health Science degree program at the bachelor’s level, or they may complete these courses as part of the M.O.T. program. Currently enrolled students are only admitted into the M.O.T. program once a year and can expect to graduate at the end of the fall term after 1.33 years of successful full-time M.O.T. coursework (5 semesters) and 58 credits.

This program is accredited by the Accreditation Council for Occupational Therapy Education (ACOTE) of the American Occupational Therapy Association. The address for ACOTE is:

4720 Montgomery Lane
Suite 200
Bethesda, MD, 20814

The phone number is (301) 652-2682. Graduates of the program are eligible to sit for the national certification exam administered by the National Board for Certification in Occupational Therapy (NBCOT). The website address of NBCOT is www.nbcot.org (http://www.nbcot.org).

### Majors

- Occupational Therapy (p. 479)

### Faculty

#### Professor
- Classen, Sherrilene

#### Associate Professor
- Kramer, Jessica M.
- Liu, Chiung-ju
- Shechtman, Orit

#### Assistant Professor
- Wang, Zheng

#### Clinical Assistant Professor
- Kramer, John

#### Clinical Associate Professor
- Myers, Christine T.
Research Assistant Scientist
  • Winter, Sandra M.

Research Assistant Professor
  • Kreider, Consuelo Maun
  • Romero, Sergio

Affiliated Faculty
  • Doty, Leilani
    Associate Scientist

Occupational Therapy

Program Information
The UF Department of Occupational Therapy currently offers a Master’s in Occupational Therapy (MOT), however, the Department is in the process of transitioning to the Doctor of Occupational Therapy (OTD) and is no longer admitting students to the Master’s program. Please see the Department website http://ot.phhp.ufl.edu.

Degrees Offered

Degrees Offered with a Major in Occupational Therapy
  • Master of Health Science
  • Master of Occupational Therapy

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Occupational Therapy Courses

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Occupational Therapy Departmental Courses

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<td>PHC 6316</td>
<td>Health, Risk, and Crisis Communication</td>
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Student Learning Outcomes

Occupational Therapy (MOT)

SLO 1 Knowledge
Articulate and apply an understanding of the translation of research to clinical practice, and be prepared to be an effective consumer of the latest research and knowledge bases that support occupational therapy practice and contribute to the growth and dissemination of research and knowledge.

SLO 2  Skills
Achieve entry-level clinical competence as an occupational therapist through a combination of academic and fieldwork education.

Speech, Language, and Hearing Sciences Department

Interim Chair: Kenneth J. Logan
Graduate Coordinators: Kenneth J. Logan and Jill Raney

Graduate programs in the Department lead to Master of Arts and Doctor of Philosophy degrees in Communication Sciences and Disorders and to the Doctor of Audiology degree. Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

The Master of Arts in Communication Sciences and Disorders and the Doctor of Audiology degrees are accredited by the Council on Academic Accreditation in Audiology and Speech-Language Pathology (CAA) of the American Speech-Language-Hearing Association.

The Master of Arts (M.A.) Program offers comprehensive academic and clinical training for students who are interested in a career in speech-language pathology. The five-semester program culminates in the completion of either a clinical externship or a Master’s thesis, and it provides graduates with entry level knowledge and skills for obtaining employment in a variety of professional work settings. Students have the opportunity to complete clinical practica at sites within the University of Florida’s Health Science Center and at other medical, rehabilitative, and educational facilities on or near the campus. These sites allow students to gain experience with providing clinical services to a range of patient populations.

Applicants to the Master’s program must demonstrate successful completion of pre-requisite coursework in both normal bases of communication and introductory concepts in communication disorders. Additional information about these pre-requisites is available on the Department website. Graduates of the program are eligible for the Certificate of Clinical Competence in Speech-Language Pathology (CCC-SLP) from the American Speech-Language-Hearing Association as well as state licensure in speech-language pathology. For more information, contact Kenneth J. Logan, Ph.D. (klogan@ufl.edu).

The Doctor of Audiology (Au.D.) Program in the Department of Speech, Language, and Hearing Sciences is a four-year graduate degree. Graduate students take course work in theoretical and applied audiological sciences and research. There are no specific undergraduate courses required for admission to the Au.D. degree program, although applicants with a strong science background are encouraged to apply. Graduates of this program are eligible for the Certificate of Clinical Competence in Audiology (CCC-A) administered by the American Speech-Language-Hearing Association, Board Certification in Audiology administered by the American Academy of Audiology, and for state licensure in audiology. For more information, contact Jill Raney, Ph.D. (jraney@phhp.ufl.edu (http://catalog.ufl.edu/graduate/colleges-departments/public-health-professions/speech-language-hearing-sciences/jraney@phhp.ufl.edu)).

The Ph.D. Program in Rehabilitation Sciences: Communication and Swallowing Sciences and Disorders focuses on the scientific investigation of all aspects of communication and swallowing disorders and their rehabilitation. This concentration involves a range of interdisciplinary, conceptually broad subfields, unified by the anatomical and neurophysiological structures they share. Students may focus on the mechanisms and rehabilitation of swallowing and the upper aerodigestive tract, and/or speech, language, and hearing sciences and disorders. The required courses in the concentration reflect a broad conceptual frame underlying CSSD as well as the wide range of science being conducted by the Graduate Faculty from Departments and Institutes across the University of Florida. Students may choose from a variety of courses to fulfill their core requirements to create a unique program preparing them to do research in their field of interest.

For more information about the Ph.D in Rehabilitation Science: Concentration in Communication and Swallowing Sciences and Disorders, see the degree program website: https://rehabsci.phip.ufl.edu/programs/course-requirements/communication-and-swallowing-sciences-and-disorders/ (https://nam12.safelinks.protection.outlook.com/?url=https%3A%2F%2Frehabsci.phip.ufl.edu%2Fprograms%2Fcourse-requirements%2Fcommunication-and-swallowing-sciences-and-disorders%2F&data=02%7C01%7C7ce5bb375d5124a6eacfa308d804074ac9%7C84df9e7fe9f640af645aaa024a0%7C1%7C0%7C637263776439690999&data=61JoAfFgXRdyFY1G0PgybCPLVw7euXW).

Majors
- Audiology (p. 481)
- Communication Sciences and Disorders (p. 482)

Faculty

Professor
- Nittroer, Susan N.

Associate Professor
- Altman, Lori J.
- Hegland, Karen W.
- Humbert, Iannesa A.
- Logan, Kenneth J.
- Plowman, Emily Kate

Assistant Professor
- Masapollo, Matthew Thomas
- Oh, Yonghee
- Sheffield, Sterling Wilkinson

Affiliated Faculty
- Antonelli, Patrick J. Professor
- Lombardino, Linda J. Professor
- Someya, Shinichi Associate Professor
Audiology

Program Information

The Department of Speech, Language, and Hearing Sciences offers the Doctor of Audiology degree. The official minimum requirements for the degree are available in the Graduate Degrees (p. 48) section of this catalog.

The Doctor of Audiology degree program is a campus-based program that:

• Prepares students for a professional career in audiology.
• Provides a wide array of experiences in the practice of diagnostic and rehabilitative audiology.
• Provides students with complex and diverse skills necessary to meet the challenges of the rapidly changing health care field.

The clinical and academic curriculum includes course work in the basic sciences, applied audiology, clinical research, statistics, audiologic rehabilitation, medical neuroscience, neuro-otology, cochlear implants, health care administration, programmable hearing aids, counseling, and aging. Graduates of this program are eligible for the Certificate of Clinical Competence in Audiology (CCC-A) administered by the American Speech-Language-Hearing Association, Board Certification in Audiology administered by the American Academy of Audiology, and for state licensure in audiology.

The on-campus program for bachelors-level applicants is a four-year graduate degree totaling 110 semester hours. The curriculum includes 78 hours of course work in basic sciences, applied audiology, clinical research, statistics, audiologic rehabilitation, medical neuroscience, neuro-otology, cochlear implants, pharmacology, health care administration, programmable and digital hearing aids, counseling, communication and aging, and speech-language pathology.

In the remaining 32 hours of the on-campus program, students gain extensive clinical practicum experience. These practicum experiences utilize various resources at the University of Florida Health Science Center and affiliated hospitals in the North Florida area as well as the Veterans Administration Medical Center. The final clinical training hours occur during the fourth year of the program as part of an audiology externship placement.


Degrees Offered

Degrees Offered with a Major in Audiology

• Doctor of Audiology

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.
Student Learning Outcomes

Audiology (Aud)

SLO 1  Knowledge
Identifies, describes, explains and applies acoustic, anatomical, psychological, developmental and social aspects of normal and disordered hearing

SLO 2  Knowledge
Identifies, plans, and applies the range of appropriate management steps for persons with hearing and balance disorders and the methods for determining the effectiveness of each

SLO 3  Skills
Through advanced professional practice obtains accurate information about hearing and balance function, including via case history interview, and through the appropriate selection and completion of behavioral, electrophysiological and psycho-social assessments

SLO 4  Skills
Applies clinical decision making and problem-solving skills in a clinical audiology context

SLO 5  Professional Behavior
Critically evaluates research relevant to audiology practice

SLO 6  Professional Behavior
Communicates critical, clinically relevant information verbally and/or in writing

Communication Sciences and Disorders

Program Information

The Department of Speech, Language, and Hearing Sciences offers a Master of Arts in Communication Sciences and Disorders. A Doctor of Philosophy (Ph.D.) degree is offered through the Rehabilitation Sciences Doctor of Philosophy Program: Communication and Swallowing Sciences and Disorders (CSSD) concentration. For more information about a Ph.D. in Speech Pathology and Audiology related topics, see https://rehabsci.phhp.ufl.edu/programs/course-requirements/communication-and-swallowing-sciences-and-disorders-track/

The Master of Arts program is designed to prepare students for entry-level professional practice in speech-language pathology. The program offers students a comprehensive learning experience – one that combines active classroom-based learning with an assortment of “hands on” learning opportunities at the many clinical sites available on or near the University of Florida campus. Graduates of the program can expect to develop the knowledge and skills that are needed to deliver evidence-based clinical services to a wide range of populations in a variety of clinical settings. The Master of Arts program is primarily oriented toward developing students’ clinical competence, however, students who elect to enter the “thesis track” of the program have the opportunity to conduct original research in laboratory and real-world settings under the mentorship of faculty who are widely recognized for their research contributions.

For more information, please see the department website: http://slhs.phhp.ufl.edu/academics (http://slhs.phhp.ufl.edu/academics/).
Degrees Offered

Degrees Offered with a Major in Communication Sciences and Disorders

- Doctor of Philosophy
- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Speech, Language and Hearing Sciences

Departmental Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<td>LIN 6720</td>
<td>Second Language Acquisition</td>
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<td>SPA 5051</td>
<td>Clinical Observation in Audiology</td>
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<tr>
<td>SPA 5102</td>
<td>Auditory Anatomy and Physiology</td>
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<tr>
<td>SPA 5204</td>
<td>Phonological Disorders</td>
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<tr>
<td>SPA 5211</td>
<td>Voice Disorders</td>
<td>3</td>
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<tr>
<td>SPA 5225</td>
<td>Principles of Speech Pathology: Stuttering</td>
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<tr>
<td>SPA 5254</td>
<td>Neurocognitive Language Disorders</td>
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<td>SPA 5304</td>
<td>Principles of Audiological Evaluation</td>
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</tr>
<tr>
<td>SPA 5315</td>
<td>Peripheral and Central Auditory Disorders</td>
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<td>SPA 5401</td>
<td>Speech Pathology Language Disorder</td>
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<tr>
<td>SPA 6010</td>
<td>Basic Auditory Sciences</td>
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<tr>
<td>SPA 6133L</td>
<td>Hearing Aid Analysis Laboratory</td>
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<td>SPA 6211</td>
<td>Applied Voice Disorders: Diagnosis and Treatment</td>
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<td>SPA 6233</td>
<td>Speech Motor Control Disorders</td>
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<td>SPA 6270</td>
<td>Auditory Processing Disorders</td>
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<td>SPA 6305</td>
<td>Pediatric Audiology</td>
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<td>SPA 6311</td>
<td>Medical Audiology</td>
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<td>SPA 6316</td>
<td>CI Auditory Electroph</td>
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<td>SPA 6317</td>
<td>Vestibular Disorders</td>
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<td>SPA 6323</td>
<td>Audiologic Rehabilitation for Adults</td>
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<td>SPA 6324</td>
<td>Audiologic Rehabilitation for Children</td>
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<td>SPA 6341</td>
<td>Amplification II</td>
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<td>SPA 6390</td>
<td>Proseminar: Speech-Language Pathology and Audiology</td>
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<td>SPA 6410</td>
<td>Adult Language Disorders</td>
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<td>SPA 6416</td>
<td>Applied Neurogenic Disorders: Diagnosis and Treatment</td>
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<tr>
<td>SPA 6430</td>
<td>Applied Developmental Disorders: Diagnosis and Treatment in Speech and Language</td>
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<td>SPA 6506</td>
<td>Clinical Clerkship in Audiology</td>
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<td>SPA 6524</td>
<td>Practicum in Speech-Language Therapy: UFSHC</td>
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<td>SPA 6531</td>
<td>Clinical Practice in Hearing Assessment</td>
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<td>SPA 6564</td>
<td>Communication and Aging</td>
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<td>SPA 6581</td>
<td>Special Clinical</td>
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<tr>
<td>SPA 6805</td>
<td>Introduction to Graduate Research</td>
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<td>SPA 6905</td>
<td>Individual Study</td>
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<tr>
<td>SPA 6910</td>
<td>Supervised Research</td>
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<td>SPA 6930</td>
<td>Proseminar in Speech-Language Pathology and Audiology</td>
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<tr>
<td>SPA 6935</td>
<td>Applied Reading Disabilities: Diagnosis and Treatment</td>
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College of Public Health and Health Professions Courses

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<td>Supervised Teaching</td>
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<tr>
<td>SPA 6942</td>
<td>Externship in Speech-Language Pathology</td>
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<td>SPA 6971</td>
<td>Research for Master’s Thesis</td>
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<td>SPA 7306</td>
<td>Audiologic Assessment in a Medical Setting</td>
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<td>SPA 7318</td>
<td>Clinical Auditory Electrophysiology</td>
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</tr>
<tr>
<td>SPA 7319</td>
<td>Balance Disorders: Evaluation and Treatment</td>
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<td>SPA 7325</td>
<td>Audiologic Rehabilitation</td>
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<tr>
<td>SPA 7343</td>
<td>Cochlear Implants and Assistive Devices</td>
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<td>SPA 7348</td>
<td>Principles of Amplification</td>
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<td>SPA 7353</td>
<td>Environmental Hearing Conservation</td>
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<td>Seminar in Audiology: Hearing Conservation and Noise Control</td>
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<td>SPA 7391</td>
<td>Business and Professional Issues in Audiology</td>
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<td>SPA 7500</td>
<td>Public School Practicum</td>
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<td>SPA 7523</td>
<td>Practicum in Speech Pathology in a Medical/Dental Setting</td>
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<td>Diagnosis and Treatment of Language and Language-Based Literacy Disorders</td>
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<td>SPA 7566</td>
<td>Counseling Individuals with Hearing Losses</td>
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<td>SPA 7833</td>
<td>Audiology Research Project</td>
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<td>Graduate Practicum in Audiology</td>
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<td>SPA 7958</td>
<td>Clinical Externship</td>
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<td>SPA 7979</td>
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<td>SPA 7980</td>
<td>Research for Doctoral Dissertation</td>
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Graduate

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<td>GEY 5935</td>
<td>Topics in Gerontology</td>
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<td>GEY 6220</td>
<td>Overview of Geriatric Care Management</td>
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<tr>
<td>GEY 6306</td>
<td>Interpersonal Communication Within the Aging Network</td>
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<td>GEY 6646</td>
<td>Issues and Concepts in Gerontology</td>
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<td>Professional Development in Gerontology/ Geriatrics</td>
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<td>HSC 6905</td>
<td>Independent Study</td>
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<td>Supervised Research</td>
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<td>PHC 6053</td>
<td>Regression Methods for the Health and Life Sciences</td>
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<td>PHC 6120</td>
<td>Community Assessment and Partnerships</td>
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<td>PHC 6193</td>
<td>Qualitative Data Analysis</td>
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<tr>
<td>PHC 6195</td>
<td>Health information for Diverse Populations: Theory &amp; Methods</td>
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<tr>
<td>PHC 6316</td>
<td>Health, Risk, and Crisis Communication</td>
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<td>PHC 6447</td>
<td>Ecology of HIV/Aids in the Rural South</td>
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<td>PHC 6607</td>
<td>Critical Issues in Public Health</td>
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<td>PHC 6917</td>
<td>Supervised Research Project</td>
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<td>PHC 6945</td>
<td>Public Health Practicum</td>
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<td>PHC 6946</td>
<td>Public Health Internship</td>
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<tr>
<td>PHC 7587</td>
<td>Theory Development and Testing in Behavioral &amp; Community Public Health</td>
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<tr>
<td>PHC 7752</td>
<td>Seminar in Instrument Development for Public Health</td>
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<tr>
<td>PHC 7907</td>
<td>Social and Behavioral Science Journal Club</td>
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<td>RCS 6036</td>
<td>Or to Forensic Vt P</td>
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<td>RCS 6601</td>
<td>Forensic Rehabilitation Consultation I</td>
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<tr>
<td>RCS 6602</td>
<td>Forensic Rehabilitation Consultation II</td>
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<tr>
<td>RCS 6905</td>
<td>Individual Work</td>
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</table>
Public Health (M.P.H.)

Program Information

**Director and Graduate Coordinator:** Cindy Prins, PhD, MPH

The Master of Public Health degree is offered as a non-thesis program and is designed to prepare students to become effective public health practitioners, scientists, and educators. Students select one of six concentration areas:

- Biostatistics
- Environmental health
- Epidemiology
- Population health management
- Public health practice
- Social and behavioral sciences

Both a 48-credit program for students without terminal health science degrees and a 42-credit program for students with a terminal degree are offered. A combined bachelor’s/master of public health program is available, as well as a 15-credit college certificate program. Students interested in collaborative programs may pursue joint MPH and DVM, MD, JD, PharmD, DPT, or DMD degrees, or concurrent master’s and PhD programs. The MPH degree program and the Public Health certificate are available on campus and online. For program descriptions and information on applying, visit the website: [www.mph.ufl.edu](http://catalog.ufl.edu/graduate/colleges-departments/public-health-mph/).  

**48-credit Master of Public Health:** Students who do not hold a terminal degree in a health science discipline are eligible to apply for the 48-credit program. The program provides comprehensive coverage of core public health content and allows selection of a concentration. Students must complete 18 credits of core public health course work, 12 to 15 credits of concentration core courses, up to 12 credits of elective courses, and three credits of applied practice experience. The course work representing these requirements is described below.  

**42-credit accelerated Master of Public Health:** Students who hold a terminal degree (usually a doctoral degree) in a health science discipline may be eligible for the 42-credit accelerated program. This program requires completion of 16 credits of core public health course work, 21 credits of concentration and elective course work, and a five-credit internship.  

Combined degree program: The College offers a combined degree program to allow qualified undergraduates to earn both a bachelor’s degree and the Master of Public Health degree efficiently. Seniors with any undergraduate major are eligible for the combined degree program as long as they have an undergraduate GPA of at least 3.2 and competitive scores on the verbal and quantitative portions of the GRE, and their career interests match the MPH program. Students accepted into the combined degree program complete 15 credits of public health course work while still undergraduates, leaving only 33 credits after admission to graduate school. Students must achieve a B or better in public health courses taken as an undergraduate and be accepted to graduate school to complete the program.  

Core Courses: All MPH students take five public health core courses. The core courses in environmental health, epidemiology, public health management and policy, and social and behavioral sciences are taken by all students. The core biostatistics course varies across concentration areas. Students in the biostatistics, environmental health, epidemiology and social and behavioral sciences concentrations must take PHC 6052:
Introduction to Biostatistical Methods. All other MPH students must take PHC 6050: Statistical Methods for Health Sciences Research I. In addition, all students must take a three-credit Master of Public Health Capstone course and three credits of PHC 6946: MPH Applied Practice Experience.

Applied Practice Experience (APE): Each student completes an internship during their APE course, which provides an opportunity to apply knowledge acquired in the classroom to a real public health problem in a practice setting. Students may engage in many activities during an internship, but each student must produce at least two portfolio products that demonstrate achievement of at least five Public Health Competencies.

MPH Capstone: This course serves as the required integrative learning experience for students in the MPH program. Students will demonstrate synthesis of foundational and concentration competencies through an individual or group project that addresses the needs of a public health agency. Students will produce a high-quality written report for their agency and present their project on Public Health Day near the end of the semester.

**Master of Public Health with a Concentration in Biostatistics**

The contribution of biostatisticians is far reaching and includes both core public health research and consultation with other health professionals. The biostatistics concentration is designed primarily for students with a previous graduate degree (particularly in the health sciences) who want to obtain a solid background in quantitative and analytical methods for public health research. The course work exposes students to methodology typically used to analyze different types of public health data and gives them opportunities to apply these methodologies themselves.

Graduates of the MPH program with a concentration in biostatistics return to their careers with an improved understanding of quantitative methods for public health research. This increased knowledge will facilitate their own research programs and will enhance their ability to critically read the literature in their field. The biostatistics concentration requires completion of four concentration core courses: Regression Methods for the Health and Life Sciences, Epidemiology Research Methods I, Public Health Computing, and Survival Analysis. Remaining courses include the public health internship and electives in statistics and public health. Visit the biostatistics concentration website for the most up-to-date information about course options: http://mph.ufl.edu/programs/master-of-public-health/biostatistics.html

See the department Biostatistics website for information about other programs offered by the department: http://biostat.ufl.edu/.

**Master of Public Health with a Concentration in Environmental Health**

Professionals trained in environmental health study the impact of our surroundings on our health. They understand how environmental risk factors can cause diseases like asthma, cancer, and food poisoning. Environmental health professionals make up approximately half of public health personnel and the field accounts for about half of public health expenditures. Students interested in environmental health typically have a background in biological or physical sciences, engineering, nursing, medicine, and veterinary medicine. Prior experience in chemistry, biology, statistics, and Microsoft Excel software is desirable. Please note the prerequisites for Environmental Health courses and speak with the instructor if you have not successfully completed the prerequisites. The following courses are required for all students pursuing the environmental health concentration: Environmental Toxicology Applications in Public Health, Environmental Policy and Risk Management in Public Health, Exposure Measurement and Assessment, Environmental Ecology of Human Pathogens, Global Health and Development I, and MPH Capstone. Students may also choose from elective course work listed on the department website below. Environmental health students complete their programs with an internship and electives on a wide variety of environmental health and public health topics.

Visit the environmental health concentration website for the most up-to-date information about course options: http://mph.ufl.edu/programs/master-of-public-health/environmental-health/. And visit the Website of the Department of Environmental and Global Health for information about other academic programs and activities in the department: http://egh.phhp.ufl.edu.

**Master of Public Health with a Concentration in Epidemiology**

Epidemiology focuses on the study of the distribution and determinants of health in populations and communities. It is the scientific foundation of public health research that seeks to reduce risk factors and improve health. The discipline also contributes to public health practice and policy, and research in other health-related fields such as medicine and pharmacy. This concentration area is designed to train professionals to apply the principles and methods of epidemiological investigation in a broad range of settings. The required concentration core courses in epidemiology are Epidemiology Research Methods I, Epidemiology Research Methods I, Epidemiology of Infectious Diseases, Epidemiology of Chronic Disease, and MPH Capstone. Epidemiology concentration students complete their programs with an internship and electives in epidemiology and public health.

Additional detail and options for epidemiology elective course work are at the website: http://mph.ufl.edu/programs/master-of-public-health/epidemiology/. Please also visit the website of the Department of Epidemiology for up-to-date information about other epidemiology programs and activities: http://epidemiology.phhp.ufl.edu.

**Master of Public Health with a Concentration in Population Health Management (PHM)**

This concentration focuses on the structure and administration of health organizations and the policies that impact health programs and reimbursement of health services. The concentration encompasses two of the major roles of leaders in public health. Essential skills for managing a health agency or organization include accounting, financial management, human resource management, strategic and program planning, operations research, economics, and monitoring outcome measures. Development, analysis, interpretation, and evaluation of government policies require analytical skills and social skills, as well as a deep understanding of politics.

The required concentration core courses in PHM are Evidence-Based Management of Public Health Programs, Health Economics, Public Health Quality & Outcomes, Survey Research Methods, Systems Thinking and Public Health, and MPH Capstone. PHM students complete their programs with an internship and electives in population health management. Visit the population health management concentration...

**Master of Public Health with a Concentration in Public Health Practice**

This concentration provides the opportunity to develop breadth in public health by taking coursework in two, three, or four of the core public health concentrations. Such breadth is often required of professionals who assume positions of leadership in public health. It is available to students in joint and concurrent degree programs, medical and other health scientists, and working professionals. The Public Health Practice concentration is available on-campus and online.

The campus curriculum for this concentration follows the same model as the other concentrations. Students pursuing public health practice begin their programs with the five core courses required of all MPH students. Instead of a specified set of concentration core courses, however, these students may choose two or more courses from advanced course options in two to four of the other concentrations. Students complete their degree with a capstone course and an internship. All students in this concentration must hold a prior health professional degree or be enrolled in a joint or concurrent graduate program. To be eligible for the accelerated option, applicants must hold a terminal degree in a health or health-related field.

The online Public Health Practice curriculum begins with the five core courses and then offers two or more courses in epidemiology, environmental health, public health management and policy and social and behavioral sciences. Students complete their degree with a capstone course and an internship. Online students are not available to pursue the MPH on campus in Gainesville, either due to employment or geographic distance.

**Master of Public Health with a Concentration in Social and Behavioral Sciences**

The social and behavioral sciences concentration is based on the understanding that health and health behavior are influenced by multiple psychological, behavioral, social, and cultural factors. Central to addressing health problems and eliminating health disparities and inequalities, these factors must be understood and addressed using a framework exploring multiple levels (individual, interpersonal, organizational, community, and population) and the interactions among them. Through classroom instruction, research, and field practice, MPH students who concentrate in social and behavioral sciences explore the unique issues faced by diverse groups and populations and acquire skills to achieve social and behavioral change. Students in the social and behavioral sciences concentration are required to take six courses: Assessment and Surveillance in Public Health, Public Health Program Planning and Evaluation, Social and Behavioral Research Methods, Public Health Information for Diverse Populations: Theory & Methods, Theoretical Foundations of Public Health, and MPH Capstone. Social and behavioral science students complete their programs with an internship and elective courses in public health or related fields.

Visit the social and behavioral science concentration website for the most up-to-date information about course options.


**Degrees Offered**

**Degrees Offered with a Major in Public Health**

- Master of Public Health
  - without a concentration
  - with a concentration in Biostatistics
  - with a concentration in Epidemiology
  - with a concentration in Environmental Health
  - with a concentration in Health Management and Policy
  - with a concentration in Public Health Management
  - with a concentration in Public Health Practice
  - with a concentration in Social and Behavioral Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

**Courses**

**Public Health Courses**

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<td>HSA 6105</td>
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<td>HSA 6114</td>
<td>U.S. Health Care System</td>
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<td>HSA 6115</td>
<td>Introduction to Management of Health Services Organizations</td>
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<td>Strategic Management in Health Administration</td>
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<td>Information Management in Health Administration</td>
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<td>HSA 6385</td>
<td>Performance Management for Health Care Managers</td>
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<tr>
<td>HSA 6395</td>
<td>Healthcare Data Analytics I</td>
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<td>HSA 6427</td>
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**Environmental Health Courses**

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<td>Current Issues in Food Safety and Sanitation</td>
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**Epidemiology Courses**

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### College of Public Health and Health Professions Courses

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<td>Theory Development and Testing in Behavioral &amp; Community Public Health</td>
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### Student Learning Outcomes

#### Public Health (MPH)

**SLO 1**  Problem-solving skills
- Demonstrate problem-solving skills by applying, analyzing, and synthesizing content knowledge in public health by identifying component parts, relationships, and idea

**SLO 2**  Professional behavior
- Display ethical behaviors, cultural sensitivity, teamwork, professional conduct and communication skills

#### Public Health (Ph.D.)

### Program Information

The College of Public Health and Health Professions does not offer the Ph.D. in Public Health without a concentration. All students accepted into the program must choose one of four concentrations: Environmental Health (p. 470), Health Services Research (https:// hsrmp.phhp.ufl.edu/), One Health (p. 471), or Social and Behavioral Sciences (p. 462). Please see those program pages for more information.

### Degrees Offered

**Degrees Offered with a Major in Public Health**

- Doctor of Philosophy
  - concentration in Environmental Health
  - concentration in Health Services Research
  - concentration in One Health
  - concentration in Social and Behavioral Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

### Courses

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<tr>
<td>PHC 6946</td>
<td>Public Health Internship</td>
<td>1-9</td>
</tr>
<tr>
<td>PHC 7587</td>
<td>Theory Development and Testing in Behavioral &amp; Community Public Health</td>
<td>2</td>
</tr>
<tr>
<td>PHC 7752</td>
<td>Seminar in Instrument Development for Public Health</td>
<td>2</td>
</tr>
<tr>
<td>PHC 7907</td>
<td>Social and Behavioral Science Journal Club</td>
<td>1</td>
</tr>
<tr>
<td>RCS 6036</td>
<td>Or to Forensic Vt P</td>
<td>3</td>
</tr>
<tr>
<td>RCS 6601</td>
<td>Forensic Rehabilitation Consultation I</td>
<td>3</td>
</tr>
<tr>
<td>RCS 6602</td>
<td>Forensic Rehabilitation Consultation II</td>
<td>3</td>
</tr>
<tr>
<td>GEY 6646</td>
<td>Issues and Concepts in Gerontology</td>
<td>3</td>
</tr>
<tr>
<td>GEY 6936</td>
<td>Professional Development in Gerontology/ Geriatrics</td>
<td>1-2</td>
</tr>
<tr>
<td>HSC 6905</td>
<td>Independent Study</td>
<td>1-3</td>
</tr>
</tbody>
</table>
Rehabilitation Science

Program Information

Director: David D. Fuller
Graduate Coordinator: Laura Quintana

The interdisciplinary Ph.D. program in rehabilitation science is offered through the College of Public Health and Health Professions. Rehabilitation science describes those disciplines which focus on both basic and applied aspects of health science and services, the social sciences, and engineering as they relate to restoring human functional capacity and improving a person’s interaction with the surrounding environment. An important point of emphasis is that rehabilitation science should encompass research ranging from molecular biology through population health. The program embraces a wide range of disciplines, and supports the view that collaboration is the best way to advance human health. Students work closely with their faculty mentor within three broad concentrations/emphasis areas: Neuromuscular Plasticity, Disability, Occupation and Participation Science, and Communication and Swallowing Sciences and Disorders. On successful completion of the program, graduates typically take positions in research universities and research centers. Requirements for the Ph.D. degree are provided elsewhere in this catalog.

Admissions decisions are determined by an interdisciplinary admissions committee. The program is a minimum of 90 credit hours of study beyond the bachelor’s degree. The curriculum includes 10 credit hours in rehabilitation science application; 6 credit hours in rehabilitation science teaching; 13 graduate credits in research methods and statistics; 31 credit hours in research; 18 credit hours within the student’s concentration/emphasis area; 12 credit hours of elective courses. Course work should be selected with guidance and approval from the faculty mentor and when applicable, the supervisory committee. Up to 30 credit hours may be transferred in from a master’s degree program with the approval of the faculty mentor, supervisory committee, and steering committee.

For more information, including admissions requirements and deadlines, please see our website: http://rehabsci.phhp.ufl.edu (http://rehabsci.phhp.ufl.edu/).

Degrees Offered

Degrees Offered with a Major in Rehabilitation Science

• Doctor of Philosophy
  • without a concentration
  • concentration in Clinical and Translational Science
  • concentration in Communication and Swallowing Sciences and Disorders
  • concentration in Neuromuscular Plasticity

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

Rehabilitation Sciences Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>RSD 6718</td>
<td>Neuroplasticity: A Foundation for Neurorehabilitation</td>
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<tr>
<td>RSD 6110</td>
<td>Rehabilitation Science Theory and Application I</td>
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<tr>
<td>RSD 6700</td>
<td>Rasch Measurement: Introduction and Application</td>
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<tr>
<td>RSD 6706</td>
<td>Scientific Writing for the Rehabilitation Professional</td>
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<tr>
<td>RSD 6900</td>
<td>College Classroom: Teaching Process and Practice</td>
<td>3</td>
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<td>RSD 6905</td>
<td>Individual Work</td>
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</tr>
<tr>
<td>RSD 6910</td>
<td>Supervised Research</td>
<td>1-5</td>
</tr>
<tr>
<td>RSD 6930</td>
<td>Special Topics in Rehabilitation Science</td>
<td>1-4</td>
</tr>
<tr>
<td>RSD 6940</td>
<td>Supervised Teaching</td>
<td>1-3</td>
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</table>

Student Learning Outcomes

public health

SLO 1 Knowledge
Generate new knowledge in the field of public health.

SLO 2 Teaching Skills
Demonstrate competence in class preparation, engagement and contributions to a positive learning environment

SLO 3 Problem-Solving Skills
Demonstrate problem-solving skills by applying, analyzing and synthesizing content knowledge in public health.

SLO 4 Professional Behavior
Display behavior appropriate to scientific discourse and communication
College of Public Health and Health Professions Courses

<table>
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<td>GYE 5935</td>
<td>Topics in Gerontology</td>
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<td>GYE 6220</td>
<td>Overview of Geriatric Care Management</td>
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<td>GYE 6306</td>
<td>Interpersonal Communication Within the Aging Network</td>
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<td>GYE 6646</td>
<td>Issues and Concepts in Gerontology</td>
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<tr>
<td>GYE 6936</td>
<td>Professional Development in Gerontology/ Geriatrics</td>
<td>1-2</td>
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<td>HSC 6905</td>
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<td>PHC 6053</td>
<td>Regression Methods for the Health and Life Sciences</td>
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<tr>
<td>PHC 6120</td>
<td>Community Assessment and Partnerships</td>
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<tr>
<td>PHC 6193</td>
<td>Qualitative Data Analysis</td>
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</tr>
<tr>
<td>PHC 6195</td>
<td>Health information for Diverse Populations: Theory &amp; Methods</td>
<td>3</td>
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<tr>
<td>PHC 6316</td>
<td>Health, Risk, and Crisis Communication</td>
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<tr>
<td>PHC 6447</td>
<td>Ecology of HIV/AIDS in the Rural South</td>
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<td>PHC 6607</td>
<td>Critical Issues in Public Health</td>
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<td>RCS 6905</td>
<td>Individual Work</td>
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<td>RCS 6931</td>
<td>Special Topics</td>
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<td>RSD 6110</td>
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<tr>
<td>RSD 6910</td>
<td>Supervised Research</td>
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<td>Special Topics in Rehabilitation Science</td>
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<td>RSD 6940</td>
<td>Supervised Teaching</td>
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<tr>
<td>RSD 7979</td>
<td>Advanced Research</td>
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<tr>
<td>RSD 7980</td>
<td>Research for Doctoral Dissertation</td>
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</table>

Student Learning Outcomes

Rehabilitation science

SLO 1  Skills

Conduct high quality rehabilitation research.

SLO 2  Knowledge
Display an understanding of the fundamental models and theories and principles underlying the discipline of Rehabilitation Science.

SLO 3  Professional Behavior
Display understanding of the ethics of research, and exhibit ethical research conduct.

College of Veterinary Medicine

Dean: G. F. Hoffsis

The UF College of Veterinary Medicine is the state’s only veterinary college. UF’s College of Veterinary Medicine offers comprehensive services to the public through teaching, research, extension and state-of-the-art patient care.

For more information, please see our website: http://www.vetmed.ufl.edu

Departments

- Animal Molecular and Cellular Biology (p. 492)
- Animal Molecular and Cellular Biology (p. 493)
- Interdisciplinary (p. 493)
- Veterinary Medical Sciences (p. 493)

Faculty

Professor

- Adin, Christopher A.
- Allred, David R.
- Bolser, Donald Clementz
- Bonde, Robert Knudsen
- Brown, Mary B.
- Butcher, Gary D.
- Curtiss, Roy
- Dame, John B.
- Drost, Maarten
- Ellison, Gary W.
- Estrada, Amara H.
- Francis-Floyd, Ruth
- Freeman, David E.
- Hernandez, Jorge A.
- Isaza, Ramiro
- Johnson, Richard D.
- Kariyawasam, Subhashinie
- Levy, Julie K.
- Long, Maureen T.
- Mackay, Robert J.
- Macpherson, Margo Lee
- Marsella, Rosanna
- Mergia, Ayalew
- Milner, Rowan J.
- Moore, Julie M.
- Powell, James
- Rae, D O.
• Roberts, Stephen M.
• Sanchez, Linda C.
• Vickroy, Thomas W.
• Vulpe, Christopher Dillon
• Yamamoto, Janet K.
• Zadeh, Mansour Mohamad
• Zhou, Liang

**Associate Professor**

• Abbott, Jeffrey R.
• Bechtel, Sandra Marie
• Brown, Dan
• Case, Joseph Bradly
• Chebel, Ricardo C.
• Dinglasan, Rhoel David
• Galvao, Klibs Neblan
• Gilor, Chen
• Hayward, Linda F.
• Heard, Darryl J.
• Hill, Richard C.
• Kim, Stanley E.
• Lester, Guy Damon
• Nguyen, Cuong
• Plummer, Caryn E.
• Rajeev, Sreekumari
• Shiomitsu, Keijiro
• Snyder, Patti Sue
• Stern, Adam Wayne
• Wakshlag, Joseph J.
• Waltzek, Thomas B.
• Wellehan, James F.

**Assistant Professor**

• Allison, Andrew J.
• Bertran, Judit
• Biedrzycki, Adam Henry
• Bisinotto, Rafael Sisconeto
• Bowden, John A.
• Campos Krauer, Juan Manuel
• Eshraghi, Aria
• Fox-Alvarez, William Alexander
• Harris, Autumn Nourse
• Jabur Bittar, Joao Henrique
• Lee, Che Yu
• McCarrel, Taralyn Mary
• Mickle, Aaron
• Pereira, Fernando Lucio
• Portela, Diego Angel
• Regier, Penny Jean
• Santoro, Domenico
• Souza, Carlos Henrique
• Tuanyak, Apichai
• Walden, Heather D.

**Eminent Scholar**

• Lewis, Daniel D.

**Clinical Assistant Professor**

• Bowie, Michael V.
• Conner, Bobbi Jo
• Craft, William F.
• Crawford, Patti C.
• Denagamage, Thomas N.
• Giglio, Robson Fortes
• Gomez Nieto, Diego E.
• Johnson, Alanna L.
• Johnson, Matthew D.
• Kelleman, Audrey A.
• Lejeune, Amandine Tamara
• Londono, Leonel A.
• Maunsell, Fiona P.
• O’Kell, Allison L.
• Ossiboff, Robert J.
• Porter, Erin G.
• Romano, Marta
• Sahay, Bikash
• Spencer, Terry G.
• Spoldi, Elisa
• Stacy, Nicole Indra
• Szivek, Anna

**Lecturer**

• Larkin, Iskande V.

**Distinguished Professor**

• Davenport, Paul W.

**Clinical Associate Professor**

• Buckley, Gareth J.
• Cooke, Kirsten L.
• Dark, Michael James
• Farina, Lisa Lee
• Gram, Wallace Dunbar
• Morton, Alison J.
• Pozor, Malgorzata A.
• Shmailberg, Justin William
• Walsh, Michael T.
• Winter, Matthew D.

**Clinical Professor**

• Hamor, Ralph Edward
• House, Amanda M.
• Sleeper, Margaret Mary
Research Professor
• Xie, Huisheng
  • Zimmel, Dana N.

Research Assistant Professor
• Romero, Carlos H.

Assistant Librarian
• Hunter, Margaret K.

Affiliated Faculty
• Aguirre, Jose I.
  • Bose, Prodip Kumar
  • Byrd, Jason H.
  • Campbell Thompson, Martha
  • Chapman, Frank A.
  • Cooke, Paul S.
  • Doty, Andria L.
  • Fuller, David
  • Gallastegui Menoyo, Aitor
  • Gibson, Daniel J.
  • Hansen, Peter J.
  • Jobin, Christian
  • Kane, Andrew S.
  • Kilberg, Michael S.
  • MacFadden, Bruce J.
  • Martyniuk, Christopher
  • Martynuk, Anatoly Eugeny
  • Pacak, Christina A.
  • Pascual, David Wayne
  • Rathore, Mobeen H.
  • Reier, Paul J.

• Reznikov, Leah R.
  • Sabo-Attwood, Tara L.
  • Small, Parker A.
  • Stone, Amy E.
  • Tebbett, Ian R.
  • Terada, Naohiro
  • Tevosian, Sergei G.
  • Vilaplana Grosso, Federico Rafael
  • Wood, Charles E.
  • Zubcevic, Jasenka

Animal Molecular and Cellular Biology Department

Director: P.J. Hansen

For more information about the program, contact P.J. Hansen at pjhansen@ufl.edu, follow the link below to our catalog page, or visit the program’s website at http://www.animal.ufl.edu/amcb/.

Majors
• Animal Molecular and Cellular Biology (p. 493)

Faculty

Associate Professor
• Jeong, Kwang Cheol

Assistant Professor
• Bromfield, John James
  • Laporta, Jimena
  • Nelson, Corwin D.

Affiliated Faculty
• Binelli, Mario
  • Brooks, Samantha Ann
  • Brown, Mary B.
  • Dahl, Geoffrey E.
  • Daigneault, Bradford William
  • Driver, John P.
  • Faciola, Antonio
Animal Molecular and Cellular Biology

Program Information
The animal molecular and cell biology (AMCB) graduate program offers Master of Science and Doctor of Philosophy degrees. Faculty are drawn from these disciplines:

- Animal Sciences
- Biochemistry and Molecular Biology
- Large Animal Clinical Sciences
- Obstetrics and Gynecology
- Zoology

Early in the program, students choose a faculty supervisor who will ensure the quality of their research experience. Students may also do optional rotations through the laboratories of one or more other faculty. The Annual Research Symposium features guest speakers and student research presentations. A weekly journal club and monthly seminars draw on the knowledge and diversity the campus offers in molecular and cell biology.

Core course requirements for the M.S. degree are BCH 5045 Graduate Survey of Biochemistry (4 cr.), registration in a 1-credit graduate seminar course and successful completion of a course on responsible and ethical conduct of research. Core course requirements for the Ph.D. include BCH 5413 Mammalian Molecular Biology and Genetics (3 cr.) and GMS 6421 Cell Biology (4 cr.), registration in two graduate seminar courses and successful completion of a course on responsible and ethical conduct of research.

Contact P.J. Hansen at pjhansen@ufl.edu or visit the program’s website at http://www.animal.ufl.edu/amcb/.

---

Degrees Offered

Degrees Offered with a Major in Animal Molecular and Cellular Biology

- Doctor of Philosophy
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.

Courses

College of Veterinary Medicine courses

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>VME 6934</td>
<td>Topics in Veterinary Medical Sciences</td>
<td>1-4</td>
</tr>
<tr>
<td>VME 6936</td>
<td>Seminar in Pathophysiology</td>
<td>1</td>
</tr>
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</table>

Student Learning Outcomes

Animal Molecular & Cellular Biology (MS)

SLO 1  Knowledge
Identify, recall, appraise, and interpret the principles of molecular and cellular biology and their application to comparative biology

SLO 2  Skills
Design, conduct and draw sound conclusions on scientific experiments

SLO 3  Professional Behavior
Interact with peers and instructors with honesty, cultural sensitivity and effective communication

Interdisciplinary Department

Majors

- Veterinary Medical Sciences (p. 493)

Veterinary Medical Sciences

Program Information

Chair: C. Risco
Graduate Coordinator (Large Animals): I. Larkin
Graduate Coordinator (Small Animals): D. Lewis

Complete faculty listing by department: Follow this link (https://gradschool.ufl.edu/GimsPublic/Acalog/Faculty.aspx).

The College of Veterinary Medicine offers graduate study leading to the Master of Science and Doctor of Philosophy degrees in veterinary medical sciences. The College also offers certification and a non-thesis concentration in forensic toxicology via web-based distance education. Minimum requirements for the Master of Science and Doctor of Philosophy degrees are described in the Graduate Degrees section of this catalog.

The program provides extensive training in basic and applied research for qualified students with a baccalaureate degree or a D.V.M. or equivalent degree. Applicants are expected to have a background in the biological sciences, mathematics, chemistry, and physics. Particular attention is paid to the advanced education of veterinarians, those interested solely in research, and those interested in combining their graduate study with
residency training in a clinical specialty. The College offers three areas of specialization within the veterinary medical sciences program:

**Large and Small Animal Clinical Sciences:** Physiology, endocrinology, aquatic animal health, fish diseases, gastroenterology, immunology, vision sciences, perinatology, reproductive biology, pharmacokinetics, veterinary sports medicine, and wildlife and zoological medicine (I. Larkin and D. Lewis Graduate Coordinators).

**Physiological Sciences:** Comparative anatomy, physiology, pharmacology, biochemistry, neurobiology, nutrition, reproductive biology, and toxicology (R. Johnson, Graduate Coordinator).

**Infectious Diseases and Experimental Pathology:** Bacteriology, parasitology, virology, immunopathology, molecular mechanisms of disease and host defense, epidemiology, and veterinary public health (M.T. Long, Graduate Coordinator).

The College participates in the interdisciplinary specialization in toxicology, in cooperation with other departments and colleges in both the Health Science Center and the Institute of Food and Agricultural Sciences and with the Center for Environmental and Human Toxicology (see the Toxicology description under Interdisciplinary Graduate Studies).

The following courses in related areas are acceptable for graduate major credit in veterinary medical sciences:

<table>
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<tr>
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<tr>
<td>GMS 6070</td>
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<tr>
<td>GMS 6074</td>
<td>Comparative and Evolutionary Neurobiology</td>
<td>3</td>
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<tr>
<td>GMS 6077</td>
<td>Pharmacology</td>
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<tr>
<td>GMS 6312</td>
<td>Pharmacokinetics and Biopharmaceuticals</td>
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<tr>
<td>GMS 6313</td>
<td>Pharmaceutical Product Formulation</td>
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<tr>
<td>GMS 6393</td>
<td>Pharmaceutical Gene Delivery</td>
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<tr>
<td>PHA 5270</td>
<td>Health Care and Patient Safety</td>
<td>3</td>
</tr>
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<td>PHA 5271</td>
<td>Health Care Risk Management</td>
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<tr>
<td>PHA 5272</td>
<td>Risk Management, Liability and Compliance</td>
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<tr>
<td>PHA 6115</td>
<td>Health Care Risk Management</td>
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<tr>
<td>PHA 6116</td>
<td>In Vivo and In Vitro Stability of Drugs</td>
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</tr>
<tr>
<td>PHA 6118</td>
<td>Pharmaceutical Law</td>
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<td>PHA 6119</td>
<td>Pharmacoeconomics and Health Technology</td>
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<tr>
<td>PHA 6120</td>
<td>Assessment</td>
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<td>PHA 6125</td>
<td>Introduction to Pharmaceutical Outcomes</td>
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<td>PHA 6126</td>
<td>Policy I</td>
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<td>PHA 6250</td>
<td>Patient Responsibility in Health Care</td>
<td>3</td>
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<td>PHA 6264</td>
<td>Federal Regulations of Drugs and Pharmacy</td>
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<td>PHA 6268</td>
<td>Federal Regulations of Controlled Substances</td>
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<td>PHA 6269</td>
<td>Pharmacy Benefit Design &amp; Management</td>
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<td>PHA 6277</td>
<td>Ethics in Drug Development and Use</td>
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<td>PHA 6278</td>
<td>State Regulation of Drugs and Pharmacy</td>
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<tr>
<td>PHA 6279</td>
<td>Pharmaceutical Outcomes and Policy Seminar</td>
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</table>

Degrees Offered

**Degrees Offered with a Major in Veterinary Medical Sciences**

- Doctor of Philosophy
  - without a concentration
  - concentration in Animal Molecular and Cellular Biology
  - concentration in Clinical and Translational Science
  - concentration in Toxicology
- Master of Science
  - without a concentration
  - concentration in Forensic Toxicology
  - concentration in Shelter Medicine
  - concentration in Veterinary Forensic Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 48) section of this catalog.
Veterinary Medical Sciences

### Pharmacology Courses

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<td>GMS 6590</td>
<td>Seminar in Pharmacology</td>
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<td>GMS 6592</td>
<td>Ion Channels Journal Club: Pharmacology, Biophysics, and Neuroscience of Excitable Membranes</td>
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<tr>
<td>GMS 6847</td>
<td>Translational Research and Therapeutics: Bench, Bedside, Community, &amp; Policy</td>
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<tr>
<td>GMS 7593</td>
<td>Topics in Pharmacology and Toxicology</td>
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### College of Pharmacy Courses

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<th>Code</th>
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<tbody>
<tr>
<td>PHA 6356</td>
<td>Structure Determination of Complex Natural Products</td>
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<tr>
<td>PHA 6418</td>
<td>Applied Translational Systems Pharmacology</td>
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</tr>
<tr>
<td>PHA 6471</td>
<td>Synthetic Medicinal Chemistry</td>
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### College of Veterinary Medicine Courses

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<tbody>
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<td>Topics in Veterinary Medical Sciences</td>
<td>1-4</td>
</tr>
<tr>
<td>VME 6936</td>
<td>Seminar in Pathophysiology</td>
<td>1</td>
</tr>
</tbody>
</table>

### Student Learning Outcomes

**Veterinary medical sciences (PhD)**

**SLO 1** Knowledge
Students identify, describe, explain and apply the literature, research, and practices relevant to their area of specialization.

**SLO 2** Skills
Students analyze and critically evaluate new information and ideas contained in books and journal articles, as well as information and ideas presented at scientific meetings, seminars and/or informal discussions with other scientists.

**SLO 3** Skills
Students apply speaking skills needed to communicate orally in formal and informal settings.

**SLO 4** Skills
Students write effectively in a manner appropriate to veterinary medical sciences.

**SLO 5** Professional Behavior
Students exhibit ethical and professional behavior during their studies and research.

**SLO 6** Professional Behavior
Students exercise the etiquette of constructive criticism and respond appropriately to criticism in a professional manner.

**Veterinary Medical Sciences (MS)**

**SLO 1** Knowledge
1. For students in the programs that require a Master's thesis, successful completion of the thesis and thesis defense.
GRADUATE PROGRAMS BY COLLEGE

College of Agricultural and Life Sciences

- Agricultural and Biological Engineering (CALS) (p. 78)
- Agricultural Education and Communication (p. 81)
- Agronomy (p. 85)
- Animal Sciences (p. 89)
- Entomology and Nematology (p. 93)
- Family, Youth, and Community Sciences (p. 100)
- Fisheries and Aquatic Sciences (p. 124)
- Food and Resource Economics (p. 104)
- Food Science (p. 107)
- Food Science and Human Nutrition (p. 108)
- Forest Resources and Conservation (p. 126)
- Genetics and Genomics (CALS) (p. 136)
- Horticultural Sciences (p. 112)
- Microbiology and Cell Science (p. 116)
- Nutritional Sciences (p. 109)
- Plant Medicine (p. 95)
- Plant Molecular and Cellular Biology (CALS) (p. 119)
- Plant Pathology (p. 120)
- School of Forest Resources and Conservation (p. 121)
- School of Natural Resources and Environment (p. 128)
- Soil and Water Sciences (p. 131)
- Wildlife Ecology and Conservation (p. 134)
- Youth Development and Family Science (p. 102)

College of the Arts

- Art (p. 146)
- Art Education (p. 148)
- Art History (p. 149)
- Design and Visual Communications (http://catalog.ufl.edu/graduate/colleges-departments/arts/art-history/design-visual-communications/)
- Digital Arts and Sciences (Arts) (p. 138)
- Digital Worlds Institute (p. 138)
- Museology (p. 151)
- Music (p. 140)
- Music Education (p. 143)
- Theatre (p. 154)

Warrington College of Business

- Accounting (p. 164)
- Business Administration (Accounting) (p. 165)
- Business Administration (Finance, Insurance, and Real Estate) (p. 157)
- Business Administration (Information Systems and Operations Management) (p. 169)
- Business Administration (M.A.) (p. 189)
- Business Administration (M.B.A.) (p. 192)
- Business Administration (M.S.) (p. 196)
- Business Administration (Management) (p. 175)
- Business Administration (Marketing - Master’s) (p. 185)
- Business Administration (Marketing - Ph.D.) (p. 186)
- Business Administration (Ph.D.) (p. 199)
- Entrepreneurship (p. 160)
- Finance (p. 161)
- Information Systems and Operations Management (p. 172)
- International Business (p. 178)
- Management (p. 181)
- Real Estate (p. 162)

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- Dental Sciences (p. 205)

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- Construction Management (p. 213)
- Design, Construction, and Planning (Ph.D.) (p. 226)
- Fire and Emergency Sciences (p. 215)
- Historic Preservation (p. 228)
- Interior Design (p. 208)
- International Construction Management (p. 217)
- Landscape Architecture (p. 211)
- M.E. Rinker, Sr. School of Construction Management (p. 212)
- School of Architecture (p. 220)
- Sustainable Construction (p. 218)
- Urban and Regional Planning (p. 224)

College of Education

- Anatomical Sciences Education (http://catalog.ufl.edu/graduate/colleges-departments/education/human-development-organizational-studies/anatomical-sciences-education/)
- Counseling and Counselor Education (p. 232)
- Curriculum and Instruction (CCD) (p. 256)
- Curriculum and Instruction (ISC) (p. 260)
- Early Childhood Education (p. 291)
- Educational Leadership (p. 235)
- Elementary Education (p. 264)
- English Education (p. 269)
- Higher Education Administration (p. 237)
- Marriage and Family Counseling (p. 240)
- Mathematics Education (p. 273)
- Mental Health Counseling (p. 242)
- Program Evaluation in Educational Environments (p. 245)
- Reading Education (p. 278)
- Research and Evaluation Methodology (p. 247)
- School Counseling and Guidance (p. 250)
- School Psychology (p. 292)
- Science Education (p. 282)
- Social Studies Education (p. 286)
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- Aerospace Engineering (p. 335)
- Agricultural and Biological Engineering (Engineering) (p. 298)
- Biomedical Engineering (p. 327)
- Chemical Engineering (p. 302)
- Civil Engineering (p. 305)
- Coastal and Oceanographic Engineering (p. 307)
- Computer Engineering (p. 311)
- Computer Science (Engineering) (p. 312)
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- Materials Science and Engineering (p. 330)
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- Health and Human Performance (p. 345)
- Health Education and Behavior (p. 343)
- Sport Management (http://catalog.ufl.edu/graduate/colleges-departments/health-human-performance/sport-management/sport/)
- Tourism and Recreation Management (http://catalog.ufl.edu/graduate/colleges-departments/health-human-performance/tourism-hospitality/tourism-recreation/)

College of Journalism and Communications

- Advertising (p. 348)
- Mass Communication (p. 348)

College of Liberal Arts and Sciences

- Animal Molecular and Cellular Biology (p. 352)
- Anthropology (p. 355)
- Astronomy (p. 358)
- Botany (p. 360)
- Chemistry (p. 371)
- Classical Studies (p. 373)
- Computer Science (CLAS) (p. 378)
- Counseling Psychology (http://catalog.ufl.edu/graduate/colleges-departments/liberal-arts-sciences/psychology/counseling/)
- Creative Writing (p. 383)
- Criminology, Law and Society (p. 414)
- Economics (p. 382)
- English (p. 384)
- French and Francophone Studies (p. 379)
- Genetics and Genomics (CLAS) (p. 422)
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- Geology (p. 388)
- German (p. 380)
- History (p. 390)
- Latin (p. 375)
- Latin American Studies (p. 367)
- Linguistics (p. 393)
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- Political Science (p. 405)
- Political Science - International Relations (p. 408)
- Psychology (CLAS) (http://catalog.ufl.edu/graduate/colleges-departments/liberal-arts-sciences/psychology/psychology/)
- Religion (p. 410)
- Romance Languages (Language, Literature and Culture) (p. 381)
- Romance Languages (Spanish and Portuguese Studies) (p. 418)
- Sociology (p. 415)
- Spanish (p. 419)
- Statistics (p. 421)
- Sustainable Development Practice (p. 368)
- Women's Studies (p. 363)
- Zoology (p. 362)

College of Medicine

- Anatomical Sciences Education (http://catalog.ufl.edu/graduate/colleges-departments/medicine/interdisciplinary-departments/anatomical-sciences-education/)
- Biochemistry and Molecular Biology (p. 426)
- Biostatistics (Medicine) (p. 429)
- Epidemiology (Medicine) (p. 431)
- Genetics and Genomics (Medicine) (p. 434)
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- Nursing Sciences (p. 442)

College of Pharmacy

- Pharmaceutical Sciences (Medicinal Chemistry) (p. 445)
- Pharmaceutical Sciences (Pharmaceutical Outcomes and Policy) (p. 449)
- Pharmaceutical Sciences (Pharmaceutics) (p. 452)
- Pharmaceutical Sciences (Pharmacodynamics) (p. 455)
- Pharmaceutical Sciences (Pharmacotherapy and Translational Research) (p. 458)
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- Audiology (p. 481)
- Biostatistics (PHHP) (p. 465)
- Communication Sciences and Disorders (p. 482)
- Environmental and Global Health (M.H.S. - One Health) (p. 469)
- Epidemiology (PHHP) (p. 472)
- Health Administration (p. 475)
- Health Services Research (p. 476)
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- Psychology (Clinical and Health Psychology - PHHP) (p. 466)
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- Public Health (Ph.D. - Environmental and Global Health) (p. 470)
- Public Health (Ph.D. - One Health) (p. 471)
- Public Health (Ph.D. - Social and Behavioral Sciences) (p. 462)
- Public Health (Ph.D.) (p. 488)
- Rehabilitation Science (p. 489)

College of Veterinary Medicine

- Animal Molecular and Cellular Biology (p. 493)
- Veterinary Medical Sciences (p. 493)
GRADUATE CERTIFICATES

For the list of available Graduate Certificates, please visit the Graduate School’s website:
http://graduateschool.ufl.edu/academics/graduate-certificates/

For the Graduate Certificate Policy, please visit the Graduate School’s website:
http://graduateschool.ufl.edu/files/certificate-policy.pdf

For information about the policies governing certificates, please visit the Office of the Provost’s website:
http://aa.ufl.edu/
# GRADUATE SCHOOL ACADEMIC CALENDAR

## Fall 2019 Calendar

### August 2019

<table>
<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 19, Monday</td>
<td>5:00 p.m.</td>
<td>Deadline for requesting transfer of credit (for fall degree candidates)</td>
</tr>
<tr>
<td>August 19, Monday</td>
<td>11:59 p.m.</td>
<td>Last day for thesis and dissertation students to clear prior to the fall semester with the Graduate School Editorial Office. See <a href="http://graduateschool.ufl.edu/editorial/deadlines">http://graduateschool.ufl.edu/editorial/deadlines</a> for more information.</td>
</tr>
<tr>
<td>August 20, Tuesday</td>
<td></td>
<td>Classes start.</td>
</tr>
<tr>
<td>August 26, Monday</td>
<td>11:59 p.m.</td>
<td>Drop/add ends.</td>
</tr>
<tr>
<td>August 30, Friday</td>
<td>3:30 p.m.</td>
<td>Fee payment deadline</td>
</tr>
<tr>
<td>August 30, Friday</td>
<td>5:00 p.m.</td>
<td>Residency reclassification deadline for receiving the request and all documents</td>
</tr>
</tbody>
</table>

### September 2019

<table>
<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 2, Monday, Labor Day</td>
<td></td>
<td>No classes</td>
</tr>
<tr>
<td>September 6, Friday</td>
<td>5:00 p.m.</td>
<td>Deadline for Graduate Student Records to review/approve S/U Option Application for courses with this grading scheme</td>
</tr>
<tr>
<td>September 13, Friday</td>
<td>5:00 p.m.</td>
<td>Degree application deadline for degree award this term <a href="http://www.graduateschool.ufl.edu/graduation/checklists">www.graduateschool.ufl.edu/graduation/checklists</a></td>
</tr>
<tr>
<td>September 27, Friday</td>
<td>5:00 p.m.</td>
<td>Last day to submit Transmittal Letter and doctoral dissertation for initial review by Graduate School Editorial Office <a href="http://graduateschool.ufl.edu/graduation/checklists">http://graduateschool.ufl.edu/graduation/checklists</a></td>
</tr>
</tbody>
</table>

### October 2019

<table>
<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>October 4-5, Friday, Homecoming</td>
<td></td>
<td>No classes</td>
</tr>
<tr>
<td>October 15, Tuesday</td>
<td></td>
<td>Midpoint of term</td>
</tr>
<tr>
<td>October 25, Friday</td>
<td>5:00 p.m.</td>
<td>Last day to submit successfully defended master's thesis for review by Graduate School Editorial Office <a href="http://graduateschool.ufl.edu/graduation/checklists">http://graduateschool.ufl.edu/graduation/checklists</a></td>
</tr>
</tbody>
</table>

### November 2019

<table>
<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 11, Monday, Veterans Day observed</td>
<td></td>
<td>No classes</td>
</tr>
<tr>
<td>November 15, Friday</td>
<td>5:00 p.m.</td>
<td>Deadline for final exam milestone to be completed in SIS (the Student Information System) for dissertation, non-thesis, project and project-in-lieu-of-thesis students</td>
</tr>
<tr>
<td>November 15, Friday</td>
<td>5:00 p.m.</td>
<td>Deadline for ETD Signature Pages to be posted in GIMS (the Graduate Information Management System) for thesis and dissertation students</td>
</tr>
<tr>
<td>November 15, Friday</td>
<td>5:00 p.m.</td>
<td>Deadline for doctoral dissertation students to submit the UF Publishing Agreement in GIMS (the Graduate Information Management System)</td>
</tr>
<tr>
<td>November 25, 11:59 p.m.</td>
<td></td>
<td>Drop Deadline (W assigned to individual course(s). Drops of individual courses must be approved by the student's college).</td>
</tr>
</tbody>
</table>
### December 2019

<table>
<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 4,</td>
<td>5:00 p.m.</td>
<td>Last day to drop a course and receive W on transcript via College</td>
</tr>
<tr>
<td>Wednesday</td>
<td></td>
<td>petition to the Registrar, Room 222 Criser</td>
</tr>
<tr>
<td>December 4,</td>
<td></td>
<td>Deadline for requesting transfer of credit (for spring degree</td>
</tr>
<tr>
<td>Wednesday</td>
<td></td>
<td>candidates)</td>
</tr>
<tr>
<td>December 5-6,</td>
<td></td>
<td>Last day to withdraw (all courses) without failing grades via</td>
</tr>
<tr>
<td>Thursday-Friday</td>
<td></td>
<td>College petition to the Registrar, Room 222 Criser</td>
</tr>
<tr>
<td>December 5-6,</td>
<td></td>
<td>Examination reading days (no classes)</td>
</tr>
<tr>
<td>Thursday-Friday</td>
<td></td>
<td>Final examinations</td>
</tr>
<tr>
<td>December 7,</td>
<td></td>
<td>Final examinations</td>
</tr>
<tr>
<td>Saturday, and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9-13, Monday-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 13-15,</td>
<td></td>
<td>Commencement Ceremonies¹</td>
</tr>
<tr>
<td>Friday-Sunday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 16,</td>
<td>12:00 noon</td>
<td>Final term grades are due.</td>
</tr>
<tr>
<td>Monday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 17,</td>
<td></td>
<td>Degree certification</td>
</tr>
<tr>
<td>Tuesday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 18,</td>
<td></td>
<td>Unofficial transcripts with grades and remarks available via ONE.UF</td>
</tr>
<tr>
<td>Wednesday</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ Projected dates. Specific dates and times of ceremonies for colleges and schools will be made available at https://www.commencement.ufl.edu once approved by the University Commencement Committee and as soon as plans are finalized. Please do not anticipate exact dates and times until the website has been updated.

NOTES: All dates and deadlines are subject to change and will be updated accordingly. Prospective students should contact the appropriate academic unit for admission application deadlines.

### Spring 2020 Calendar

#### December 2019

<table>
<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 4,</td>
<td>5:00 p.m.</td>
<td>Deadline for requesting transfer of credit (for spring degree</td>
</tr>
<tr>
<td>Wednesday</td>
<td></td>
<td>candidates)</td>
</tr>
<tr>
<td>January 3,</td>
<td>5:00 p.m.</td>
<td>Last day for thesis and dissertation students to clear prior to the</td>
</tr>
<tr>
<td>Friday</td>
<td></td>
<td>spring semester with the Graduate School Editorial Office—visit http://</td>
</tr>
<tr>
<td></td>
<td></td>
<td>graduateschool.ufl.edu/editorial/deadlines (<a href="http://graduateschool.ufl.edu/editorial/deadlines/">http://graduateschool.ufl.edu/editorial/deadlines/</a>) for more information</td>
</tr>
<tr>
<td>January 3,</td>
<td>11:59 p.m.</td>
<td>Registration deadline (Late fee assessed for registrations occurring after 11:59 p.m., 1/3/20.)</td>
</tr>
<tr>
<td>Friday</td>
<td>p.m.</td>
<td></td>
</tr>
<tr>
<td>January 6,</td>
<td></td>
<td>Classes start.</td>
</tr>
<tr>
<td>Monday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>January 10,</td>
<td>11:59 p.m.</td>
<td>Late registration starts.</td>
</tr>
<tr>
<td>Friday</td>
<td>p.m.</td>
<td></td>
</tr>
<tr>
<td>January 17,</td>
<td>3:30 p.m.</td>
<td>Fee payment deadline</td>
</tr>
<tr>
<td>Friday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>January 17,</td>
<td>5:00 p.m.</td>
<td>Residency reclassification deadline for receiving requests and all documents</td>
</tr>
<tr>
<td>Friday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>January 20,</td>
<td></td>
<td>No classes</td>
</tr>
<tr>
<td>Monday,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Martin Luther</td>
<td></td>
<td></td>
</tr>
<tr>
<td>King Jr. Day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>January 24,</td>
<td>5:00 p.m.</td>
<td>Deadline for Graduate Student Records to review/approve S/U Option Application for courses with this grading scheme</td>
</tr>
<tr>
<td>Friday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>January 31,</td>
<td>5:00 p.m.</td>
<td>Degree application deadline for degree award this term <a href="http://www.graduateschool.ufl.edu/graduation/checklists/">www.graduateschool.ufl.edu/graduation/checklists/</a> (<a href="http://www.graduateschool.ufl.edu/graduation/checklists/">http://www.graduateschool.ufl.edu/graduation/checklists/</a>) <a href="https://one.ufl.edu/">https://one.ufl.edu/</a></td>
</tr>
<tr>
<td>Friday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>February 12,</td>
<td>5:00 p.m.</td>
<td>Last day to submit Transmittal Letter and doctoral dissertation pdf documents via GIMS (the Graduate Information Management System) for review by Graduate School Editorial Office <a href="http://graduateschool.ufl.edu/graduation/checklists">http://graduateschool.ufl.edu/graduation/checklists</a> (<a href="http://graduateschool.ufl.edu/graduation/checklists/">http://graduateschool.ufl.edu/graduation/checklists/</a>)</td>
</tr>
<tr>
<td>Wednesday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>February 19,</td>
<td></td>
<td>Midpoint of term</td>
</tr>
<tr>
<td>Wednesday</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### February 2020
Deadline to finalize all data (except Final Exam) in SIS (the Student Information System) for all degree applicants

Late degree application deadline for degree award this term https://registrar.ufl.edu/services/degreeapp.html

February
29-March 7, Saturday-Saturday,
Spring Break

No classes

March 2020

<table>
<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 12, Thursday</td>
<td>5:00 p.m.</td>
<td>Last day to submit successfully defended master’s thesis for review by Graduate School Editorial Office <a href="http://graduateschool.ufl.edu/graduation/checklists">http://graduateschool.ufl.edu/graduation/checklists</a> (<a href="http://graduateschool.ufl.edu/graduation/checklists/">http://graduateschool.ufl.edu/graduation/checklists/</a>)</td>
</tr>
<tr>
<td>March 22, Wednesday</td>
<td>5:00 p.m.</td>
<td>Deadline for final exam milestone to be completed in SIS (the Student Information System) for thesis students</td>
</tr>
<tr>
<td>April 10, Friday</td>
<td>11:59 p.m.</td>
<td>Deadline for thesis and dissertation students to submit final pdf document for review by the Graduate School Editorial Office in order to qualify for degree award this term. No exceptions can be granted. <a href="http://graduateschool.ufl.edu/editorial/deadlines">http://graduateschool.ufl.edu/editorial/deadlines</a> (<a href="http://graduateschool.ufl.edu/editorial/deadlines/">http://graduateschool.ufl.edu/editorial/deadlines/</a>) <a href="http://www.graduateschool.ufl.edu/graduation/checklists">www.graduateschool.ufl.edu/graduation/checklists</a> (<a href="http://www.graduateschool.ufl.edu/graduation/checklists/">http://www.graduateschool.ufl.edu/graduation/checklists/</a>)</td>
</tr>
</tbody>
</table>

April 2020

<table>
<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 22, Wednesday</td>
<td>5:00 p.m.</td>
<td>Last day to drop a course and receive W on transcript via College petition to the Registrar, Room 222 Criser</td>
</tr>
<tr>
<td>April 24, Friday</td>
<td>5:00 p.m.</td>
<td>Deadline for thesis and dissertation students to receive confirmation of Final Clearance status with the Graduate School Editorial Office to remain eligible for a degree award this term. No exceptions can be granted. <a href="http://graduateschool.ufl.edu/editorial/deadlines">http://graduateschool.ufl.edu/editorial/deadlines</a> (<a href="http://graduateschool.ufl.edu/editorial/deadlines/">http://graduateschool.ufl.edu/editorial/deadlines/</a>)</td>
</tr>
</tbody>
</table>

April 25, Saturday; April 27-May 1, Monday-Friday

Final examinations

May 2020

<table>
<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 1-3, Friday-Sunday</td>
<td></td>
<td>Commencement Ceremonies</td>
</tr>
<tr>
<td>May 4, Monday</td>
<td>12:00 noon</td>
<td>Final term grades are due.</td>
</tr>
<tr>
<td>May 5, Tuesday</td>
<td></td>
<td>Degree certification</td>
</tr>
<tr>
<td>May 6, Wednesday</td>
<td></td>
<td>Unofficial transcripts with grades and remarks are available via ONE.UF.</td>
</tr>
</tbody>
</table>

1 Projected dates. Specific dates and times of ceremonies for colleges and schools will be made available at http://www.commencement.ufl.edu (https://commencement.ufl.edu/) once approved by the University Commencement Committee and as soon as plans are finalized. Please do not anticipate exact dates and times until the website has been updated.

NOTES: All dates and deadlines are subject to change and will be updated accordingly. Prospective students should contact the appropriate academic unit for admission application deadlines.
Summer 2020 Calendar

PLEASE BE AWARE---DUE TO THE COVID-19 PANDEMIC, THE GRADUATE ACADEMIC CALENDAR HAS BEEN UPDATED TO REFLECT ADJUSTED SUMMER DEADLINE EXTENSION DATES. THIS ARCHIVAL DOCUMENT HAS NOT BEEN UPDATED TO REFLECT THESE CHANGES. THE CORRECT CURRENT CALENDAR CAN BE VIEWED BY VISITING:
http://graduateschool.ufl.edu/graduate-school-calendar/

All Summer 2020 graduate-level degrees will be awarded at the end of Summer B/C (August 2020). Applicants will select Summer B/C 2020 on the degree application menu in ONE.UF (https://one.uf.edu).

Students enrolled only in Summer A courses must still apply for degree award during the Summer B/C term, since graduate-level degrees are only awarded at the end of the B/C term. No graduate-level degrees are awarded at the end of Summer A (June). No late degree applications will be approved after the B/C deadline (July 3).

https://one.uf.edu (https://one.uf.edu)

April 2020

<table>
<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 20, Monday</td>
<td>5:00 p.m.</td>
<td>Deadline for requesting transfer of credit (for summer degree candidates)</td>
</tr>
</tbody>
</table>

May 2020

<table>
<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 8, Friday</td>
<td>5:00 p.m.</td>
<td>Last day for thesis and dissertation students to clear prior to the summer semester with the Graduate School Editorial Office <a href="http://graduateschool.ufl.edu/editorial/deadlines">http://graduateschool.ufl.edu/editorial/deadlines</a> (<a href="http://graduateschool.ufl.edu/editorial/deadlines/">http://graduateschool.ufl.edu/editorial/deadlines/</a>)</td>
</tr>
<tr>
<td>May 8, Friday</td>
<td>11:59 p.m.</td>
<td>Summer A &amp; C registration deadline (Late fee assessed for registrations occurring after 11:59 p.m., 5/8/20.)</td>
</tr>
<tr>
<td>May 11, Monday</td>
<td></td>
<td>Summer A &amp; C classes start.</td>
</tr>
</tbody>
</table>

May 20, Wednesday | 5:00 p.m. | Summer A deadline to withdraw (all courses) with 25% refund (W symbol assigned) http://www.registrar.ufl.edu/pdf/withdrawal.pdf |

May 22, Friday | 3:30 p.m. | Summer A & C fee payment deadline |

May 22, Friday | 5:00 p.m. | Summer A & C residency reclassification deadline for receiving the request and all documents |

May 25, Monday, Memorial Day observed | No classes |

May 29, Friday | 5:00 p.m. | Summer C deadline to withdraw all courses with 25% refund (W symbol assigned) http://www.registrar.ufl.edu/pdf/withdrawal.pdf |

June 2020

<table>
<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 8, Monday</td>
<td>5:00 p.m.</td>
<td>Last day to submit Transmittal Letters and doctoral dissertation pdf documents via GIMS (the Graduate Information Management System) for initial review by Graduate School Editorial Office <a href="http://www.graduateschool.ufl.edu/graduation/checklists">www.graduateschool.ufl.edu/graduation/checklists</a> (<a href="http://www.graduateschool.ufl.edu/graduation/checklists/">http://www.graduateschool.ufl.edu/graduation/checklists/</a>)</td>
</tr>
<tr>
<td>June 12, Friday</td>
<td>11:59 p.m.</td>
<td>Last day to drop or withdraw (all courses) via ONE.UF for Summer A without failing grades <a href="http://www.registrar.ufl.edu/services/withdrawals.html">http://www.registrar.ufl.edu/services/withdrawals.html</a></td>
</tr>
<tr>
<td>June 19, Friday</td>
<td></td>
<td>Summer A classes end</td>
</tr>
<tr>
<td>June 19, Friday</td>
<td>5:00 p.m.</td>
<td>Summer A final examinations during regular class periods</td>
</tr>
<tr>
<td>June 19, Friday</td>
<td></td>
<td>Last day to drop a course and receive W on transcript for Summer A term via College petition to the Registrar, Room 222 Criser</td>
</tr>
<tr>
<td>June 22, Monday</td>
<td>12:00 p.m.</td>
<td>Summer A final term grades are due.</td>
</tr>
<tr>
<td>June 22, Monday</td>
<td></td>
<td>Summer A final term grades are due.</td>
</tr>
<tr>
<td>June 22-26, Monday-Friday, Summer Break</td>
<td>No classes</td>
<td></td>
</tr>
<tr>
<td>June 24, Wednesday</td>
<td></td>
<td>Final grades viewable via ONE.UF for Summer A courses (choose Student Self Service &gt; My Online Services &gt; Transcripts)</td>
</tr>
<tr>
<td>Date</td>
<td>Hour</td>
<td>Event</td>
</tr>
<tr>
<td>--------------------</td>
<td>----------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>June 26, Friday</td>
<td>5:00 p.m.</td>
<td>Summer B Registration (Late registration fee assessed after 11:59 p.m., 6/26/20.)</td>
</tr>
<tr>
<td>June 29, Monday</td>
<td></td>
<td>Summer B drop/add starts.</td>
</tr>
<tr>
<td>June 30, Tuesday</td>
<td>11:59 p.m.</td>
<td>Summer B late registration ends. (Late registration fee assessed.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Summer B deadline to drop or withdraw with no fee liability.</td>
</tr>
<tr>
<td>July 1, Wednesday</td>
<td></td>
<td>Summer B/C degree application deadline — no exceptions will be granted after this date. <a href="http://www.graduateschool.ufl.edu/graduation/checklists">http://www.graduateschool.ufl.edu/graduation/checklists</a></td>
</tr>
</tbody>
</table>
See commencement schedule for specific dates: http://www.commencement.ufl.edu

August 10, Monday 12:00 noon Summer B and C final term grades are due.

August 11, Tuesday Degree certification

August 12, Wednesday Unofficial transcripts with grades and remarks are available via ONE.UF.

1 Projected dates. Specific dates and times of ceremonies for colleges and schools will be made available at https://www.commencement.ufl.edu once approved by the University Commencement Committee and as soon as plans are finalized. Please do not anticipate exact dates and times until the website has been updated.

NOTES: All dates and deadlines are subject to change and will be updated accordingly. Prospective students should contact the appropriate academic unit for admission application deadlines.

### Fall 2020 Calendar

#### August 2020

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<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 28, Friday</td>
<td>5:00 p.m.</td>
<td>Deadline for requesting transfer of credit (for fall degree candidates)</td>
</tr>
<tr>
<td>August 28, Friday</td>
<td>11:59 p.m.</td>
<td>Registration deadline (Late fee assessed for registrations occurring after 11:59 p.m., 8/28/20.)</td>
</tr>
<tr>
<td>August 31, Monday</td>
<td></td>
<td>Classes start.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Late registration starts. (Late fee assessed for registrations occurring after 11:59 p.m., 8/28/20.)</td>
</tr>
</tbody>
</table>

#### September 2020

<table>
<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 4, Friday</td>
<td>11:59 p.m.</td>
<td>Drop/add ends.</td>
</tr>
<tr>
<td>September 7, Monday, Labor Day</td>
<td></td>
<td>Late registration ends. (Late fee assessed.) Deadline to withdraw with no fee liability</td>
</tr>
<tr>
<td>September 11, Friday</td>
<td>3:30 p.m.</td>
<td>Fee payment deadline</td>
</tr>
<tr>
<td>September 11, Friday</td>
<td>5:00 p.m.</td>
<td>Residency reclassification deadline for receiving the request and all documents</td>
</tr>
<tr>
<td>September 18, Friday</td>
<td>5:00 p.m.</td>
<td>Deadline for Graduate Student Records to review/approve S/U Option Application for courses with this grading scheme</td>
</tr>
<tr>
<td>September 25, Friday</td>
<td>5:00 p.m.</td>
<td>Deadline to withdraw with 25% refund (W symbol assigned)</td>
</tr>
</tbody>
</table>

#### October 2020

<table>
<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>October 3, Saturday</td>
<td></td>
<td>Homecoming Game</td>
</tr>
<tr>
<td>October 7, Wednesday</td>
<td>5:00 p.m.</td>
<td>Last day to submit Transmittal Letter and doctoral dissertation for initial review by Graduate School Editorial Office</td>
</tr>
<tr>
<td>October 12, Monday</td>
<td></td>
<td>Midpoint of term</td>
</tr>
<tr>
<td>October 28, Wednesday</td>
<td>5:00 p.m.</td>
<td>Last day to submit successfully defended master’s thesis for review by Graduate School Editorial Office</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deadline for final exam milestone to be completed in SIS (the Student Information System) for thesis students</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deadline for thesis students to submit the UF Publishing Agreement in GIMS (the Graduate Information Management System)</td>
</tr>
</tbody>
</table>

#### November 2020

<table>
<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 11, Wednesday, Veterans Day observed</td>
<td></td>
<td>No classes</td>
</tr>
<tr>
<td>November 18, Wednesday</td>
<td>5:00 p.m.</td>
<td>Deadline for final exam milestone to be completed in SIS (the Student Information System) for dissertation, non-thesis, project and project-in-lieu-of-thesis students</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deadline for ETD Signature Pages to be posted in GIMS (the Graduate Information Management System) for thesis and dissertation students</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deadline for doctoral dissertation students to submit the UF Publishing Agreement in GIMS (the Graduate Information Management System)</td>
</tr>
</tbody>
</table>
Deadline for thesis and dissertation students to submit final pdf document for review by the Graduate School Editorial Office in order to qualify for degree award this term. No exceptions can be granted. http://graduateschool.ufl.edu/editorial/deadlines (http://graduateschool.ufl.edu/editorial/deadlines/) www.graduateschool.ufl.edu/graduation/checklists (http://www.graduateschool.ufl.edu/graduation/checklists/)

### December 2020

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<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 23, 11:59 p.m.</td>
<td></td>
<td>Drop Deadline (W assigned to individual course(s). Drops of individual courses must be approved by the student's college).</td>
</tr>
<tr>
<td>November 25-28, Wednesday-Saturday, Thanksgiving</td>
<td></td>
<td>No classes</td>
</tr>
<tr>
<td>December 9, Wednesday</td>
<td></td>
<td>Classes end.</td>
</tr>
<tr>
<td>December 9, 5:00 p.m.</td>
<td></td>
<td>Last day to drop a course and receive W on transcript via College petition to the Registrar, Room 222 Criser</td>
</tr>
<tr>
<td>December 9, 5:00 p.m.</td>
<td></td>
<td>Last day to withdraw (all courses) without failing grades via College petition to the Registrar, Room 222 Criser</td>
</tr>
<tr>
<td>December 11, 5:00 p.m.</td>
<td></td>
<td>Deadline for thesis and dissertation students to receive confirmation of Final Clearance status with the Graduate School Editorial Office to remain eligible for a degree award this term. No exceptions can be granted. <a href="http://graduateschool.ufl.edu/editorial/deadlines">http://graduateschool.ufl.edu/editorial/deadlines</a> (<a href="http://graduateschool.ufl.edu/editorial/deadlines/">http://graduateschool.ufl.edu/editorial/deadlines/</a>)</td>
</tr>
<tr>
<td>December 10-11, Thursday-Friday</td>
<td></td>
<td>Examination reading days (no classes)</td>
</tr>
<tr>
<td>December 12-18, Saturday-Friday</td>
<td></td>
<td>Final examinations</td>
</tr>
<tr>
<td>December 18-19, Friday-Saturday</td>
<td></td>
<td>Commencement Ceremonies¹</td>
</tr>
<tr>
<td>December 21, 12:00 noon</td>
<td></td>
<td>Final term grades are due.</td>
</tr>
</tbody>
</table>

### January 2021

<table>
<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 8, 5:00 p.m.</td>
<td></td>
<td>Last day for thesis and dissertation students to clear prior to the spring semester with the Graduate School Editorial Office—visit <a href="http://graduateschool.ufl.edu/editorial/deadlines">http://graduateschool.ufl.edu/editorial/deadlines</a> (<a href="http://graduateschool.ufl.edu/editorial/deadlines/">http://graduateschool.ufl.edu/editorial/deadlines/</a>) for more information</td>
</tr>
<tr>
<td>January 8, 11:59 p.m.</td>
<td></td>
<td>Registration deadline (Late fee assessed for registrations occurring after 11:59 p.m., 1/8/21.)</td>
</tr>
<tr>
<td>January 11, 5:00 p.m.</td>
<td></td>
<td>Drop/add starts.</td>
</tr>
<tr>
<td>January 15, 11:59 p.m.</td>
<td></td>
<td>Late registration ends. (Late fee assessed.)</td>
</tr>
<tr>
<td>January 18, 5:00 p.m.</td>
<td></td>
<td>Deadline to withdraw with no fee liability</td>
</tr>
<tr>
<td>January 22, 3:30 p.m.</td>
<td></td>
<td>Fee payment deadline</td>
</tr>
<tr>
<td>January 22, 5:00 p.m.</td>
<td></td>
<td>Residency reclassification deadline for receiving requests and all documents</td>
</tr>
<tr>
<td>January 22, 5:00 p.m.</td>
<td></td>
<td>Deadline for Graduate Student Records to review/approve S/U Option Application for courses with this grading scheme</td>
</tr>
<tr>
<td>January 29, 5:00 p.m.</td>
<td></td>
<td>Degree application deadline for degree award this term <a href="http://www.graduateschool.ufl.edu/graduation/checklists">www.graduateschool.ufl.edu/graduation/checklists</a> (<a href="http://www.graduateschool.ufl.edu/graduation/checklists/">http://www.graduateschool.ufl.edu/graduation/checklists/</a>) <a href="https://one.uf.edu/">https://one.uf.edu/</a></td>
</tr>
</tbody>
</table>

¹ Projected dates. Specific dates and times of ceremonies for colleges and schools will be made available at https://www.commencement.ufl.edu (https://www.commencement.ufl.edu/) once approved by the University Commencement Committee and as soon as plans are finalized. Please do not anticipate exact dates and times until the website has been updated.

NOTES: All dates and deadlines are subject to change and will be updated accordingly. Prospective students should contact the appropriate academic unit for admission application deadlines.

### Spring 2021 Calendar

#### December 2020

- **Deadline for requesting transfer of credit (for spring degree candidates)**
  - December 9, 5:00 p.m. - Deadline for requesting transfer of credit (for spring degree candidates)

#### January 2021

- **Last day for thesis and dissertation students to clear prior to the spring semester with the Graduate School Editorial Office**
  - January 8, 5:00 p.m. - Last day for thesis and dissertation students to clear prior to the spring semester with the Graduate School Editorial Office—visit http://graduateschool.ufl.edu/editorial/deadlines (http://graduateschool.ufl.edu/editorial/deadlines/) for more information

- **Registration deadline (Late fee assessed)**
  - January 8, 11:59 p.m. - Registration deadline (Late fee assessed for registrations occurring after 11:59 p.m., 1/8/21.)

- **Drop/add starts.**
  - January 11, 5:00 p.m. - Drop/add starts.

- **Late registration starts.**
  - January 15, 11:59 p.m. - Late registration starts.

- **Late registration ends. (Late fee assessed.)**
  - January 18, 5:00 p.m. - Late registration ends. (Late fee assessed.)

- **Deadline to withdraw with no fee liability**
  - January 22, 5:00 p.m. - Deadline to withdraw with no fee liability

- **No classes**
  - January 29, 5:00 p.m. - Degree application deadline for degree award this term www.graduateschool.ufl.edu/graduation/checklists (http://www.graduateschool.ufl.edu/graduation/checklists/) https://one.uf.edu/
<table>
<thead>
<tr>
<th>February 2021</th>
<th></th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Hour</td>
<td>Event</td>
</tr>
<tr>
<td>February 10,</td>
<td>5:00 p.m.</td>
<td>Last day to submit Transmittal Letter and doctoral dissertation pdf documents via GIMS (the Graduate Information Management System) for review by Graduate School Editorial Office. <a href="https://graduateschool.ufl.edu/graduation/checklists/">Link</a></td>
</tr>
<tr>
<td>Wednesday</td>
<td></td>
<td>Deadline to finalize all data (except Final Exam) in SIS (the Student Information System) for all degree applicants.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Late degree application deadline for degree award this term <a href="https://registrar.ufl.edu/services/degreeapp.html">Link</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>March 2021</th>
<th></th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Hour</td>
<td>Event</td>
</tr>
<tr>
<td>March 15,</td>
<td></td>
<td>Master's Thesis First Submission</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>April 2021</th>
<th></th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Hour</td>
<td>Event</td>
</tr>
<tr>
<td>April 1,</td>
<td>5:00 p.m.</td>
<td>Last day to submit successfully defended master’s thesis for review by Graduate School Editorial Office <a href="https://graduateschool.ufl.edu/graduation/checklists/">Link</a></td>
</tr>
<tr>
<td>Thursday</td>
<td></td>
<td>Deadline for final exam milestone to be completed in SIS (the Student Information System) for thesis students</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deadline for thesis students to submit the UF Publishing Agreement in GIMS (the Graduate Information Management System)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deadline for final exam milestone to be completed in SIS (the Student Information System) for dissertation, non-thesis, project and project-in-lieu-of-thesis students</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deadline for ETD Signature Pages to be posted in GIMS (the Graduate Information Management System) for thesis and dissertation students</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deadline for doctoral dissertation students to submit the UF Publishing Agreement in GIMS (the Graduate Information Management System)</td>
</tr>
</tbody>
</table>

| April 9,  | 11:59 p.m. | Drop Deadline (W assigned to individual course(s)). Drops of individual courses must be approved by the student’s college. |
| Friday    |        | Last day to withdraw (all courses) via ONE.UF without failing grades [Link](http://www.registrar.ufl.edu/currents/withdraw.html) |
| April 21, | 5:00 p.m. | Last day to drop a course and receive W on transcript via College petition to the Registrar, Room 222 Criser |
| Wednesday |        | Last day to withdraw (all courses) without failing grades via College petition to the Registrar, Room 222 Criser |
| April 21, | 5:00 p.m. | Deadline for thesis and dissertation students to receive confirmation of Final Clearance status with the Graduate School Editorial Office to remain eligible for a degree award this term. No exceptions can be granted. [Link](http://graduateschool.ufl.edu/editorial/deadlines/) |
| Wednesday |        | Examination reading days (no classes) |
| April 24, |        | Deadline for requesting transfer of credit (for summer degree candidates) |
| Saturday; April 26-30, Monday-Friday |        | Final examinations |

<table>
<thead>
<tr>
<th>May 2021</th>
<th></th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Hour</td>
<td>Event</td>
</tr>
<tr>
<td>April 30-May 2, Friday-Sunday</td>
<td></td>
<td>Commencement Ceremonies</td>
</tr>
<tr>
<td>May 3, Monday</td>
<td>12:00 noon</td>
<td>Final term grades are due.</td>
</tr>
<tr>
<td>May 4, Tuesday</td>
<td></td>
<td>Degree certification</td>
</tr>
<tr>
<td>May 5, Wednesday</td>
<td></td>
<td>Unofficial transcripts with grades and remarks are available via ONE.UF.</td>
</tr>
</tbody>
</table>
Projected dates. Specific dates and times of ceremonies for colleges and schools will be made available at http://www.commencement.ufl.edu once approved by the University Commencement Committee and as soon as plans are finalized. Please do not anticipate exact dates and times until the website has been updated.

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### Summer 2021 Calendar

#### April 2021

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<th>Date</th>
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<tbody>
<tr>
<td>April 19,</td>
<td>5:00 p.m.</td>
<td>Deadline for requesting transfer of credit (for summer degree candidates)</td>
</tr>
</tbody>
</table>

#### May 2021

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<thead>
<tr>
<th>Date</th>
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</tr>
</thead>
<tbody>
<tr>
<td>May 7, Friday</td>
<td>5:00 p.m.</td>
<td>Last day for thesis and dissertation students to clear prior to the summer semester with the Graduate School Editorial Office <a href="http://graduateschool.ufl.edu/editorial/deadlines/">http://graduateschool.ufl.edu/editorial/deadlines/</a></td>
</tr>
<tr>
<td>May 7, Friday</td>
<td>11:59 p.m.</td>
<td>Summer A &amp; C registration deadline (Late fee assessed for registrations occurring after 11:59 p.m., 5/7/21.)</td>
</tr>
<tr>
<td>May 10, Monday</td>
<td></td>
<td>Summer A &amp; C classes start.</td>
</tr>
<tr>
<td>May 11, Tuesday</td>
<td>11:59 p.m.</td>
<td>Summer A &amp; C drop/add starts. (Late fee assessed.)</td>
</tr>
<tr>
<td>May 19, Wednesday</td>
<td>5:00 p.m.</td>
<td>Summer A deadline to withdraw (all courses) with 25% refund (W symbol assigned) <a href="http://www.registrar.ufl.edu/pdf/withdrawal.pdf">http://www.registrar.ufl.edu/pdf/withdrawal.pdf</a></td>
</tr>
<tr>
<td>May 21, Friday</td>
<td>3:30 p.m.</td>
<td>Summer A &amp; C fee payment deadline</td>
</tr>
<tr>
<td>May 21, Friday</td>
<td>5:00 p.m.</td>
<td>Summer A &amp; C residency reclassification deadline for receiving the request and all documents</td>
</tr>
<tr>
<td>May 28, Friday</td>
<td>5:00 p.m.</td>
<td>Summer C deadline to withdraw all courses with 25% refund (W symbol assigned) <a href="http://www.registrar.ufl.edu/pdf/withdrawal.pdf">http://www.registrar.ufl.edu/pdf/withdrawal.pdf</a></td>
</tr>
</tbody>
</table>

#### June 2021

<table>
<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Event</th>
</tr>
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<tbody>
<tr>
<td>June 8, Tuesday</td>
<td>5:00 p.m.</td>
<td>Last day to submit Transmittal Letters and doctoral dissertation pdf documents via GIMS (the Graduate Information Management System) for initial review by Graduate School Editorial Office <a href="http://www.graduateschool.ufl.edu/graduation/checklists/">www.graduateschool.ufl.edu/graduation/checklists/</a></td>
</tr>
<tr>
<td>June 11, Friday</td>
<td>11:59 p.m.</td>
<td>Last day to drop or withdraw (all courses) via ONE.UF for Summer A without failing grades <a href="http://www.registrar.ufl.edu/services/withdrawals.html">http://www.registrar.ufl.edu/services/withdrawals.html</a></td>
</tr>
<tr>
<td>June 18, Friday</td>
<td></td>
<td>Summer A classes end</td>
</tr>
<tr>
<td>June 21, Monday</td>
<td>12:00 p.m.</td>
<td>Summer A final term grades are due.</td>
</tr>
<tr>
<td>June 21-25, Monday-Friday, Summer Break</td>
<td></td>
<td>No classes</td>
</tr>
<tr>
<td>June 23, Wednesday</td>
<td></td>
<td>Final grades viewable via ONE.UF for Summer A courses (choose Student Self Service &gt; My Online Services &gt; Transcripts)</td>
</tr>
<tr>
<td>June 25, Friday</td>
<td>5:00 p.m.</td>
<td>Summer B Registration (Late registration fee assessed after 11:59 p.m., 6/25/21.)</td>
</tr>
<tr>
<td>June 28, Monday</td>
<td></td>
<td>Summer B classes start.</td>
</tr>
<tr>
<td>June 29, Tuesday</td>
<td>11:59 p.m.</td>
<td>Summer B drop/add starts. (Late registration fee assessed.)</td>
</tr>
<tr>
<td>June 31, Monday, Memorial Day observed</td>
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June 21-25, Monday-Friday, Summer Break: No classes

May 31, Monday, Memorial Day observed: No classes

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June 21-25, Monday-Friday, Summer Break: No classes

May 31, Monday, Memorial Day observed: No classes
## Graduate School Academic Calendar

### June 30, Wednesday

Summer B/C degree application deadline — no exceptions will be granted after this date [www.graduateschool.ufl.edu/graduation/checklists](http://www.graduateschool.ufl.edu/graduation/checklists) / [one.uf.edu Choose Student Self Service > My Record > Certificate/Degree Application](https://one.uf.edu)

Midpoint of summer term

Deadline to finalize all data (except Final Exam) in SIS (the Student Information System) for all degree applicants

### July 2021

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<thead>
<tr>
<th>Date</th>
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<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 5, Monday, Independence Day (Observed)</td>
<td></td>
<td>No classes</td>
</tr>
<tr>
<td>July 7, Wednesday</td>
<td></td>
<td>Summer B Deadline for Graduate Student Records to review/approve S/U Option Application for courses with this grading scheme</td>
</tr>
<tr>
<td>July 9, Friday</td>
<td>3:30 p.m.</td>
<td>Summer B fee payment deadline</td>
</tr>
<tr>
<td>July 9, Friday</td>
<td>5:00 p.m.</td>
<td>Summer B residency reclassification deadline for receiving the request and all documents</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deadline for final exam milestone to be completed in SIS (the Student Information System) for thesis students</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deadline for thesis students to submit the UF Publishing Agreement in GIMS (the Graduate Information Management System)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Last day to submit successfully defended master's thesis via GIMS (the Graduate Information Management System) for intended review by the Graduate School Editorial Office <a href="http://www.graduateschool.ufl.edu/graduation/checklists">www.graduateschool.ufl.edu/graduation/checklists</a> / <a href="http://www.graduateschool.ufl.edu/graduation/checklists">www.graduateschool.ufl.edu/graduation/checklists</a></td>
</tr>
<tr>
<td>July 28, Wednesday</td>
<td>5:00 p.m.</td>
<td>Deadline for final exam milestone to be completed in SIS (the Student Information System) for dissertation, non-thesis, project and project-in-lieu-of-thesis students</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deadline for ETD Signature Pages to be posted in GIMS (the Graduate Information Management System) for thesis and dissertation students</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deadline for doctoral dissertation students to submit the UF Publishing Agreement in GIMS (the Graduate Information Management System)</td>
</tr>
</tbody>
</table>

### August 2021

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<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 4, Wednesday</td>
<td>5:00 p.m.</td>
<td>Deadline for thesis and dissertation students to receive confirmation of Final Clearance status with the Graduate School Editorial Office to remain eligible for a degree award this term. No exceptions can be granted. <a href="http://www.graduateschool.ufl.edu/editorial/deadlines">www.graduateschool.ufl.edu/editorial/deadlines</a> / <a href="http://www.graduateschool.ufl.edu/graduation/checklists">www.graduateschool.ufl.edu/graduation/checklists</a> / <a href="http://www.graduateschool.ufl.edu/graduation/checklists">www.graduateschool.ufl.edu/graduation/checklists</a></td>
</tr>
<tr>
<td>August 6, Friday</td>
<td>5:00 p.m.</td>
<td>Final examinations are during regular class periods</td>
</tr>
<tr>
<td>August 6, Friday</td>
<td>5:00 p.m.</td>
<td>Last day to drop a course and receive W on transcript for Summer B or Summer C via College petition to the Registrar, Room 222 Criser</td>
</tr>
<tr>
<td>August 6, Friday</td>
<td>5:00 p.m.</td>
<td>Last day to withdraw (all courses) without failing grades for Summer B or Summer C via College petition to the Registrar, Room 222 Criser</td>
</tr>
<tr>
<td>August 8-9, Friday-Sunday</td>
<td>12:00 noon</td>
<td>Deadline for requesting transfer of credit (for fall degree candidates)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See commencement schedule for specific dates: <a href="http://www.commencement.ufl.edu">http://www.commencement.ufl.edu</a></td>
</tr>
<tr>
<td>August 6-8, Friday-Sunday</td>
<td></td>
<td>Commencement Ceremonies</td>
</tr>
<tr>
<td>August 9, Monday</td>
<td>12:00 noon</td>
<td>Summer B and C final term grades are due.</td>
</tr>
<tr>
<td>August 10, Tuesday</td>
<td></td>
<td>Degree certification</td>
</tr>
<tr>
<td>August 11, Wednesday</td>
<td></td>
<td>Unofficial transcripts with grades and remarks are available via ONE.UF.</td>
</tr>
</tbody>
</table>
Projected dates. Specific dates and times of ceremonies for colleges and schools will be made available at [https://www.commencement.ufl.edu](https://www.commencement.ufl.edu) once approved by the University Commencement Committee and as soon as plans are finalized. Please do not anticipate exact dates and times until the website has been updated.

NOTES: All dates and deadlines are subject to change and will be updated accordingly. Prospective students should contact the appropriate academic unit for admission application deadlines.
GRADUATE COURSES A-Z

A
• Accounting (http://catalog.ufl.edu/graduate/courses-az/accounting/)
• African Studies (p. 513)
• Agricultural and Biological Engineering (p. 514)
• Agricultural Education and Communication (p. 516)
• Agricultural Operations Management (p. 519)
• Agronomy (p. 519)
• Animal Sciences (p. 521)
• Anthropology (p. 523)
• Applied Physiology and Kinesiology (p. 527)
• Architecture (http://catalog.ufl.edu/graduate/courses-az/architecture/)
• Art and Art History (p. 531)
• Astronomy and Astrophysics (p. 535)

B
• Biology (p. 535)
• Biomedical Engineering (p. 536)
• Biostatistics (http://catalog.ufl.edu/graduate/courses-az/biostatistics/)
• Botany (p. 538)

C
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• Chemistry (p. 541)
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• Classics (p. 549)
• Computer and Information Science and Engineering (p. 549)
• Construction Management (p. 552)
• Criminology (p. 556)

D
• Digital Worlds Institute (p. 556)

E
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• Education, School of Human Development and Organizational Studies in Education (p. 561)
• Education, School of Special Education, School Psychology and Early Childhood Studies (p. 568)
• Education, School of Teaching and Learning (p. 572)
• Electrical and Computer Engineering (p. 579)
• Engineering, General (p. 585)
• English (p. 586)
• Entomology and Nematology (p. 587)
• Environmental Engineering Sciences (p. 590)
• Environmental Horticulture (p. 594)
• Epidemiology (http://catalog.ufl.edu/graduate/courses-az/epidemiology/)
• European Studies (p. 595)

F
• Family, Youth and Community Sciences (p. 595)
• Finance (p. 597)
• Fisheries and Aquatic Sciences (p. 601)
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• Food Science and Human Nutrition (p. 604)
• French (p. 625)

G
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• Geomatics (p. 610)
• German (p. 626)
• Greek Studies (p. 611)

H
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• Horticultural Sciences (p. 616)

I
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• Information Systems (p. 620)
• Interior Design (p. 623)

J
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• Journalism (p. 624)

L
• Landscape Architecture (p. 624)
• Latin (p. 628)
• Linguistics (p. 629)

M
• Management (p. 631)
• Marketing (p. 633)
• Mass Communication (p. 636)
• Materials Science and Engineering (p. 642)
• Mathematics (p. 645)
• Mechanical and Aerospace Engineering (p. 649)
• Microbiology and Cell Science (p. 653)
• Music (p. 655)

N
• Nuclear and Radiological Engineering (p. 659)

O
• Occupational Therapy (p. 666)
Introducing the basic core competencies and practical skills required of a development practitioner. It differs from other development courses at UF by uniquely focusing on the inter-relationship between management, health, natural and social sciences in African development contexts and linked to the praxis of Development Administration that MDP graduates should be familiar with before embarking on their careers in sustainable development.

**AFS 6303 Development Administration 3 Credits**
**Grading Scheme:** Letter Grade
This course for Master of Sustainable Development Practice (MDP) students and others whose academic work and future plans address sustainable development challenges.

**AFS 6305 Development Theory and Practice Intro 3 Credits**
**Grading Scheme:** Letter Grade
By emphasizing both theory and practice. Theories and methods that underlie the study of African history and change as the field has evolved over the last four or more decades. Attention to changing frameworks for viewing the African past, with a focus on the historians' research methods and techniques.

**AFS 6060 Research Problems in African Studies 3 Credits**
**Grading Scheme:** Letter Grade
In-depth reading and discussion of aspects of modern African history. Seminar focuses on specific tools, such as ethnicity, colonialism, violence, warfare, gender, religion, and nationalism.

**AFH 6805 Theo/Met African Hist 3 Credits**
**Grading Scheme:** Letter Grade
Survey of advanced reference, specialized research tools (including variety of electronic databases, published paper indexes, and bibliographies), and methods for graduate-level research in all disciplines of African area studies.

**AFH 6061 Africana Bibliography 1 Credit**
**Grading Scheme:** Letter Grade
Theories and methods that underlie the study of African history and change as the field has evolved over the last four or more decades. Attention to changing frameworks for viewing the African past, with a focus on the historians’ research methods and techniques.

**AFH 6259 Seminar in Modern Africa 3 Credits**
**Grading Scheme:** Letter Grade
In-depth reading and discussion of aspects of modern African history. Seminar focuses on specific themes, such as ethnicity, colonialism, violence, warfare, gender, religion, and nationalism.

**AFH 6934 Africa 3 Credits**
**Grading Scheme:** Letter Grade
Africana Bibliography 1 Credit
Survey of advanced reference, specialized research tools (including variety of electronic databases, published paper indexes, and bibliographies), and methods for graduate-level research in all disciplines of African area studies.

**AFS 6060 Research Problems in African Studies 3 Credits**
**Grading Scheme:** Letter Grade
In-depth reading and discussion of aspects of modern African history. Seminar focuses on specific tools, such as ethnicity, colonialism, violence, warfare, gender, religion, and nationalism.

**AFS 6062 Design and Methods for Sustainable Development Practice 3 Credits**
**Grading Scheme:** Letter Grade
Builds practical skills and critical perspectives to engage constructively in planning, implementation and evaluation of sustainable development practice. Designed for Master of Sustainable Development Practice (MDP) students and others whose academic work and future plans address sustainable development challenges.

**AFS 6303 Development Administration 3 Credits**
**Grading Scheme:** Letter Grade
Introducing the basic core competencies and practical skills required of a development practitioner. It differs from other development courses at UF by uniquely focusing on the inter-relationship between management, health, natural and social sciences in African development contexts and by emphasizing both theory and practice.
### Agricultural and Biological Engineering

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Grading Scheme</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABE 5009</td>
<td>Control Methods in SmartAg Systems</td>
<td>3</td>
<td>Letter Grade</td>
<td>None</td>
</tr>
<tr>
<td>ABE 5015</td>
<td>Empirical Models of Crop Growth and Yield Response</td>
<td>3</td>
<td>Letter Grade</td>
<td>consent of instructor</td>
</tr>
<tr>
<td>ABE 5038</td>
<td>Recent Developments and Applications in Biosensors</td>
<td>3</td>
<td>Letter Grade</td>
<td>General biology and organic chemistry, or consent of instructor</td>
</tr>
<tr>
<td>ABE 5152</td>
<td>Fluid Power Circuits and Control</td>
<td>3</td>
<td>Letter Grade</td>
<td>EML 3100, EGM 3400, 3520</td>
</tr>
<tr>
<td>ABE 5307</td>
<td>Foundations of Economics for Sustainable Development</td>
<td>3</td>
<td>Letter Grade</td>
<td>Ecology, or consent of instructor</td>
</tr>
<tr>
<td>ABE 5332</td>
<td>Advanced Agricultural Structures</td>
<td>3</td>
<td>Letter Grade</td>
<td>Design criteria for agricultural structures including steady and unsteady</td>
</tr>
<tr>
<td>ABE 5442</td>
<td>Advanced Agricultural Process Engineering</td>
<td>3</td>
<td>Letter Grade</td>
<td>Engineering principles, processes, and techniques for using biological</td>
</tr>
<tr>
<td>ABE 5443C</td>
<td>Biological Systems Modeling</td>
<td>3</td>
<td>Letter Grade</td>
<td>Introduction to concepts and methods of process-based modeling of biological</td>
</tr>
<tr>
<td>ABE 5446</td>
<td>Biological and Agricultural Systems Simulation</td>
<td>3</td>
<td>Letter Grade</td>
<td>Basic concepts of systems analysis, modeling, and computer simulation of</td>
</tr>
<tr>
<td>ABE 5453</td>
<td>Rhetology and Mechanics of Agricultural and Biological Materials</td>
<td>3</td>
<td>Letter Grade</td>
<td>Principles of microbial biotechnology, emphasizing the application of</td>
</tr>
<tr>
<td>ABE 5563</td>
<td>Advanced Applied Microbial Biotechnology</td>
<td>3</td>
<td>Letter Grade</td>
<td>Principles of microbial biotechnology, emphasizing the application of</td>
</tr>
<tr>
<td>ABE 5570C</td>
<td>Agricultural Waste Management</td>
<td>3</td>
<td>Letter Grade</td>
<td>Engineering analysis and design of systems for the collection, storage,</td>
</tr>
</tbody>
</table>

### Additional Courses

- **AFS 6307 Foundations of Economics for Sustainable Development**
  - 3 Credits
  - **Grading Scheme:** Letter Grade
  - Providing students with limited economics background with a foundation in development economics, with attention devoted to sustainable development. Students learn about the major theoretical debates within the discipline, the most current research topics and apply their knowledge to the comparative analysis of development in Africa and Latin America.
  - **Prerequisite:** None.

- **AFS 6346 Conservation and Development Practicum**
  - 3 Credits
  - **Grading Scheme:** Letter Grade
  - Gain competence in applied, professional work in development practice through a guided analysis of the information generated during Master of Sustainable Development Practice field practicums, and in the interpretation of results, linking findings across disciplines and scales.
  - **Prerequisite:** Graduate student standing

- **AFS 6905 Individual Work in African Studies**
  - 1-3 Credits, Max 9 Credits
  - **Grading Scheme:** Letter Grade
  - Individual Work in African Studies
ABE 5815C Food and Bioprocess Engineering Design 4 Credits
Grading Scheme: Letter Grade
Engineering design of unit process operations employed in agro/food, pharmaceutical, and biological industries including sterilization/pasteurization, radiation, freezing, drying, evaporation, fermentation, distillation.

ABE 5936 Writing Grant Proposals for Scholarships and Fellowships 2 Credits
Grading Scheme: Letter Grade
Provides incoming graduate students in the ABE Department an introduction to acquire scholarships, fellowships, internships, and graduate assistantships from federal funding agencies. Students will be introduced to funding sources and opportunities, provided guidelines for proposal writing, and prepare a mock proposal for instructor and peer review.
Prerequisite: ENC3246 or equivalent technical writing course, and graduate status in the Agricultural and Biological Engineering Department.

ABE 6005 Applied Control for Automation and Robots 3 Credits
Grading Scheme: Letter Grade
Introduction to industrial controls, programmable logic controllers, and manipulator application programming in agricultural and biological engineering. Kinematics, dynamics, and control strategies for serial link manipulators in agricultural applications.
Prerequisite: EML 5311.

ABE 6017 Stochastic Modeling in Ecology and Hydrology 3 Credits
Grading Scheme: Letter Grade
Stochastic modeling is introduced through a problem-based approach. Selected papers are studied in depth; derivation of their main results unpacked. Examples include stochastic models of biodiversity, soil moisture, and rainfall. Students pick stochastic models to study for final projects. Students enjoy deeper understanding from unpacking these otherwise seemingly mysterious results.
Prerequisite: MAC 2312 or equivalent.

ABE 6031 Instrumentation in Agricultural Engineering Research 3 Credits
Grading Scheme: Letter Grade
Principles and application of measuring instruments and devices for obtaining experimental data in agricultural engineering research.

ABE 6035 Advanced Remote Sensing: Science and Sensors 3 Credits
Grading Scheme: Letter Grade
Develops understanding of remote sensing theory and systems using information obtained from visible/near infrared, thermal infrared, and microwave regions of the EM spectrum.
Prerequisite: MAP 2302.

ABE 6037C Remote Sensing in Hydrology 3 Credits
Grading Scheme: Letter Grade
Develops practical understanding of remote sensing applications to hydrology using observations in different regions of the EM spectrum. Seminar style with emphasis on literature review and presentation.
Prerequisite: ABE 6035.

ABE 6252 Advanced Soil and Water Management Engineering 3 Credits
Grading Scheme: Letter Grade
Physical and mathematical analysis of problems in infiltration, drainage, and groundwater hydraulics.

ABE 6254 Simulation of Agricultural Watershed Systems 3 Credits
Grading Scheme: Letter Grade
Characterization and simulation of agricultural watershed systems including land and channel phase hydrologic processes and pollutant transport processes. Investigation of the structure and capabilities of current agricultural watershed computer models.
Prerequisite: CWR 4111 and working knowledge of FORTRAN.

ABE 6265 Vadose Zone Modeling 3 Credits
Grading Scheme: Letter Grade
Unsaturated zone modeling of water flow and solute transport processes. Comparative analysis of alternative mechanistic modeling approaches of different complexity.
Prerequisite: Recommended basic use of high level computer language or numerical computing environment (i.e., Matlab, Mathematica, etc.) that allows the student to test algorithms and read existing modeling source code.

ABE 6266 Nanotechnology in Water Research 3 Credits
Grading Scheme: Letter Grade
Applications of environmental nanotechnology to water quality control. Fate and transport of nanomaterials in hydrologic pathways.
Prerequisite: Basic knowledge of hydrology, environmental engineering, and water chemistry.

ABE 6615 Advanced Heat and Mass Transfer in Biological Systems 3 Credits
Grading Scheme: Letter Grade
Analytical and numerical technique solutions to problems of heat and mass transfer in biological systems. Emphasis on nonhomogeneous, irregularly shaped products with respiration and transpiration.
Prerequisite: COP 2271, ABE 3612C.

ABE 6644 Agricultural Decision Systems 3 Credits
Grading Scheme: Letter Grade
Computerized decision systems for agriculture. Expert systems, decision support systems, simulations, and types of applications in agriculture.

ABE 6645C Computer Simulation of Crop Growth and Management Responses 3 Credits
Grading Scheme: Letter Grade
Teaches the background of computer models for the dynamic simulation of crop growth, development, and yield, and soil and plant water, nutrient, and carbon dynamics, and the application of models to real-world problems. The course is based on a systems analysis approach using DSSAT as a platform.

ABE 6649C Advanced Biological Systems Modeling 3 Credits
Grading Scheme: Letter Grade
This course serves as an advanced graduate class for continued biological modeling and covers topics such as: (1) formulating, solving analytical and numerical problems with programming, (2) dynamic biological models; (3) object-oriented design and agent-based modeling, (4) High Performance Computing and Global Sensitivity and Uncertainty Analysis.
Prerequisite: ABE 5643C.
ABE 6654C Advanced Bio-Based Products from Renewable Resources 3 Credits
Grading Scheme: Letter Grade
Provides the knowledge for the production of fuels, chemicals and materials from renewable resources. The course includes the fundamental principles and practical applications of bio-based products: biorefinery and biobased products overview, fundamental concepts in understanding biorefinery and biobased products; materials, chemical platforms, and fuels from biomass.
Prerequisite: CHM2045 or equivalent, or instructor permission.

ABE 6816 Food and Bioprocess Sterilization 3 Credits
Grading Scheme: Letter Grade
Analysis of available process technologies for sterilization in the food, pharmaceutical and biotechnology industries.

ABE 6840 Data Diagnostics 3 Credits
Grading Scheme: Letter Grade
Application of nonlinear time series analysis to detect, characterize, and model deterministic structure in real-world time series data. Topics include signal processing, phase space reconstruction, surrogate data testing, causal network analysis, and phenomenological modeling.
Prerequisite: Elementary statistics and Differential equations.

ABE 6905 Individual Work in Agricultural and Biological Engineering 1-4 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Special problems in agricultural engineering.

ABE 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

ABE 6931 Seminar 1 Credit, Max 2 Credits
Grading Scheme: S/U
Preparation and presentation of reports on specialized aspects of research in agricultural engineering and agricultural operations management.

ABE 6933 Special Topics in Agricultural and Biological Engineering 1-4 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Lectures, laboratory, and/or special projects.

ABE 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

ABE 6971 Research for Master’s Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master’s Thesis

ABE 6972 Research for Engineer’s Thesis 1-15 Credits
Grading Scheme: S/U
Research for Engineer’s Thesis

ABE 6974 Nonthesis Project 1-6 Credits, Max 6 Credits
Grading Scheme: S/U
In-depth project.

ABE 6986 Applied Mathematics in Engineering and Agriculture 3 Credits
Grading Scheme: Letter Grade
Mathematical methods, including regression analysis, graphical techniques, and analytical and numerical solution of ordinary and partial differential equations, relevant to engineering in agriculture and the related sciences.

ABE 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ABE 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

AGG 5607 Communicating in Academia 3 Credits
Grading Scheme: Letter Grade
Teaching graduate students about academic writing, specifically focused on research proposals, theses, dissertations, manuscripts, grant proposals, and CVs. Also teaching students about aspects of academic writing that are not normally part of graduate curriculum but are necessary to succeed.

CWR 6536 Stochastic Subsurface Hydrology 3 Credits
Grading Scheme: Letter Grade
Stochastic modeling of subsurface flow and transport including geostatistics, time series analysis, Kalman filtering, and physically based stochastic models.
Prerequisite: senior-level course in probability and statistics, calculus through differential equations, soil physics, and subsurface hydrology.

EGN 5949 Practicum/Internship/Cooperative Work Experience 1-6 Credits, Max 6 Credits
Grading Scheme: S/U
Practical cooperative engineering work under approved industrial and faculty supervision.
Prerequisite: graduate student.

EGN 6913 Engineering Graduate Research 0-3 Credits
Grading Scheme: S/U
Course will provide the student with supervised research in a laboratory setting.

Agricultural Education and Communication

AEC 5032 Agricultural Media Writing 3 Credits
Grading Scheme: Letter Grade
Varied media writing assignments: feature stories, news releases, and video.
Prerequisite: AEC 5541.

AEC 5037 Agricultural Media Production 3 Credits
Grading Scheme: Letter Grade
Various agricultural media production assignments. Developing agricultural websites and publications.
Prerequisite: AEC 5541.

AEC 5060 Public Opinion and Agricultural and Natural Resource Issues 3 Credits
Grading Scheme: Letter Grade
Public opinion measurement and agenda setting. Media treatment, public opinion, and public relations/public information activity on issues affecting agricultural production and trade.

AEC 5074 Agriculture, Resources, People, and the Environment: A Global Perspective 3 Credits
Grading Scheme: Letter Grade
Interdependence in the global context, and the need to cultivate a lifelong global perspective.
AEC 5201 Teaching in Colleges of Agricultural and Life Sciences 3 Credits
Grading Scheme: Letter Grade
Theories, principles, and practices associated with effective teaching and learning in higher education.
Prerequisite: graduate standing.

AEC 5203 Advanced Teaching in Colleges of Agricultural and Life Sciences 3 Credits
Grading Scheme: Letter Grade
Advanced theories, principles, and practices associated with effective teaching and learning in the agricultural and life sciences. Emphasis will be on selecting and implementing a variety of teaching methods.
Prerequisite: AEC 5201 or approval of the instructor.

AEC 5206 Teaching Methods in Agricultural Education 3 Credits
Grading Scheme: Letter Grade
Teaching methodology course that focuses on the selection and use of teaching strategies, methods/ approaches, and techniques; evaluating learning; managing learning environments; and classroom management for teaching agricultural subjects in formal educational settings.

AEC 5227 Teaching in Agricultural Education Laboratory Facilities 3 Credits
Grading Scheme: Letter Grade
This course is designed to introduce pre-service agricultural education teachers to laboratory integration into the agricultural education curriculum at the middle school and secondary school level.
Prerequisite: Admission to state approved agriculture teacher certification program.

AEC 5302 Professional Skill Development in Agriscience Education I 1-3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Development and enhancement of technical agricultural and scientific knowledge and skills by professional agriscience teachers.
Prerequisite: Teaching experience.

AEC 5324 Philosophy and Development of Agricultural Education 3 Credits
Grading Scheme: Letter Grade
An analysis of evolving concepts and philosophies of agricultural education programs with emphasis upon history, legislation, and principles underlying organization and practice.
Prerequisite: Admission to AEC state-approved graduate-level teacher certification program.

AEC 5416 Critical and Creative Thinking in Problem Solving and Decision Making 3 Credits
Grading Scheme: Letter Grade
Creating a foundation for effective leadership practice through the analysis and development of critical and creative thinking skills and dispositions as applied to dynamic organizational and community contexts. Contexts include agriculture, life sciences, natural resources, and related settings.

AEC 5440 Interpersonal Leadership in Agricultural and Life Sciences 3 Credits
Grading Scheme: Letter Grade
Theory, research, and practices that create a foundation for self-awareness, emotional intelligence, relationship building, and leadership within the broad contexts of agriculture and life sciences and beyond.

AEC 5454 Leadership Development for Extension and Community Nonprofit Organizations 3 Credits
Grading Scheme: Letter Grade
Application of concepts related to developing leaders for organizing and maintaining extension and community nonprofit organizations.

AEC 5501 Professional Skill Development in Agriscience Education II 1-3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Advanced level of development and enhancement of technical agriculture and scientific knowledge and skills by professional agriscience educators.
Prerequisite: AEC 5302.

AEC 5541 Communication and Instructional Technologies in Agricultural and Life Sciences 3 Credits
Grading Scheme: Letter Grade
Planning and producing written and visual instructional and communication materials for programs in the agricultural and life sciences. Requires a major instructional project or communication campaign.

AEC 5544 Curriculum Development and Assessment Techniques in Emerging Agricultural Technologies 3 Credits
Grading Scheme: Letter Grade
Principles and practices used in developing agricultural education curriculum from developing objectives through instructional plans. Assessing student learning and implementing curriculum.

AEC 5545 Special Methods in Teaching Agriculture 3 Credits
Grading Scheme: Letter Grade
Teaching methods for active learning, critical, creative and evaluative thinking in the agricultural education classroom. Strategies for managing student behavior, utilizing instructional technology and utilizing FFA and SAE as teaching tools.

AEC 5546 Program Planning in Agricultural Education 3 Credits
Grading Scheme: Letter Grade
Principles and practices used in designing agricultural education program plans for effective and total program development.

AEC 6205 Advanced Curriculum and Teaching Methods 3 Credits
Grading Scheme: Letter Grade
An in-depth analysis and application of curriculum development and teaching method theories applied in an agricultural and natural resources education setting.
Prerequisite: AEC 5206 or equivalent.

AEC 6210 Designing Educational Programs in Agricultural Settings 3 Credits
Grading Scheme: Letter Grade
Designing Educational Programs in Agricultural Settings

AEC 6211 Delivering Educational Programs in Agricultural Settings 3 Credits
Grading Scheme: Letter Grade
This course will be focusing on delivering educational programs in formal and nonformal settings. Emphasis will be placed on balancing theoretical and practical development and delivery of educational programs.

AEC 6212 Teacher Education in Agriculture 3 Credits
Grading Scheme: Letter Grade
Preparing future agricultural teacher educators with the knowledge and skills needed to provide leadership in a university teacher education program. Students will investigate various models of teacher education and determine the composition of a well-developed agriculture teacher education program.
AEC 6229 Laboratory Instruction: Theory and Practice 3 Credits
Grading Scheme: Letter Grade
Research and theoretical foundations underlying the aspects of planning, management, teaching, evaluation, safety, and facility design: discussed in the context of laboratory instruction.

AEC 6300 Methodology of Planned Change 3 Credits
Grading Scheme: Letter Grade
Processes by which professional change agents influence the introduction, adoption, and diffusion of technological changes. Applicable to those who are responsible for bringing about change.

AEC 6316 From America to Zimbabwe: An Overview of International Extension Systems 3 Credits
Grading Scheme: Letter Grade
Various extension models and delivery systems, extension partners; linkages and issues affecting extension internationally. Field trip.

AEC 6321 The Land Grant University and University Governance 3 Credits
Grading Scheme: Letter Grade
Implications of change and future pathways for teaching, research and extension, including global perspectives, and the role and philosophy of administrators in governing a complex university.
Prerequisite: None.

AEC 6325 History and Philosophy of Agricultural Education 3 Credits
Grading Scheme: Letter Grade
Analysis of evolving concepts and philosophies. Emphasis on history, legislation, and principles underlining organization and practice. Participation in field experience required.

AEC 6411 Organizational Leadership in Agriculture and Life Sciences 3 Credits
Grading Scheme: Letter Grade
Leadership will be examined as it relates to agriculture and life science based organizations and will provide a knowledge base for effective leadership. Topics will focus on: organizational leadership, culture, structure, relationships, change, conflict and issues within agriculture and life sciences that can impact organizations.

AEC 6419 Communication and Competencies for Global Leadership 3 Credits
Grading Scheme: Letter Grade
Identifying and developing the personal and professional competencies required for effective leadership in an increasingly global society. International communication is included.

AEC 6426 Development of a Volunteer Leadership Program 3 Credits
Grading Scheme: Letter Grade
Identification, recruitment, training, retention, and supervision of volunteer leaders.

AEC 6512 Program Development in Extension Education 3 Credits
Grading Scheme: Letter Grade
Concepts and processes drawn from the social sciences that are relevant to the development of extension education programs.

AEC 6543 Teaching and Learning Theory: Applications in Agricultural Education 3 Credits
Grading Scheme: Letter Grade
Contemporary and foundational theory and research on teaching and learning.
Prerequisite: AEC 5206

AEC 6552 Evaluating Programs in Extension Education 3 Credits
Grading Scheme: Letter Grade
Concepts and research drawn from the social sciences relevant to evaluating youth and adult extension programs.

AEC 6611 Agricultural and Extension Adult Education 3 Credits
Grading Scheme: Letter Grade
Concepts and principles related to design, implementation, and evaluation of education programs for adults.

AEC 6704 Extension Administration and Supervision 3 Credits
Grading Scheme: Letter Grade
Principles and practices for effective administration and supervision of the cooperative extension service program at the county and state levels.

AEC 6767 Research Strategies in Agricultural Education and Communication 3 Credits
Grading Scheme: Letter Grade
Exploration of current topics and trends.

AEC 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research
Prerequisite: consent of department chair.

AEC 6912 Nonthesis Research in Agricultural and Extension Education 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Library and workshop related to methods in agricultural and extension education, including study of research work, review of publications, development of written reports.

AEC 6932 Special Topics In Agricultural Education and Communication 1-3 Credits
Grading Scheme: Letter Grade
Explores contemporary and emerging topics in agricultural education and communication.

AEC 6933 Seminar in Agricultural Education and Communication 1-3 Credits, Max 3 Credits
Grading Scheme: Letter Grade
Supervised Teaching
Prerequisite: consent of department chair.

AEC 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching
AEC 6945 Practicum in Agricultural Education and Communication 1-9 Credits, Max 9 Credits
Grading Scheme: Letter Grade
An individual program whereby students are apprenticed to expert teachers to gain practical experience in a school-based agriscience program.
Prerequisite: Successful completion of all three portions of the Florida Teacher Certification Examination (FTCE) - General Knowledge, Professional Education, and Agriculture 6-12.

AEC 6947 Experiential Learning in Agricultural Education 3 Credits
Grading Scheme: Letter Grade
Focuses on applying experiential learning theory in agricultural education through classroom-based lessons, project-based learning, service learning, guided inquiry, field trips, internships/externships, study abroad, and outdoor/adventure learning.
Prerequisite: Graduate standing or consent of instructor.

AEC 6971 Research for Master’s Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master’s Thesis

AEC 6980 Thesis/Dissertation Proposal Development 3 Credits
Grading Scheme: Letter Grade
Designed to assist students in the preparation of their thesis or dissertation research proposal. Students will submit an acceptable draft of the first three chapters of their thesis/dissertation proposal by the end of the course.
Prerequisite: AEC 6767 or equivalent.

AEC 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

AEC 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

Agricultural Operations Management

AOM 5334C Agricultural Chemical Application Technology 3 Credits
Grading Scheme: Letter Grade
Equipment and methods used to apply pesticides in agriculture. Emphasis on techniques to avoid misapplication and pesticide drift.

AOM 5431 GIS and Remote Sensing in Agriculture and Natural Resources 3 Credits
Grading Scheme: Letter Grade
Principles and applications of geographic information systems (GIS) and global positioning system (GPS) technologies supporting land use/cover assessment, agricultural production, and natural resource conservation.
Prerequisite: working knowledge of computer or consent of instructor.

AOM 5435 Advanced Precision Agriculture 3 Credits
Grading Scheme: Letter Grade
Principles and applications of technologies supporting precision farming and natural resource data management planning. Global positioning systems (GPS), geographic information systems (GIS), variable rate technologies (VRT), data layering of independent variables, automated guidance, Internet information access, computer software management.

AOM 6061 Agri-food Systems Innovation 3 Credits
Grading Scheme: Letter Grade
Students explore the role of innovation in food systems from a reverse chain perspective. Students will gain knowledge of the food system framework from a multi-level (i.e., individual, organizational, etc.) perspective, identify current, innovative business and technological practices, as well as present and think critically about future trends in food.

AOM 6735 Irrigation Principles and Management 3 Credits
Grading Scheme: Letter Grade
Designed to teach graduate students about irrigation and gain skills to evaluate an irrigation system, identify parts of a system, and develop an irrigation schedule based on system characteristics. This course is designed for nonengineers although quantitative ability will be required for calculations and analysis. Prerequisites: Students must be proficient in Microsoft Excel and Word. Students should be able to use equation functions and graphing functions in Excel. It is recommended that students have basic understanding of hydrology, unit conversions, and algebra.

AOM 6736 Principles and Issues in Environmental Hydrology 3 Credits
Grading Scheme: Letter Grade
Principles and issues in environmental hydrology.

AOM 6905 Individual Work in Agricultural Operations Management 1-6 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Special problems.

AOM 6932 Special Topics in Agricultural Operations Management 1-6 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Lectures, laboratory, and /or special projects.

Agronomy

AGR 5230C Florida Grassland Agroecosystems 4 Credits
Grading Scheme: Letter Grade
Comprehensive overview of planted and native grassland ecosystems in Florida emphasizing their growth, species diversity, management, and use by ruminant animals. Offered spring term.

AGR 5266C Field Plot Techniques 3 Credits
Grading Scheme: Letter Grade
Techniques and procedures used in design and analysis of field plot, greenhouse, and laboratory research experiments. Application of research methodology, the analysis and interpretation of research results. Offered fall term.
Prerequisite: STA 3023.

AGR 5277C Tropical Crop Production 3 Credits
Grading Scheme: Letter Grade
Ecology and production practices of selected crops grown in the tropics. Offered spring term.
Prerequisite: consent of instructor.

AGR 5307 Molecular Genetics for Crop Improvement 3 Credits
Grading Scheme: Letter Grade
Lectures and laboratory demonstrations for a thorough understanding of concepts and applied aspects of plant molecular and cellular biology. Discussion of current research in plant biotechnology and functional genomics. Offered spring term.
Prerequisite: AGR 3303.
AGR 5321C Genetic Improvement of Plants 3 Credits
Grading Scheme: Letter Grade
Genetic basis for crop improvement including methods for improving crop yield, pest resistance, and adaptability. Emphasis on manipulating genetic variability in self- and cross-pollinate, annual and perennial crop plants. Offered fall term.
Prerequisite: AGR 3303.

AGR 5444 Ecophysiology of Crop Production 3 Credits
Grading Scheme: Letter Grade
Physiological, ecological, and environmental responses that impact growth, development, and yield formation of cultivated crops. Offered spring term.
Prerequisite: AGR 3005 or equivalent.

AGR 5511 Crop Ecology 3 Credits
Grading Scheme: Letter Grade
Relationships of ecological factors and climatic classifications to agroecosystems, and crop modeling of the major crops. Offered fall term.
Prerequisite: AGR 4210, BOT 3503, PCB 3043C, or equivalent.

AGR 6233 Tropical Grassland Agroecosystems 3 Credits
Grading Scheme: Letter Grade
Potential of natural grasslands of tropical and subtropical regions. Development of improved pastures and forages and their use in livestock production. Offered fall term in odd-numbered years.
Prerequisite: AGR 4231C and ANS 5446 or consent of instructor.

AGR 6237C Research Techniques in Forage Evaluation 3 Credits
Grading Scheme: Letter Grade
Experimental techniques for field evaluation of forage plants. Design of grazing trials and procedures for estimating yield and botanical composition in the grazed and ungrazed pasture. Offered summer C term in odd-numbered years.
Prerequisite: STA 6166.
Corequisite: STA 6166.

AGR 6322 Advanced Plant Breeding 3 Credits
Grading Scheme: Letter Grade
Theory and use of biometrical genetic models for analytical evaluation of qualitative and quantitative characteristics, with procedures applicable to various types of plant species. Offered spring term in even-numbered years.
Prerequisite: AGR 3303, 4231, AGR 6311, and STA 6167.

AGR 6325L Plant Breeding Techniques 1 Credit
Grading Scheme: Letter Grade
Examination of various breeding techniques used by agronomic and horticultural crop breeders in Florida. Field and lab visits to active plant breeding programs, with discussion led by a specific breeder each week. Hands-on experience in breeding programs. Offered spring term in odd-numbered years.
Prerequisite: AGR 3303 or equivalent.
Corequisite: AGR 6322.

AGR 6422C Environmental Crop Nutrition 3 Credits
Grading Scheme: Letter Grade
Design of cost-effective and environmentally sound crop nutrient management strategies. Diagnostic nutrient analysis, nutrient uptake, BMPs, and sustainable agriculture. Offered fall term.
Prerequisite: BOT 3503.

AGR 6442C Physiology of Agronomic Plants 4 Credits
Grading Scheme: Letter Grade
Yield potentials of crops as influenced by photosynthetic efficiencies, respiration, translocation, drought, and canopy architecture. Plant response to environmental factors. Offered spring term.
Prerequisite: BOT 3503.

AGR 6905 Agronomic Problems 1-5 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Special topics for classroom, library, laboratory, or field studies of agronomic plants.

AGR 6932 Topics in Agronomy 1-3 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Critical review of selected topics in specific agronomic areas.

AGR 6933 Graduate Agronomy Seminar 1 Credit, Max 3 Credits
Grading Scheme: Letter Grade
Current literature and agronomic developments.

AGR 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

AGR 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

AGR 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

AGR 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

ALS 5155 Global Agroecosystems 3 Credits
Grading Scheme: Letter Grade
Focusing on the principles of agroecology and presentation of topics that integrate ecological with agricultural principles to optimize resource conservation, productivity, societal benefit, and profitability.
Prerequisite: SWS 3022 or SWS 5050 & ALS 3153 & AGR 4214C or equivalents.

ALS 5932 Special Topics 1-4 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Special Topics

ALS 6031 Project Team Research: Building Skills in Agrobiology 3 Credits
Grading Scheme: Letter Grade
Hands-on experience in addressing a real-world problem faced by an agricultural industry partner. Production of a detailed plan, project design, and preliminary data for evaluating and solving the problem. Offered every term.

IPM 5305 Principles of Pesticides 3 Credits
Grading Scheme: Letter Grade
Basic knowledge of pesticides and their use. Practical working knowledge of pesticides used in agricultural and horticultural settings. Offered spring term.
Prerequisite: Graduate standing or instructor's permission to register.
**Animal Sciences**

**ANS 5446 Animal Nutrition 3 Credits**  
*Grading Scheme: Letter Grade*  
Carbohydrates, fats, proteins, minerals, and vitamins and their functions in the animal body. Offered fall term.  
*Prerequisite: ANS 3440, BCH 4024, or consent of instructor.*

**ANS 5935 Reproductive Biology Seminar and Research Studies 1 Credit, Max 4 Credits**  
*Grading Scheme: S/U*  
Invited speakers on a wide range of topics. Student-faculty participation in research projects.  
*Prerequisite: ANS 3319C or equivalent.*

**ANS 6040 Concepts in Applied Ethology 3 Credits**  
*Grading Scheme: Letter Grade*  
Introduces concepts and methods used to conduct research in the field of applied ethology. Course content includes an overview of mechanisms of animal behavior and approaches to measuring and modeling animal behavior. The focus is on developing skills necessary to conduct, analyze, and interpret research in applied ethology.  
*Prerequisite: CALS major.*

**ANS 6288 Experimental Techniques and Analytical Procedures in Meat Research 3 Credits**  
*Grading Scheme: Letter Grade*  
Experimental design, analytical procedures; techniques; carcass measurements and analyses as related to livestock production and meats studies. Offered spring term in even-numbered years.

**ANS 6312C Applied Ruminant Reproductive Management 4 Credits**  
*Grading Scheme: Letter Grade*  
In-depth review of applied bovine reproductive management; factors that affect the efficiency of reproduction (managerial, biological, and economical). Offered fall term.  
*Prerequisite: ANS 3319C.*

**ANS 6313 Current Concepts in Reproductive Biology 2 Credits**  
*Grading Scheme: Letter Grade*  
Lectures prepared by students and discussion of current review articles. Offered spring term in odd-numbered years.  
*Prerequisite: ANS 3319C or equivalent; consent of instructor.*

**ANS 6379L Techniques Genetics 2 Credits**  
*Grading Scheme: Letter Grade*  
Techniques Genetics

**ANS 6387 Genetic Analysis of Complex Traits in Livestock 3 Credits**  
*Grading Scheme: Letter Grade*  
Comprehensive examination of principles of livestock inheritance, QTL mapping strategies and functional genomic approaches used for genomic selection and improvement programs in farm animals.

**ANS 6447 Ruminant Nutrition 4 Credits**  
*Grading Scheme: Letter Grade*  
The anatomy and physiology of the ruminant digestive system as well as the digestion and metabolism of dietary nutrients for the purposes of growth, pregnancy, and lactation. Ration formulations using computer software.  
*Prerequisite: ANS 5446: Animal Nutrition.*

**ANS 6449 Vitamins 3 Credits**  
*Grading Scheme: Letter Grade*  
Historical development, properties, assays, and physiological effects.  
*Prerequisite: organic chemistry.*

**ANS 6452 Principles of Forage Quality Evaluation 3 Credits**  
*Grading Scheme: Letter Grade*  
Definition of forage quality in terms of animal performance, methodology used in forage evaluation, and proper interpretation of forage evaluation data. Offered spring term in even-numbered years.  
*Prerequisite: ANS 5446, AGR 4231C.*

**ANS 6458 Advanced Methods in Nutrition Technology 3 Credits**  
*Grading Scheme: Letter Grade*  
Demonstrations and limited performance of procedures used in nutrition research. Offered fall term in even-numbered years.  
*Prerequisite: for graduate students but open to seniors by special permission.*
ANS 6636 Meat Technology 3 Credits
Grading Scheme: Letter Grade
Chemistry, physics, histology, bacteriology, and engineering involved in the handling, processing, manufacturing, preservation, storage, distribution, and utilization of meat. Offered fall term in odd-numbered years.

ANS 6637 Quantitative Microbial Risk Assessment of Pathogens in Food Systems 3 Credits
Grading Scheme: Letter Grade
Modeling principles of microbial risk assessment in food chains. Model implementation in stochastic simulation software (R). Focus is on the bottom-up food chain approach and basic principles of the top-down approach.
Prerequisite: STA 6166 or similar statistics course & knowledge of the R programming environment.

ANS 6702 Physiology of the Mammary Gland and Lactation 2 Credits
Grading Scheme: Letter Grade
Offers insights into the endocrinology and physiology of the defining characteristics of mammals: the mammary gland and lactation, focusing on the anatomy and development of the mammary gland with an overview of the biochemical, cellular and molecular processes controlling lactation emphasizing on livestock species.
Prerequisite: ANS 6704 or permission of instructor

ANS 6704 Mammalian Endocrinology 2 Credits
Grading Scheme: Letter Grade
Physiologic systems of farm animals. Emphasizes the impact of endocrinology and cell biology on animal physiology, development and performance.
Prerequisite: BCH 4024 or BCH 3025, or equivalent.

ANS 6705 Muscle Physiology 1 Credit
Grading Scheme: Letter Grade
Overview of morphological, physiological, cellular, and molecular factors affecting muscle structure and function, with special emphasis on mammalian skeletal muscle.
Prerequisite: Undergraduate coursework in biology, biochemistry, and physiology.

ANS 6707 Growth Physiology in Farm Animals 1 Credit
Grading Scheme: Letter Grade
Biological regulation of muscle, cartilage and bone formation and function in farm animals with integration of physiological systems to livestock tissue growth.
Prerequisite: ANS 6704

ANS 6711 Current Topics in Equine Nutrition and Exercise Physiology 2 Credits
Grading Scheme: Letter Grade
Equine science with emphasis on current topics of interest. Offered fall term in odd-numbered years.

ANS 6714 Current Topics in Microbial Physiology in Animals 1 Credit
Grading Scheme: Letter Grade
Insights into microbial pathogenesis, microbial genetics, and molecular microbiology with particular reference to livestock species.

ANS 6715 Gastrointestinal and Feed Microbiology 3 Credits
Grading Scheme: Letter Grade
Microbiology of the rumen, hindgut, and feed; relation to livestock production and food safety.
Prerequisite: ANS 5446.

ANS 6716 Physiology in Farm Animals 1 Credit
Grading Scheme: Letter Grade
Physiology and function of the gastrointestinal system in monogastrics and ruminants.
Prerequisite: ANS 6704

ANS 6718 Nutritional Physiology of Domestic Animals 2 Credits
Grading Scheme: Letter Grade
Physiological, biochemical and molecular control of nutritional processes in monogastrics and ruminants.
Prerequisite: ANS 5446; introductory biochemistry course.

ANS 6723 Mineral Nutrition and Metabolism 3 Credits
Grading Scheme: Letter Grade
Physiological effect of macro- and micro-elements, and mineral interrelationships.

ANS 6750 Reproductive Physiology in Farm Animals 1 Credit
Grading Scheme: Letter Grade
Physiology and function of the reproductive system in farm animals.
Prerequisite: ANS 6704 and ANS 3319C or equivalent.

ANS 6751 Physiology of Reproduction 3 Credits
Grading Scheme: Letter Grade
Conceptual relationship of the hypothalamus, pituitary, and reproductive organs during the estrous cycle and pregnancy. Influence of exteroceptive factors and seasonal reproduction. Offered fall term in even-numbered years.
Prerequisite: BCH 5045 or equivalent.

ANS 6757  Advanced Endocrinology 4 Credits
Grading Scheme: Letter Grade
Overview of mammalian endocrine systems and molecular basis of hormone action; Current topics on endocrine control of growth, development, reproduction and nutrition.
Prerequisite: BCH 4024 or BCH 5045; ANS 6704 ; or equivalent, or consent of instructor.

ANS 6775 Essentials of Livestock Immunology 1 Credit
Grading Scheme: Letter Grade
Basic immunological concepts and their relation to immunity for livestock and other species.

ANS 6905 Problems in Animal Science 1-4 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Problems in Animal Science

ANS 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

ANS 6932 Special Topics in Animal Science 1-3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
New developments in animal nutrition and livestock feeding, animal genetics, animal physiology, and livestock management.

ANS 6933 Graduate Seminar in Animal Science 1 Credit, Max 8 Credits
Grading Scheme: Letter Grade
Graduate Seminar in Animal Science

ANS 6936 Graduate Seminar in Animal Molecular and Cell Biology 1-2 Credits
Grading Scheme: Letter Grade
Seminar attendance and 1-hour presentation on graduate research project.
ANS 6939 Animal Molecular and Cellular Biology Journal Colloquy 1
Credit, Max 5 Credits
Grading Scheme: S/U
Critical evaluation, presentation and discussion of recent scientific journal articles on a specified topic in cellular and/or molecular biology.

ANS 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: Letter Grade
Helping students develop teaching skills in the animal sciences under the guidance of faculty member.

ANS 6942 Supervised Extension in the Animal Sciences 1-3 Credits
Grading Scheme: Letter Grade
Develops extension skills in the Animal Sciences under the guidance of faculty member.

ANS 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

ANS 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ANS 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

PCB 6816 Thermal Physiology 1 Credit
Grading Scheme: Letter Grade
Exploring the processes by which homeotherms produce heat and regulate its exchange with the environment, and the consequences of thermal biology for animal production.

Anthropology

ANG 5012 Fantastic Anthropology and Fringe Science 3 Credits
Grading Scheme: Letter Grade
Examination of paranormal and pseudoscientific theories concerning human condition. Critical examination of fringe science claims and their perpetuation in contemporary society.

ANG 5085 Collection and Analysis of Visual Data in Anthropology 3 Credits
Grading Scheme: Letter Grade
Anthropological methods course in which students learn to: (1) produce high quality video for research projects; (2) code still and moving images, as well as audio; (3) analyze naturally occurring speech, interactions, facial expressions, and other observable events in video footage.
Prerequisite: Graduate status or permission of instructor

ANG 5126 Zooarcheology 3 Credits
Grading Scheme: Letter Grade
Human use of animal resources, emphasizing prehistoric hunting and fishing practices. Origins of animal domestication.
Prerequisite: consent of instructor.

ANG 5162 Maya Archeoastronomy and Ethnoastronomy 3 Credits
Grading Scheme: Letter Grade
Focus on Maya cosmology, past and present with emphasis on continuity of culture seen in specific astronomical concepts.

ANG 5164 The Inca and Their Ancestors 3 Credits
Grading Scheme: Letter Grade
Evolution of the Inca empire traced archeologically through earlier Andean states and societies to the beginning of native civilization. Not open to students who have taken ANT 3164.

ANG 5172 Historical Archeology 3 Credits
Grading Scheme: Letter Grade
Methods and theoretical foundations of historical archeology as it relates to the disciplines of anthropology, history, historic preservation, and conservation. Introduction to pertinent aspects of material culture during the historic period.
Prerequisite: ANT 3141 or consent of instructor.

ANG 5184 Principles of Archaeology 3 Credits
Grading Scheme: Letter Grade
Foundational principles of methods and practice in contemporary anthropological archaeology including field research, interpretation of archaeological materials, temporal and spatial scales, and archaeological ethics.

ANG 5265 Methods in Ethnoecology 3 Credits
Grading Scheme: Letter Grade
Acquainting students with the methods and analyses used by ethnoecologists to research contemporary issues between humans and the environment. Topics include community-based management of resources, co-evolution of cultural and biological diversity, ethnobiological classification, historical ecology and landscape modification, indigenous peoples and protected areas, traditional ecological knowledge, agrobiodiversity and traditional subsistence.
Prerequisite: Graduate status or permission of the instructor

ANG 5266 Economic Anthropology 3 Credits
Grading Scheme: Letter Grade
Anthropological perspectives on economic philosophies and their behavioral bases. Studies of production, distribution, and consumption; money, savings, credit, peasant markets; and development in a cross-cultural context from perspectives of cultural ecology, Marxism, formalism, and substantivism. Not open to students who have taken ANT 4266.

ANG 5303 Women and Development 3 Credits
Grading Scheme: Letter Grade
Influence of development on women in rural and urban areas. Women’s participation in the new opportunities of modernization.

ANG 5336 The Peoples of Brazil 3 Credits
Grading Scheme: Letter Grade
Ethnology of Brazil. Historical, geographic, and socioeconomic materials and representative monographs from the various regions of Brazil as well as the contribution of the Indian, Portuguese, and African to modern Brazilian culture. Not open to students who have taken ANT 4336.

ANG 5354 Anthropology of Modern Africa 3 Credits
Grading Scheme: Letter Grade
Continuity and change in contemporary African societies, with special reference to cultural and ethnic factors in modern nations. Not open to students who have taken ANT 4354.
ANG 5393 Media Anthropology 3 Credits
Grading Scheme: Letter Grade
Anthropological approach to cultural practices of media production, circulation, and consumption. Examination of media as an assemblage of culturally and spatio-temporally specific entities and practices. Use of contemporary theory and ethnographic case studies to distinguish the anthropological inquiry of media from other disciplines, such as cultural studies and mass communications.
Prerequisite: Graduate standing.

ANG 5395 Visual Anthropology 3 Credits
Grading Scheme: Letter Grade
Photography and film as tools and products of social science. Ways of describing, analyzing, and presenting behavior and cultural ideas through visual means, student projects, and laboratory work with visual anthropology. Not open to students who have taken ANT 3390.
Prerequisite: basic knowledge of photography, or consent of instructor.

ANG 5420 Social Network Analysis in Cultural Anthropology 3 Credits
Grading Scheme: Letter Grade
Social network analysis is a set of theories and methods to analyze social structure. Participants will learn about whole network analysis (relations within groups) and personal network analysis (relations surrounding individuals). This is an introductory hands-on course, employing examples germane to anthropological research, using software such as UCinet and Egonet.
Prerequisite: graduate status or permission of instructor

ANG 5464 Culture and Aging 3 Credits
Grading Scheme: Letter Grade
Cross-cultural perspectives of adult development and aging in traditional and industrial society. Comparative assessment of culturally mediated, life-cycle transformations into old age and health related and human service policy issues. Not open to students who have taken ANT 4464.
Prerequisite: two of following: ANT 2410, SYG 2000, or introductory psychology course.

ANG 5485 Research Design in Anthropology 3 Credits
Grading Scheme: Letter Grade

ANG 5488 Geospatial Analysis in Cultural Anthropology 3 Credits
Grading Scheme: Letter Grade
Geospatial analysis and their integration and application in anthropology including remote sensing, geographic information systems, and global positioning systems. Covering concepts necessary to work with geospatial data including research set-up and design and the use of specialized software, such as ArcGIS, Erdas Imagine, and Multispec.

ANG 5494 Text Analysis 3 Credits
Grading Scheme: Letter Grade
Methods for the systematic analysis of textual data including written texts, photos, audio, and video data. Explores inductive and deductive approaches to theme identification, code definition, construction of codebooks, and teamwork in text analysis. Also examines schema analysis, grounded theory, content analysis and dictionaries, word-based analysis, and semantic network analysis.

ANG 5525 Human Osteology and Osteometry 3 Credits
Grading Scheme: Letter Grade
Human skeletal identification for the physical anthropologist and archeologist. Techniques for estimating age at death, race, and sex from human skeletal remains. Measurement of human skeleton for comparative purposes. Not open to students who have taken ANT 4525.
Prerequisite: ANT 3514 and consent of instructor.

ANG 5531 Culture and Nutrition 3 Credits
Grading Scheme: Letter Grade
Theory, methodology, and substantive material of nutritional anthropology. Emphasizes cross-cultural bio-behavioral patterns.

ANG 5536 Bioarchaeology 3 Credits
Grading Scheme: Letter Grade
Provides a review of bioarchaeology in considerable detail. Focus will be the analysis of human remains in archaeological context. Starting with the history of biological anthropology within current lines of inquiry in anthropology and archaeology. Also explores the development of method and theory in bioarchaeology.

ANG 5595 Proseminar in Biological and Archaeological Anthropology 3 Credits
Grading Scheme: Letter Grade
Designed to introduce first-year Anthropology graduate students to the fields of Biological Anthropology and Archaeological Anthropology. This course covers the history, core components, and contemporary issues in the two sub fields.

ANG 5620 Language and Culture 3 Credits
Grading Scheme: Letter Grade
Principles and problems of anthropological linguistics. The cross-cultural and comparative study of language. Primarily concerned with the study of non-Indo-European linguistic problems.

ANG 5621 Proseminar in Cultural and Linguistic Anthropology 3 Credits
Grading Scheme: Letter Grade
History and theory of subfields of cultural and linguistic anthropology and their conceptual relationship to each other. Emphasis on current issues and their historical foundations.

ANG 5702 Anthropology and Development 3 Credits
Grading Scheme: Letter Grade
Examines key concepts and theories in 'development anthropology' and 'anthropology of development. Focus on intended and prescribed development initiatives undertaken by governments, national, transnational actors and NGOs, and on more subtle developments occurring independent of specific intentions. Key-words: globalization, neoliberalism, global policies, health, education, gender, human rights, religion, participation, empowerment.

ANG 5802 Methods for the Observation of Behavior 3 Credits
Grading Scheme: Letter Grade
Instruction on the use of behavior observation methods of data collection to answer questions of anthropological interest. Methods include traditional ethnographic direct observations, time diary techniques, and Internet mediated recordings and storage. Students learn the variable utility of different methods for specific research question
Prerequisite: Graduate status or permission of instructor
ANG 5824L Field Sessions in Archaeology 6 Credits
Grading Scheme: Letter Grade
Excavating archeological sites, recording data, laboratory handling and analysis of specimens, and studying theoretical principles that underlie field methods and artifact analysis. Not open to students who have taken ANT 4124 or equivalent.
Prerequisite: 6 hours of anthropology, or consent of instructor.

ANG 6034 Seminar in Anthropological History and Theory 3 Credits
Grading Scheme: Letter Grade
Theoretical principles and background of anthropology and its subfields.

ANG 6086 Historical Ecology 3 Credits
Grading Scheme: Letter Grade
Relationship between human social and physical environments over long time spans. Theoretical and methodological relationships of cultural ecology to biology, geographical, and historical issues.

ANG 6091 Research Strategies in Anthropology 3 Credits
Grading Scheme: Letter Grade
Prerequisite: consent of instructor.

ANG 6110 Archaeological Theory 3 Credits
Grading Scheme: Letter Grade
Theoretical approaches in social sciences and philosophies, developed and applied in anthropological archaeology through the 20th century and into the 21st. Relationship of archaeology to anthropology.
Prerequisite: Proseminar in archaeology or consent of instructor; not open to students who have taken ANG 5110.

ANG 6113 Ideology and Symbolic Approaches in Archaeology 3 Credits
Grading Scheme: Letter Grade
Critical examination of the development of thought in archaeology extending beyond a materialist interpretation of culture. Explores causality and the role of mind and culture as mediators between the environment and political, economic, and social structures.

ANG 6120C Environmental Archaeology 3 Credits
Grading Scheme: Letter Grade
Theory and case studies integrating zooarchaeology, archaeobotany, and geoarchaeology to interpret past human interactions with the natural environment.

ANG 6122C Archaeological Ceramics 3 Credits
Grading Scheme: Letter Grade
Technofunctional analysis and interpretation of archaeological ceramics. Emphasizes the life cycle of pottery.

ANG 6128 Lithic Technology 3 Credits
Grading Scheme: Letter Grade
Flintworking techniques and uses of stone implements for two million years. Emphasis on stoneworking technology in prehistoric Florida.

ANG 6146 Archaeology of Maritime Adaptations 3 Credits
Grading Scheme: Letter Grade
Archaeological and ethnographic cross-cultural examination of the nature of coastal adaptations.

ANG 6155 Southeastern U.S. Prehistory 3 Credits
Grading Scheme: Letter Grade
Prehistory of the southeastern United States, emphasizing problem-oriented research of broad anthropological significance.

ANG 6161 Problems in Caribbean Prehistory 3 Credits
Grading Scheme: Letter Grade
Theories and methods for study of prehistoric human societies. Case studies drawn primarily from Caribbean islands.

ANG 6165 Problems in South American Archaeology 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Problems and issues raised by new research on cultural evolution in South America. Topics vary significantly by professor, and students may take one or all of the topics in any sequence.

ANG 6183 Laboratory Training in Archaeology 3 Credits
Grading Scheme: Letter Grade
Processing of data recovered in field excavations; cleaning, identification, cataloging, classification, drawing, analysis, responsibilities of data reporting. Not open to students who have taken ANT 4123 or equivalent.
Prerequisite: an introductory level archeology course.

ANG 6185 Ethnoarchaeology 3 Credits
Grading Scheme: Letter Grade
Case studies examining theoretical and methodological approaches to ethnoarchaeology, with applications to field exercises.

ANG 6186 Seminar in Archaeology 3 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Selected topic.

ANG 6187 Experimental Archaeology 3 Credits
Grading Scheme: Letter Grade
Principles and applications of experimental archaeology. Draws on a broad range of case studies to show the numerous experimental methods archaeologists have used to solve analytic or interpretive problems.

ANG 6190 Seminar in Contemporary Methods 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Collecting and analyzing research data. Focus on one method or set of methods in any semester.

ANG 6191 Archaeology of Death 3 Credits
Grading Scheme: Letter Grade
Archaeological literature on mortuary data. History, cultural anthropology, and ethnography offer insights into the origin of religion, the nature of society, and the structure of ritual.

ANG 6224 Painted Books of Ancient Mexico: Codices of Aztecs, Mixtecs, and Mayas 3 Credits
Grading Scheme: Letter Grade
Colonial period and Precolumbian Codices of Mexico, with emphasis on painted books recording history and calendars of Mixtecs, Aztecs, and Mayas.

ANG 6241 Special Topics in Ecology of Religion 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Cross-cultural examination of development of religious practices and their relationship to the environment.

ANG 6267 Anthropology, Geographic Information System, and Human Ecosystems 3 Credits
Grading Scheme: Letter Grade
Sociocultural processes and interactions in large scale spatial/ecosystems context.
ANG 6273 Legal Anthropology 3 Credits
Grading Scheme: Letter Grade
Examines the relationship between philosophy of law and anthropology. Students will question what law has meant through time and today. This course and examines the legal entanglements of neoliberalism, postcolonial, and the aftermaths of counterinsurgency wars to understand how these movements shape and alter social life.

ANG 6274 Principles of Political Anthropology 3 Credits
Grading Scheme: Letter Grade
Problems of identifying political behavior. Natural leadership in tribal societies. Acephalous societies and republican structures. Kingship and early despotic states. Theories of bureaucracy. Not open to students who have taken ANT 4274.

ANG 6286 Seminar in Contemporary Theory 3 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Areas treated are North America, Central America, South America, Africa, Oceania.

ANG 6304 Seminar in Gender and International Development 3 Credits
Grading Scheme: Letter Grade
Analyses of academic and development concepts and projects in relation to gender. Multi-, bilateral, and NGO agencies considered by sector (health, agriculture, environment, education, political empowerment, etc.). RRA, PRA, GAF methods.
Prerequisite: ANG 5303 recommended.

ANG 6314 Peoples of the Arctic 3 Credits
Grading Scheme: Letter Grade
Survey of the culture, history, and ethnographic background of circumpolar Arctic. Examines problems of acculturation, human ecology, cultural survival, and self-determination of northern indigenous peoples.

ANG 6350 Ethnicity in China 3 Credits
Grading Scheme: Letter Grade
Ethnic diversity and ethnic relations in China. Multi-ethnic history of China; theories on nationality and ethnicity; state and ethnicity; ethnic conflict and political economy; gender and ethnic hierarchy.

ANG 6366 Family, Gender, and Population in China 3 Credits
Grading Scheme: Letter Grade
Examines the processes by which the family system, gender relations, and population interact to become powerful forces in shaping contemporary China's political, social, and economic conditions.

ANG 6391 Ethnographic Writing 3 Credits
Grading Scheme: Letter Grade
An ethnographic writing workshop, focusing on the craft of writing in relation to events, circumstances, and predicaments. The main activity for students will be to write, however, this course also serves as a forum to foster an extended conversation on strategies and techniques for portraying empirical words.

ANG 6407 Sickness and Power 3 Credits
Grading Scheme: Letter Grade
Exploring the problems of culture, power, networks and circulation, and authority as underlying issues of global health. Emphasizing the use of culture histories, illness experiences, and multiscalar processes and structures to interrogate how macro processes, institutions, and forces intersect with the micro-worlds of families, localities, and individual experiences.
Prerequisite: Students must have graduate standing.

ANG 6408 Enviro/Cultre/Disease 3 Credits
Grading Scheme: Letter Grade
Enviro/Cultre/Disease

ANG 6421 Landscape, Place, Dwelling 3 Credits
Grading Scheme: Letter Grade
Contemporary theoretical approaches and applications to the social construction of place and space from the macro-scale of landscape to the micro-scale of dwelling. Emphasis on materiality of experience of inhabiting space.

ANG 6452 Race and Racism in Anthropological Theory 3 Credits
Grading Scheme: Letter Grade
Critical anthropological approaches to race. Historically contingent material and ideological contexts in which various peoples become racialized in culturally diverse ways.

ANG 6453 Human Rights in Cross-Cultural Perspective 3 Credits
Grading Scheme: Letter Grade
Anthropological perspectives on the discourses and practices of international human rights.

ANG 6481 Research Methods in Cognitive Anthropology 3 Credits
Grading Scheme: Letter Grade
Data collection including free lists, pile sorts, triad tests, paired comparisons, rankings, and ratings. Consensus analysis, cluster analysis, and multidimensional scaling.

ANG 6514 Human Origins 3 Credits
Grading Scheme: Letter Grade
Review of fossil record of human evolution from Miocene to present. "Hands-on" seminar in basics of hominin fossil record.

ANG 6524 Skeletal Mechanics in Biological Anthropology 3 Credits
Grading Scheme: Letter Grade
Mechanobiology of the primate skeleton. Material and structural basis for the functional behavior of bone. Analytical approaches to functional, allometric, and evolutionary adaptation.
Prerequisite: ANG 5525, and either ANG 5683 or ANG 6740.

ANG 6532 Molecular Genetics of Disease 3 Credits
Grading Scheme: Letter Grade
Examines the molecular genetics of human disease. Discusses a range of diseases from single-gene recessive defects (such as cystic fibrosis) to complex diseases (such as alcoholism and diabetes). Also discusses detection and treatment.

ANG 6555 Issues in Evolutionary Anthropology 3 Credits
Grading Scheme: Letter Grade
Current controversies in biological anthropology. Role of evolutionary theory in addressing problems of taxonomy, speciation, systematics, selection, development, and adaptation in primate and human evolution.

ANG 6583 Primate Functional Morphology 3 Credits
Grading Scheme: Letter Grade

ANG 6591L Advanced Molecular Anthropology Laboratory 1-3 Credits
Grading Scheme: Letter Grade
Research design, experimentation, discussion, and presentation of findings of individual laboratory-based projects.
Prerequisite: consent of instructor.

ANG 6592 Seminar in Molecular Anthropology 3 Credits
Grading Scheme: Letter Grade
Current applications of molecular data to questions of human evolution and genetics, based on most recent journal articles. Possible topics: emergence of modern Homo sapiens and population movements.
Prerequisite: consent of instructor.
ANG 6593L Biological Anthropology Laboratory 4 Credits
Grading Scheme: Letter Grade
Hands-on experience with latest molecular and stable isotope techniques as applied to questions of anthropologic interest.
Prerequisite: consent of instructor.

ANG 6701 Seminar on Applied Anthropology 3 Credits
Grading Scheme: Letter Grade
Consideration of planned socio-cultural and technological change and development in the United States and abroad; special and cultural problems in the transferral of technologies; community development and aid programs. Comparative program evaluation.
Prerequisite: ANG 6700 or consent of instructor.

ANG 6737 Medical Anthropology 3 Credits
Grading Scheme: Letter Grade
Theory of anthropology as applied to nursing, medicine, hospital organization, and the therapeutic environment. Instrument design and techniques of material collection.
Prerequisite: consent of instructor.

ANG 6740 Advanced Techniques in Forensic Anthropology 3 Credits
Grading Scheme: Letter Grade
Hands on analysis and clinical diagnoses of human skeletal remains. Analysis of human trauma and other demographic techniques.
Prerequisite: human osteology and forensic anthropology introduction.

ANG 6780 Foundations for a Career in Anthropology 3 Credits
Grading Scheme: Letter Grade
Prepares graduate students for a career in Anthropology. Students will learn how to develop, fund, present, and publish independent research. Additional topics relevant to a professional career in anthropology, including non-academic job opportunities and ethics will be discussed.

ANG 6801 Ethnographic Field Methods 3 Credits
Grading Scheme: Letter Grade
Methods of collecting ethnographic data. Entry into the field; role and image conflict. Participant observation, interviewing, content analysis, photography and documents, data retrieval, analysis of data.

ANG 6905 Individual Work 1–3 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Guided readings on research in anthropology based on library, laboratory, or field work.

ANG 6910 Supervised Research 1–5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

ANG 6915 Research Projects in Social, Cultural, and Applied Anthropology 1–3 Credits, Max 10 Credits
Grading Scheme: Letter Grade
For students undertaking directed research in supplement to regular course work.
Prerequisite: consent of instructor.

ANG 6930 Special Topics in Anthropology 1–3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Special Topics in Anthropology
Prerequisite: consent of instructor.

ANG 6940 Supervised Teaching 1–5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

ANG 6945 Internship in Anthropology 1–8 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Required of all students registered in programs of applied anthropology. Students are expected to complete 4–8 hours.
Prerequisite: permission of graduate coordinator.

ANG 6971 Research for Master’s Thesis 1–15 Credits
Grading Scheme: S/U
Research for Master’s Thesis

ANG 7979 Advanced Research 1–12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ANG 7980 Research for Doctoral Dissertation 1–15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

Applied Physiology and Kinesiology

APK 5102 Kinetic Anatomy 3 Credits
Grading Scheme: Letter Grade
Will provide in-depth coverage of musculoskeletal anatomy as a foundation for learning components of simple and complex motor tasks, with an emphasis on proper execution and analysis of joint movement and common exercises.

APK 5127 Assessment in Exercise Science 3 Credits
Grading Scheme: Letter Grade
Techniques and methodologies to assess health and physical fitness.
Prerequisite: PET 3351C or equivalent.

APK 5404 Sport Psychology 3 Credits
Grading Scheme: Letter Grade
Survey of current research, learning processes, motivation, performance intervention, strategies, group dynamics, history of sport psychology, and other topics.
Prerequisite: Consent of instructor.

APK 6110C Physiology of Exercise and Movement 3 Credits
Grading Scheme: Letter Grade
Will provide in-depth coverage of musculoskeletal anatomy as a foundation for learning components of simple and complex motor tasks, with an emphasis on proper execution and analysis of joint movement and common exercises.

APK 6116C Physiological Bases of Exercise and Sport Sciences 3 Credits
Grading Scheme: Letter Grade
Applying fundamental concepts of human physiology to programs of physical education and sports. Recent research developments in sports physiology.

APK 6118 Neuromuscular Adaptation to Exercise 3 Credits
Grading Scheme: Letter Grade
Research developments; and describing neural and muscular function and adaptation to acute and chronic exercise.
Prerequisite: APK 6110C.

APK 6126 Cardiopulmonary Pathologies 3 Credits
Grading Scheme: Letter Grade
Lecture and laboratory study of anatomy, physiology, and pathophysiology of cardiac and pulmonary systems. Attention to cardiopulmonary function in diseased and stressed states. Emphasizes dysfunction, clinical assessment, and rehabilitation of cardiopulmonary patients.
Prerequisite: PET 3350C, 3351C or equivalent.
APK 6128 EKG Interpretation 3 Credits
Grading Scheme: Letter Grade
Basic and intermediate electrocardiography including cardiac function, lead systems, rate, axis, infarction, ischemia, hypertrophy, and effects of cardiovascular drugs and exercise on EKG. Particular attention to EKGs of diseased populations during exercise.
Prerequisite: PET 2350C and 3351C.

APK 6145 Movement Disorders 3 Credits
Grading Scheme: Letter Grade
Covers the sensory and motor systems of the nervous system responsible for regulating movement in movement disorders. We cover movement disorders including Parkinson's disease, tics, Huntington's disease, dystonia, tremor, spinal cord injury, spasticity, cerebellar disorders, and speech and language disorders.

APK 6167 Nutrition Aspects of Human Performance 3 Credits
Grading Scheme: Letter Grade
Offers an overview of the roles nutrient selection, metabolism, and timing play in supporting and improving physical performance. Evidence-based strategies and recommendations are applied to industry specific examples. Course concepts aid in preparation for certification exams within the exercise sciences that include nutrition as a component.
Prerequisite: HUN 2201 or APK 3163 or equivalent or instructor permission

APK 6170 Advanced Exercise Physiology 3 Credits
Grading Scheme: Letter Grade
Covers advanced concepts in integrative physiology and exercise focusing on metabolism and endocrine exercise physiology, skeletal muscle contraction and fatigue, cardiovascular and hemodynamics regulations, and respiratory exercise physiology. The course emphasizes acute responses to exercise and environmental challenges in both health and disease.
Prerequisite: APK4112 or APK6116C or equivalent or instructor approval

APK 6176 Strength and Conditioning 3 Credits
Grading Scheme: Letter Grade
Addresses the principles of designing training programs of varying duration aimed at improving muscular strength, power, speed, agility, endurance, balance, stability, and hypertrophy. Application to typical athletic populations, tactical athletic populations, and special athletic populations will be emphasized.

APK 6205C Nature and Bases of Motor Performance 3 Credits
Grading Scheme: Letter Grade
Principles of motor skill development, and conditions affecting motor skill development and retention in physical education activities.

APK 6206 Planning Motor Actions 3 Credits
Grading Scheme: Letter Grade
Processes and mechanisms involved in planning voluntary human motor actions. Variables that influence movement planning and initiation.
Prerequisite: consent of instructor.

APK 6225 Biomechanical Instrumentation 3 Credits
Grading Scheme: Letter Grade
Overview of data collection and analysis tools. Hands-on experience conducting projects using EMG, videography, and force transducer technology.
Prerequisite: APK 6220C.

APK 6226C Biomechanics of Human Motion 3 Credits
Grading Scheme: Letter Grade
Applying the principles of statics, kinematics, and kinetics to kinesiological systems of the human body in movement and sports skills.
Prerequisite: PET 2320C, MGF 1202 or MAC 1142.

APK 6406 Exercise Psychology 3 Credits
Grading Scheme: Letter Grade
Overview, examining research evidence on psychological factors associated with adapting and maintaining an exercise program.

APK 6408 Performance Enhancement 3 Credits
Grading Scheme: Letter Grade
Mental and psychological techniques and strategies to improve performance and achievement in sport and exercise.
Prerequisite: APK 5400.

APK 6900 Directed Independent Study 1-5 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Individual research projects under faculty guidance.

APK 6940 Advanced Practicum in Exercise and Sport Science 1-5 Credits, Max 5 Credits
Grading Scheme: Letter Grade
On-site practical experience in exercise and sport science.

APK 7107 Cardiovascular Exercise Physiology 3 Credits
Grading Scheme: Letter Grade
Basic mechanisms of cardiovascular dynamics at rest and in response to exercise.
Prerequisite: APK 6110C/6356L or equivalent.

APK 7108 Environmental Stress Exercise Physiology 3 Credits
Grading Scheme: Letter Grade
Energetics of environmental stress on cardiovascular, respiratory, metabolic, and muscle physiology as they pertain to physical performance.
Prerequisite: APK 6110C/6356L or equivalent.

APK 7117 Exercise Metabolism 3 Credits
Grading Scheme: Letter Grade
Principles of metabolic regulation during exercise; effects of chronic exercise on muscle metabolism.
Prerequisite: APK 6110C or equivalent.

ATR 6124 Clinical Anatomy for the Exercise Sciences 3 Credits
Grading Scheme: Letter Grade
Cadaver dissection and lectures. Appreciation of clinical applications of anatomical knowledge for those pursuing careers in exercise science fields.
Prerequisite: PET 2320C, 2350C, 3351C.

ATR 6145 Human Pathophysiology for the Exercise Sciences 3 Credits
Grading Scheme: Letter Grade
Macrotraumatic and microtraumatic inflammatory processes, factors affecting inflammation and healing, and the role of exercise in controlling the onset or course of an inflammatory response.
Prerequisite: PET 2320C, 2350C, 3351C.

ATR 6215 Evidence-Based Orthopedic Exam I: Upper-Extremity 3 Credits
Grading Scheme: Letter Grade
Identifying, evaluating, and managing acute athletic injuries.
Prerequisite: for students who are BOC-certified athletic trainers.
ATR 6216 Evidence-Based Orthopedic Exam II: Lower-Extremity 3 Credits
Grading Scheme: Letter Grade
Orthopedic and biomechanical assessment of lower-extremity function and dysfunction. Students develop skills and study the principles and procedures used in advanced evaluation techniques. Students examine components of lower-extremity function from biomechanical, neuromuscular and anatomical perspectives. Topics include advanced orthopedic special tests, 3-dimensional kinematics, interpreting contemporary diagnostic tests and treatment of lower-extremity pathology/dysfunction and critical reviews of related research.
Prerequisite: ATR 6215

ATR 6304 Rehabilitation and Modalities of Athletic Injuries 3 Credits
Grading Scheme: Letter Grade
Rehabilitation and therapeutic modalities in the field of athletic training.

ATR 6624 Athletic Training Research and Technology I 3 Credits
Grading Scheme: Letter Grade
Current theory and practical application of techniques (cardiovascular testing, isokinetic strength testing, and EMG testing) for understanding and designing research projects related to athletic training and sports medicine.

ATR 6625 Athletic Training Research and Technology II 3 Credits
Grading Scheme: Letter Grade
Current theory and practical application of techniques (modalities in research, proprioception testing, and force plate and balance testing) for understanding and designing research projects related to athletic training and sports medicine.
Prerequisite: NATA certified or eligible, or related degree or certification.

ATR 6934 Seminar in Athletic Training 3 Credits, Max 5 Credits
Grading Scheme: Letter Grade
Research topics or contemporary issues in athletic training.
Prerequisite: NATA certification.

ATR 7108C Clinical Management in Athletic Training 3 Credits
Grading Scheme: Letter Grade
Designed to enhance the independent clinical practice of new athletic training practitioners. Content focuses on creating effective, comprehensive policy and procedures (e.g., emergency management, pre-participation evaluation and clearance) for appropriate clinical management of traumatic and environmental conditions. Appropriate documentation, practice standards and communication skills discussed and practiced.
Prerequisite: Admission into the Doctor of Athletic Training Program

ATR 7128C Advanced Cadaveric Dissection 3 Credits
Grading Scheme: Letter Grade
Advanced clinical anatomy course, employing human cadaver dissection as a means to learn the major musculoskeletal, vascular, and nervous structures relevant to the field and practice of Athletic Training. Students will be responsible for dissecting the human cadaver and discussing applications of gross anatomy knowledge.
Prerequisite: Admission into the Doctor of Athletic Training Program

ATR 7209C Movement Screening and Assessment 3 Credits
Grading Scheme: Letter Grade
Athletic Trainers will advance foundational knowledge to effectively implement and interpret screening tools for injury prevention, management and comprehensive therapeutic intervention programming.
Prerequisite: Admission into the Doctor of Athletic Training Program

ATR 7210C Evidence Based Musculoskeletal Examination I 3 Credits
Grading Scheme: Letter Grade
Evidence Based Musculoskeletal Examination I
Prerequisite: ATR 7108C Clinical Management in Athletic Training

ATR 7211C Evidence Based Musculoskeletal Examination II 3 Credits
Grading Scheme: Letter Grade
Evidence Based Musculoskeletal Examination II
Prerequisite: ATR 7210C Evidence Based Musculoskeletal Examination I

ATR 7229C Diagnostic Imaging for Athletic Trainers 3 Credits
Grading Scheme: Letter Grade
Provides Athletic Trainers background information on the physics, physiology, appropriate use and appraisal of diagnostic imaging techniques used in sports medicine including: radiography, magnetic resonance imaging, ultrasonography and nuclear medicine. Athletic Trainers develop skills interpreting diagnostic imaging and analyze the principles and procedures used in each technique.
Prerequisite: Admission into the Doctor of Athletic Training Program

ATR 7300C Evidence Based Therapeutic Intervention 3 Credits
Grading Scheme: Letter Grade
Evidence Based Therapeutic Intervention
Prerequisite: Admission into the Doctor of Athletic Training Program

ATR 7318C Sport Performance and Intervention 3 Credits
Grading Scheme: Letter Grade
Furthers the Athletic Trainers' therapeutic and functional performance knowledge and advances clinical skills in the design and implementation of exercise and nutrition programs for the prevention, management and enhancement of activity/performance.
Prerequisite: ATR 7300C.

ATR 7438C Clinical Techniques and Pharmacology for Athletic Trainers I 3 Credits
Grading Scheme: Letter Grade
Clinical Techniques and Pharmacology for Athletic Trainers I
Prerequisite: Admission into the Doctor of Athletic Training Program

ATR 7439C Clinical Techniques and Pharmacology for Athletic Trainers II 3 Credits
Grading Scheme: Letter Grade
Provides the Athletic Trainer with advanced clinical diagnostic skills to assess patients using medical evaluation procedures and employ appropriate and culturally sensitive therapeutic intervention or referral strategies for injury, illness and emergent conditions.
Prerequisite: ATR 7438C Clinical Techniques and Pharmacology for Athletic Trainers I

ATR 7509 Leadership and Mentoring in AT Clinical Practice 3 Credits
Grading Scheme: Letter Grade
Leadership and Mentoring in AT Clinical Practice
Prerequisite: Admission into the Doctor of Athletic Training Program

ATR 7519 Administration in Athletic Training 3 Credits
Grading Scheme: Letter Grade
Offers Athletic Trainers an in-depth examination of the standards, policies and practices of a healthcare organization; allowing for safe, effective and quality patient care. Discussions will include current topics related to professional development, credentialing and legislative issues.
Prerequisite: Admission into the Doctor of Athletic Training Program

ATR 7628 Clinical Research in Athletic Training I 3 Credits
Grading Scheme: Letter Grade
Clinical Research in Athletic Training I
Prerequisite: Admission into the Doctor of Athletic Training Program
ATR 7629 Clinical Research in Athletic Training II 3 Credits
Grading Scheme: Letter Grade
Clinical Research in Athletic Training II
Prerequisite: ATR 7628 Clinical Research in Athletic Training I

ATR 7828C Advanced Clinical Experience II 3 Credits
Grading Scheme: Letter Grade
Advanced Clinical Experience II
Prerequisite: ATR 7828c Advanced Clinical Experience I

ATR 7838C Advanced Clinical Experience III 3 Credits
Grading Scheme: Letter Grade
Advanced Clinical Experience III
Prerequisite: ATR 7828c Advanced Clinical Experience II

ATR 7848C Advanced Clinical Experience IV 3 Credits
Grading Scheme: Letter Grade
Advanced Clinical Experience IV
Prerequisite: ATR 7838c Advanced Clinical Experience III

HLP 6515 Evaluation Procedures in Health and Human Performance 3 Credits
Grading Scheme: Letter Grade
Evaluation and interpretation of tests and analysis of research data.

HLP 6535 Research Methods in Health and Human Performance 3 Credits
Grading Scheme: Letter Grade
Introduction to research methodology and design.

HLP 6911 Research Seminar 1 Credit
Grading Scheme: S/U
Research presentations by graduate students and faculty in the College.

HLP 6935 Variable International Topics 1-6 Credits, Max 15 Credits
Grading Scheme: Letter Grade
Opportunity to study in a wide range of cultural settings.
Prerequisite: adviser's approval.

HLP 7939 HHP PhD Professional Development Seminar 3 Credits
Grading Scheme: Letter Grade
Designed to complement the scholarly emphases of the HHP PhD program by providing insight into key considerations for professional development and personal growth. Best practices will be shared for developing professional aptitude and the skills necessary for successful matriculation through graduate studies and future professional careers.

HLP 7979 Advanced Research in Health and Human Performance 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field, or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

HLP 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

PET 5936 Special Topics/Seminars 1-3 Credits
Grading Scheme: Letter Grade
Special Topics/Seminars

PET 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

PET 6947 Graduate Internship in Exercise and Sport Sciences 3-9 Credits, Max 9 Credits
Grading Scheme: S/U
On-site full-time practical experience in field of study.
Prerequisite: completion of 2 terms of course work applicable to specialization; permission of adviser, written application, and site approval.

PET 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master’s Thesis

SPM 5206 Sport Ethics 3 Credits
Grading Scheme: Letter Grade
Self-evaluating, examining, and developing philosophy on ethical issues related to sport. Research and discuss major moral and ethical issues related to sport. Opportunities for ethical decision making, using critical analysis.
Prerequisite: 7 or 8 HH/SPM or consent of instructor.

SPM 5309 Sport Marketing 3 Credits
Grading Scheme: Letter Grade
Marketing information systems, pricing strategies, media relations, promotional methods, and endorsements as they relate to marketing theories. Practical applications and principles.

SPM 5506 Sport Finance 3 Credits
Grading Scheme: Letter Grade
Financial theories and practical applications of sport income and expenditures. Principles and procedures of marketing sports in today's society.

SPM 6036 Research Seminar in Sport Management 3 Credits
Grading Scheme: Letter Grade
Theoretical and practical research information in sport and exercise program management.

SPM 6106 Management and Planning of Sport and Physical Activity Facilities 3 Credits
Grading Scheme: Letter Grade
Administrative tasks involved in managing, planning, renovating, and maintaining facilities. Effect on program selection and scheduling in sport and fitness.

SPM 6158 Management and Leadership in Sport 3 Credits
Grading Scheme: Letter Grade
Principles of leadership and management for sport settings.
Prerequisite: 7 or 8 HH/SPM or consent of instructor.

SPM 6726 Issues in Sport Law 3 Credits
Grading Scheme: Letter Grade
Legal effects of regulating and managing amateur and professional sports and wellness programs: injury liability, risk management, constitutional rights of athletes, and contract negotiation.
Prerequisite: 7 or 8 HH/SPM or consent of instructor.
Art and Art History

ARE 6049 History of Teaching Art 3 Credits
Grading Scheme: Letter Grade
History of the theory and practice of teaching art.

ARE 6148 Curriculum in Teaching Art 3 Credits
Grading Scheme: Letter Grade
Contemporary theories for developing art teaching curricula.

ARE 6246C Principles of Teaching Art 3 Credits
Grading Scheme: Letter Grade
Social and theoretical foundations of contemporary art education practice.

ARE 6247C Teaching Art: The Study of Practice 3 Credits
Grading Scheme: Letter Grade
Art teaching practices in the public schools. Emphasizes art curriculum planning, motivational strategies, art room management and alternative assessment in art.

ARE 6386 Teaching Art in Higher Education 3 Credits
Grading Scheme: Letter Grade
Study of teaching art at the post secondary level.
Prerequisite: graduate standing in art history, or consent of instructor.

ARE 6641 Issues in Art Education 3 Credits
Grading Scheme: Letter Grade
Exploration of contemporary issues in art, general education, and society that affect teaching of art in public schools.

ARE 6746 Methods of Research in Art Education 3 Credits
Grading Scheme: Letter Grade
Study of qualitative and quantitative research methods. Review of research literature.

ARE 6905 Individual Study 1-5 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Individual Study

ARE 6910 Capstone Project 3 Credits, Max 9 Credits
Grading Scheme: S/U
Repeatable for credit. Completion of an original research project that addresses an identified issue or need with the field of art education.
Prerequisite: Advanced standing in the graduate program, ARE 6705, and consent of Instructor.

ARE 6933 Special Topics in Art Education 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Special Topics in Art Education

ARE 6944 Internship in Teaching Art 3 Credits
Grading Scheme: S/U
Develops pedagogical knowledge and skills in a school classroom, under the guidance of a K-12 art teacher.
Prerequisite: Student must be accepted into the MA Program in Art Education w/ EPI, have passed his/her first-year review, and have completed ARE 6246C and ARE 6247C.

ARE 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

ARE 6973 Individual Project 1-10 Credits, Max 10 Credits
Grading Scheme: S/U
Project in lieu of thesis.

ARH 5420 Art in the Age of Revolution 3 Credits
Grading Scheme: Letter Grade
Late-18th and early-19th century European art, including Neo-Classicism and Romanticism. Works are considered in the cultural, political, social, and aesthetic contexts in which they were created. Emphasizes the politics of style during the period of revolution and reaction.
Prerequisite: Graduate standing in the Art History program, or consent of instructor.

ARH 5527 Arts of Central Africa 3 Credits
Grading Scheme: Letter Grade
Traditional arts of the equatorial forests, the savannahs to the south of them, and portions of eastern and southern Africa.
Prerequisite: graduate standing in art history or consent of instructor.

ARH 5528 Art of West Africa 3 Credits
Grading Scheme: Letter Grade
Traditional arts of western Sudan and the Guinea coast.
Prerequisite: graduate standing in art history or consent of instructor.

ARH 5529 Clothing and Textiles in Africa 3 Credits
Grading Scheme: Letter Grade
This class will be focusing on techniques, styles, and uses of textiles and elements of African dress. Course exploration reveals information about culture and history, particularly regarding movements of textiles and technologies between regions and preservation of styles of traditional dress. Readings will vary from technical analyses to artists' biographies.
Prerequisite: Graduate Student standing

ARH 5655 Indigenous American Art 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Native arts of the Americas (North, Central, or South) from pre-European times.
Prerequisite: ARH 2518 or consent of instructor.

ARH 5667 Colonial Andean Art 3 Credits
Grading Scheme: Letter Grade
Examination of the colonial art of Peru, Ecuador, Bolivia, and other territories within the Spanish Viceroyalty of Peru.
Prerequisite: graduate standing in Art and Art History or Latin American Studies, or consent of instructor.

ARH 5816 Methods of Research and Bibliography 3 Credits
Grading Scheme: Letter Grade
Methods of Research and Bibliography

ARH 5877 Gender, Representation, and the Visual Arts: 1600-1900 3 Credits
Grading Scheme: Letter Grade

ARH 5905 Individual Study 1-6 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Individual Study

ARH 6141 Greek Art Seminar 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Topics in Greek art history.
Prerequisite: graduate standing in art history or consent of instructor.

ARH 6292 Medieval Art Seminar 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Topics in medieval art.
Prerequisite: graduate standing in art history or consent of instructor.
ARH 6394 Renaissance Art Seminar 3 Credits, Max 12 Credits  
**Grading Scheme:** Letter Grade  
Special topics in the art and visual culture of the 14th through 16th centuries.  
**Prerequisite:** graduate standing in art history or consent of instructor.

ARH 6422 Beginnings of Modernism. Realism to Post-Impressionism 1848-1890 3 Credits  
**Grading Scheme:** Letter Grade  
This topic of this course is the history of European painting (French, actually) during the second half of the nineteenth century, considered within the social and political context provided by the Second Republic, Second Empire, the Commune and Third Republic. Major themes to be traced in lectures and readings will include: formation of the avant garde, the shifting social organization of industrial society, and changing structures of artistic personality, practice and consumption. The city of Paris will be our focus, as nearly all the artists we shall study -whether French, Dutch, or Scandinavian spent significant time there.

ARH 6477 Eighteenth-Century European Art Seminar 3 Credits  
**Grading Scheme:** Letter Grade  
Intersecting ideologies of gender and representation in French art.  
**Prerequisite:** graduate standing in the Art History program, or consent of instructor.

ARH 6481 Contemporary Art Seminar 3 Credits, Max 12 Credits  
**Grading Scheme:** Letter Grade  
Topics in contemporary art.  
**Prerequisite:** graduate standing in art history or consent of instructor.

ARH 6496 Modern Art Seminar 3 Credits, Max 12 Credits  
**Grading Scheme:** Letter Grade  
Topics in modern art.  
**Prerequisite:** graduate standing in art history or consent of instructor.

ARH 6596 Chinese Art Seminar 3 Credits  
**Grading Scheme:** Letter Grade  
Research seminar focusing on a topic or topics in the study of Chinese art.  
**Prerequisite:** graduate standing in art history or consent of instructor.

ARH 6597 African Art Seminar 3 Credits, Max 12 Credits  
**Grading Scheme:** Letter Grade  
Research seminar focusing on a topic or topics in the study of African art.  
**Prerequisite:** graduate standing in art history or consent of instructor.

ARH 6654 Pre-Columbian Art Seminar 3 Credits  
**Grading Scheme:** Letter Grade  
Rotating topics include topics pertaining to the study of Pre-Columbian art.  
**Prerequisite:** consent of instructor.

ARH 6666 Colonial Latin American Art Seminar 3 Credits  
**Grading Scheme:** Letter Grade  
Rotating topics include issues pertaining to the study of colonial Latin American art.  
**Prerequisite:** consent of instructor.

ARH 6696 American Art Seminar 3 Credits, Max 12 Credits  
**Grading Scheme:** Letter Grade  
Topics in American art.  
**Prerequisite:** graduate standing in art history or consent of instructor.

ARH 6797 Museum Education 3 Credits, Max 9 Credits  
**Grading Scheme:** Letter Grade  
Issues and content related to education in museums and other nontraditional education settings.
ARH 6938 Seminar in Museum Studies 3 Credits
Grading Scheme: Letter Grade
History, purposes, and functions of museums in general, and art museums in particular.
Prerequisite: consent of instructor.

ARH 6941 Supervised Internship 1-6 Credits, Max 9 Credits
Grading Scheme: S/U
Training in an approved regional or national museum, arts organization, institution, or facility. On-site supervision, with periodic reports filed with the instructor of record.

ARH 6946 Museum Practicum 1-6 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Work under museum professionals. Readings and periodic discussions with the coordinating professor.
Prerequisite: consent of graduate program adviser and prior arrangements with professors.

ARH 6948 Gallery Practicum 1-6 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Work under the supervision of gallery professionals. Readings and periodic discussions with the coordinating professor.
Prerequisite: Consent of graduate program adviser and prior arrangements with coordinating professor.

ARH 6971 Research for Master’s Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master’s Thesis

ARH 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ARH 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

ART 5674C Digital Fabrication 3 Credits
Grading Scheme: Letter Grade
Interdisciplinary studio combines in-depth analysis of the role of the physical object in diverse conceptual art practices with project-based experimentation using rapid prototyping and manufacturing technologies.
Prerequisite: consent of instructor. Familiarity with 2-D and 3-D software recommended.

ART 5905C Directed Study 1-5 Credits
Grading Scheme: Letter Grade
Directed Study

ART 5930C Special Topics 3 Credits
Grading Scheme: Letter Grade
Rotating topics in studio art and studio practice.

ART 6410C Printmaking Seminar: Mastering Process and Content 3 Credits
Grading Scheme: Letter Grade
Complex ideation, approaches, and material handling to orchestrate a unified series of images that equally support concept and methods.
Prerequisite: graduate standing in studio art or consent of instructor

ART 6411C Printmaking Seminar: Transformation and Change 3 Credits
Grading Scheme: Letter Grade
Explorations of methodologies toward conceptual and perceptual image transformations.
Prerequisite: graduate standing in studio art or consent of instructor

ART 6412C Printmaking Seminar: Ideation, Studies, and Completed Works 3 Credits
Grading Scheme: Letter Grade
In-depth investigation of process, form, and content to strengthen previous visual philosophies.
Prerequisite: graduate standing in studio art or consent of instructor

ART 6413C Printmaking Seminar: Interdisciplinary Studio 3 Credits
Grading Scheme: Letter Grade
Explores diverse media and idea development as a way to develop innovative visual philosophies.
Prerequisite: Graduate standing in studio art or consent of instructor.

ART 6671C Advanced Experiments in Digital Art 3 Credits
Grading Scheme: Letter Grade
Rotating topics include electronic art forms, with an emphasis on creative and expressive use of emergent digital media, trends in digital media art.
Prerequisite: graduate student in Art and Art History or consent of instructor.

ART 6672 Hypermedia 3 Credits
Grading Scheme: Letter Grade
Practical and theoretical issues related to the Internet as a medium for making art rather than as tool for delivering information. Emphasizes creation of dynamic and interactive experiences that utilize the Internet including video, graphics, animation, sound, image and typography.
Prerequisite: graduate level in School of Art and Art History or consent of instructor.

ART 6673C Video Art 3 Credits
Grading Scheme: Letter Grade
Studio intensive course explores digital video through lectures, demonstrations, screenings and reading with a specific overview of concepts and techniques integral to video. Emphasizes conceptual and experimental forms, rather than on conventional narrative.
Prerequisite: graduate level in School of Art and Art History or consent of instructor.

ART 6675C Digital Art and Animation 3 Credits
Grading Scheme: Letter Grade
Rotating topics explore principles and concepts of animation using traditional methods, digital imaging, and contemporary 2D and 3D software applications. Lectures, demonstrations, screenings and readings provide students with the opportunity to integrate concept, form and technology to explore the possibilities of animation.
Prerequisite: graduate level in SAAH or consent of instructor.

ART 6691 Digital Art Studio 4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Investigation of digital art practices in one or more of the following areas: bit-mapped and object-oriented graphics, 3-D modeling, computer animation, hypermedia and interactivity, and image-processing.
Prerequisite: graduate standing in art, or consent of instructor.
ART 6794C Vessel Aesthetic 1 3 Credits  
**Grading Scheme:** Letter Grade  
Further study of high-fire reduction methods, in throwing and handbuilding practice, and in the formal use of the vessel as an artistic means of expression. This course is for graduate students with basic background in handbuilding and throwing.  
**Prerequisite:** None.

ART 6795C Vessel Aesthetic 2 3 Credits  
**Grading Scheme:** Letter Grade  
Learning how to do intermediate study of in the development and use of ceramic color, forming techniques, and use of the vessel surface as an artistic means of expression. This course is for graduate students with basic background in handbuilding and throwing.  
**Prerequisite:** None.

ART 6797C Ceramic Sculpture 2 3 Credits  
**Grading Scheme:** Letter Grade  
Learning sculpture forming techniques, plaster mold-making, as well as glaze testing to develop color and surface for sculpture. As a graduate class, this course is intended for graduate elective students with a background in hand building who are seeking to do further study sculpting methods and mold making (an original three dimensional duplication technique).  
**Prerequisite:** Prior experience in hand building processes for Ceramics.

ART 6835C Research in Methods and Materials of the Artist 3-4 Credits  
**Grading Scheme:** Letter Grade  
Research in Methods and Materials of the Artist

ART 6849C Reactive Environments 3 Credits  
**Grading Scheme:** Letter Grade  
Explores site specificity and intervention in three-dimensional space through installation, using digital media, producing artworks expanding current body of work, intersecting with course theme.  
**Prerequisite:** graduate level in School of Art and Art History or consent of instructor.

ART 6897C Professional Practices for the Visual Artist 3 Credits  
**Grading Scheme:** Letter Grade  
Professional Practices for the Visual Artist

ART 6910C Supervised Research 1-5 Credits  
**Grading Scheme:** S/U  
Supervised Research

ART 6925C Art + Technology Workshop 3 Credits  
**Grading Scheme:** Letter Grade  
Examines the conceptual ramifications of new technologies, allowing the artist to experiment with new forms, in the context of a projects-based course, producing artworks, expanding their current body of work, as it intersects with the course theme.

ART 6926C Advanced Study I 2-4 Credits  
**Grading Scheme:** Letter Grade  
Applying the basic principles of studio art in one of the following areas: ceramics, creative photography, drawing, painting, printmaking, sculpture, graphic design, or multi-media.  
**Prerequisite:** major in art; consent of instructor and graduate program adviser.

ART 6927C Advanced Study II 2-4 Credits  
**Grading Scheme:** Letter Grade  
Investigating selected problems in one of the following areas: ceramics, creative photography, drawing, painting, printmaking, sculpture, graphic design, and multi-media.  
**Prerequisite:** major in art; consent of instructor and graduate program adviser.

ART 6928C Advanced Study III 2-4 Credits  
**Grading Scheme:** Letter Grade  
Experimentation in nontraditional approaches to studio art in one of the following areas: ceramics, creative photography, drawing, painting, printmaking, sculpture, graphic design, and multi-media.  
**Prerequisite:** major in art; consent of instructor and graduate program adviser.

ART 6929C Advanced Study IV 2-4 Credits  
**Grading Scheme:** Letter Grade  
Stylistic and technical analysis of contemporary studio practices in one of the following areas: ceramics, creative photography, drawing, painting, printmaking, sculpture, graphic design, and multi-media.  
**Prerequisite:** major in art; consent of instructor and graduate program adviser.

ART 6933 Area Methods: Rotating Topics 1-4 Credits, Max 27 Credits  
**Grading Scheme:** Letter Grade  
Readings, discussions, and/or studio exploration of various art issues.  
**Prerequisite:** Consent of instructor and graduate program adviser.

ART 6971 Research for Master's Thesis 1-15 Credits  
**Grading Scheme:** S/U  
Research for Master's Thesis

ART 6973C Individual Project 1-10 Credits  
**Grading Scheme:** S/U  
Creative project in lieu of written thesis.

DIG 5930 Special Topics 3 Credits  
**Grading Scheme:** Letter Grade  
Special Topics

DIG 6746C Graduate Seminar in Sensors and Electronics 3 Credits  
**Grading Scheme:** Letter Grade  
Explores how devices respond to and interact with human physical action. Students create artwork, exploring physical interfaces beyond mouse/keyboard/screen interactions through the use of microcontrollers and sensors.  
**Prerequisite:** digital media art students only, DIG 3130 (or equivalent programming experience) or consent of instructor.

GRA 6930 Seminar: Rotating Topics 3 Credits, Max 12 Credits  
**Grading Scheme:** Letter Grade  
Contemporary issues pertaining to design visual communications and related areas. Discussion of literature, development of research questions, and framing methodologies.  
**Prerequisite:** Design and Visual Communication major student or permission of instructor.  
**Corequisite:** DVC 6XXX Research & Practice.
A rotating topics course focused on the integration of research and practice to address complex problems within diverse contexts. The study and use of qualitative, quantitative, and mixed research methods appropriate for an expanded practice are addressed through discussions, case studies, writing, fieldwork, and presentations.

Prerequisite: Design and Visual Communication major student or permission of instructor.
Corequisite: DVC 6XXX Seminar.

GRA 6944 Practicum 1-6 Credits, Max 6 Credits
Grading Scheme: S/U
An opportunity to conduct research and practice in partnership with an approved organization. Students will work on projects for social, cultural, and economic development in partnership with the organization, community, and/or other disciplinary experts.
Prerequisite: Design and Visual Communication major student and permission of faculty supervisor.

GRA 6973 Project in Lieu of Thesis 1-9 Credits, Max 15 Credits
Grading Scheme: S/U
Supervised research in an area of relevance to design and visual communications that combines design exploration and academic inquiry. Includes presentation of results in a public forum, and documentation of research and findings.

IDC 6505C Programming for Artists 3 Credits
Grading Scheme: Letter Grade
Fundamental programming concepts that enable the digital artist to take full advantage of the range of computer-mediated interactivity.
Prerequisite: graduate level in School of Art and Art History or consent of instructor.

AstroNomy and astroPhysics

AST 6112 Solar System Astrophysics 3 Credits
Grading Scheme: Letter Grade
Systematic examination of the formation and current state of the solar system.

AST 6215 Stars and the Galaxy 3 Credits
Grading Scheme: Letter Grade
Stars as constituents of galaxies, with discussion of both the theoretical and observational aspects of the topic.

AST 6245 Stellar Atmospheres and Radiative Processes 3 Credits
Grading Scheme: Letter Grade
Radiative transfer, spectral line formation and broadening, and other topics applicable to stellar atmospheres and photoionized nebulae.

AST 6309 Galaxies and Cosmology 3 Credits
Grading Scheme: Letter Grade
Observations and interpretations of the kinematics, dynamics, and structure of the Milky Way Galaxy, extragalactic objects, and galaxy clusters.

AST 6336 Astrophysics of the Interstellar Medium 3 Credits
Grading Scheme: Letter Grade
Complex interplay of physical processes that determine the structure of the interstellar medium in our galaxy; compares observational data with theoretical prediction.

AST 6725C Fundamentals of Observational Astronomy 3 Credits
Grading Scheme: Letter Grade
Overview of techniques associated with observational astronomy.

AST 6905 Individual Work 1-6 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Supervised study or research in areas not covered by other courses.

AST 6925 Departmental Colloquium 1 Credit, Max 10 Credits
Grading Scheme: S/U
Repeatable for credit. Intended for first-year graduate students. Presentation of topics by visiting and local researchers.
Corequisite: AST 6935, AST 6936

AST 6935 Frontiers in Astronomy 1 Credit, Max 6 Credits
Grading Scheme: S/U
Repeatable for credit. Recent developments in theoretical and observational astronomy and astrophysics.
Corequisite: AST 6925, AST 6936

AST 6936 Astronomy Journal Club 1 Credit
Grading Scheme: S/U
Intended for first-year graduate students. Discussion of journal articles.
Prerequisite: AST 6925, 6935.

AST 7939 Special Topics 2-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Assigned reading, programs, seminar, or lecture series in a new field of advanced astronomy.

AST 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

AST 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

Biology

BOT 6276C Phylogenomics 4 Credits
Grading Scheme: Letter Grade
Acquaints graduate students with the mathematical theory and methods underlying modern phylogenetic analyses, particularly those that involve "big" data sets, either in terms of taxa or markers. Covers advanced phylogenetic methods, including comparative methods and the multi-species coalescent.
Prerequisite: BOT 6726C with a minimum grade of C-.

BOT 6656 Plant Symbiosis 3 Credits
Grading Scheme: Letter Grade
Examines the crucial role of symbioses in shaping the diversity of life. Topics include generalities among symbioses, origins and establishment of symbioses, and coevolution and cospeciation, as well as specifics of well-studied exemplars of bacterial, fungal, animal, and plant symbioses with plants.
Prerequisite: BSC2010 (C) & BSC2010L (C) & BSC2011 (C) & BSC2011L (C)

BSC 6038 Broader Impacts of Science on Society 2 Credits
Grading Scheme: Letter Grade
Explores ways in which scientists can increase impacts to society and emphasize the relevance of scientific work. Topics include broadening scientific impacts through exhibits, working with teachers, social media, serving underrepresented groups, and more.
PCB 6675C Evolutionary Biogeography 3 Credits  
Grading Scheme: Letter Grade  
Interpretation of biological data sets in a biogeographical context. Topics and methods in historical and ecological biogeography will be discussed.  
Prerequisite: Permission of instructor.

PCB 6685 Population Genetics 4 Credits  
Grading Scheme: Letter Grade  
Provides a comprehensive introduction to the mathematical theory of allele and genotype frequency dynamics within and between populations and will serve as a springboard to more advanced topics in evolutionary biology. Topics covered include deterministic and stochastic processes in evolution and an introduction to classical quantitative genetics theory.  
Prerequisite: Graduate status.

ZOO 6930 Seminar in Molecular Evolution 2 Credits  
Grading Scheme: Letter Grade  
A seminar course in evolution, genetics, and genomics. The class provides each student the opportunity to lead discussion and to exchange ideas with others on various student-selected topics in any area of the broad interdisciplinary fields of evolution, genetics, and genomics.  
Prerequisite: Graduate student standing or permission of the instructor.

Biomedical Engineering

BME 5052L Biomedical Engineering Laboratory 3 Credits  
Grading Scheme: Letter Grade  
Integrates state-of-the-art technologies with a hands-on approach to education in a flexible system of academic topics tailored for specific disciplines within biomedical engineering, by teaching primary laboratory skills, experimental design, interpretation of data, and technical writing relevant to laboratory work.

BME 5085 Patents, Product Development, and Technology Transfer 2 Credits  
Grading Scheme: Letter Grade  
For engineers and scientists. Product discovery and development; patents and trade secrets; copyright and trademark law; international intellectual property considerations; regulatory issues; business planning and market research; and licensing, marketing, negotiation, and technology transfer.

BME 5401 Biomedical Engineering and Physiology I 3 Credits  
Grading Scheme: Letter Grade  
Physiology of cells, bones, and the circulatory system from a biomaterials, biomechanics, cellular, and tissue engineering perspective. Intellectual property and technology transfer included.

BME 5407 Molecular Biomedical Engineering 3 Credits  
Grading Scheme: Letter Grade  
Fundamentals of molecular biology for biomedical engineers.

BME 5500 Biomedical Instrumentation 3 Credits  
Grading Scheme: Letter Grade  
Engineering and medical aspects of measuring and processing signals from living systems. Discusses biomedical transducers for measuring movement, biopotentials, pressure, flow, concentrations, and temperature; and treatment devices like ventilators and infusion pumps. Whenever possible, devices actually used in clinical practice are used in class.  
Prerequisite: basic knowledge of physics and calculus, consent of instructor.

BME 5703 Statistical Methods for Biomedical Engineering 3 Credits  
Grading Scheme: Letter Grade  
Computational methods needed for biomedical engineering research. Students will be acquainted with a variety of techniques for analyzing and modeling experimental data arising in molecular, cellular, physiological, and pathological systems encountered in typical laboratory and clinical settings.  
Prerequisite: Knowledge of calculus, linear algebra and basic statistics.

BME 5704 Advanced Computational Methods for Biomedical Engineering 3 Credits  
Grading Scheme: Letter Grade  
Covering advanced computational methods from a biomedical engineering perspective. Linear and nonlinear systems, partial differential equations, optimization and inverse problems will be discussed. This course is geared towards the applications of the advanced computational techniques to various biomedical engineering problems.  
Prerequisite: A basic knowledge of physics and calculus is required. This can be met by PHY2053 and MAC2311.

BME 5743 Applied Data Mathematics 3 Credits  
Grading Scheme: Letter Grade  
Advanced data science technology with Matlab to analyze biomedical data.  
Prerequisite: COP 2271 or equivalent & BME 3053L or equivalent.

BME 5937 Special Topics 1-4 Credits, Max 6 Credits  
Grading Scheme: Letter Grade  
Special Topics.

BME 6010 Clinical Immersion 1 Credit, Max 6 Credits  
Grading Scheme: Letter Grade  
Biomedical engineers develop practical solutions to various problems encountered in healthcare and clinical practice. Students learn and identify such problems through direct immersion in the clinical environment. Students will shadow a clinician (one-on-one) for 1-3 hours per week where they will identify a clinical problem and propose a solution.  
Prerequisite: BME 6018 Clinical Correlations.

BME 6018 Clinical Correlations in BME 3 Credits  
Grading Scheme: Letter Grade  
Biomedical engineers develop practical solutions to various problems encountered in healthcare and clinical practice. Students are exposed to clinical problems, learn how to identify unmet needs and will devise engineering solutions to address clinical needs. Topics related to clinical translation of biomedical innovations and medical device commercialization will be covered.  
Prerequisite: BME 5401.

BME 6164 Magnetic Biomaterials 3 Credits  
Grading Scheme: Letter Grade  
Consists of classroom lectures on fundamental concepts in magnetism and magnetic micro- and nano-materials and their applications in biomedicine. As part of the course, students will present a critical review of recent literature in the field and lead a group discussion on a specific recent paper.  
Prerequisite: Undergraduate physics and chemistry.
BME 6324 Stem Cell Engineering 3 Credits
Grading Scheme: Letter Grade
Including an historical review of stem cell research and policies surrounding stem cell research, current stem cell sources, strategies and reviews of current stem cell research. This information is essential for Biomedical Engineers to understand in repairing/rebuilding the human body after injury or disease using stem/progenitor cell strategies.
Corequisite: Undergraduate cell biology and molecular biology and physiology, or enrollment in the Biomedical Engineering graduate program, or consent from instructor.

BME 6330 Cell and Tissue Engineering 3 Credits
Grading Scheme: Letter Grade
Applying engineering principles, combined with molecular cell biology, to developing a fundamental understanding of property-function relationships in cells and tissues. Exploiting this understanding to manipulate cell and tissue properties rationally to alter, restore, maintain, or improve cell and tissue functions; and to design bioartificial tissue substitutes.
Prerequisite: GMS 6421, BME 5001, or consent of instructor.

BME 6360 Neural Engineering 3 Credits
Grading Scheme: Letter Grade
Applying engineering to neuroscience including such diverse areas as neural tissue engineering, models of neural function, and neural interface technology. Focuses mainly in the context of neural interfaces and prosthetics, from basic neural physiology and models of neural mechanisms to advanced neural interfaces currently in development or produced commercially.
Prerequisite: consent of instructor.

BME 6502 Introduction to Medical Imaging 3 Credits
Grading Scheme: Letter Grade
Modern medical imaging technologies from a biomedical engineering perspective. The physics, mathematics, instrumentation and clinical applications of all common medical imaging modalities including x-ray radiography, computed tomography (CT), ultrasound imaging, positron emission tomography (PET), and magnetic resonance imaging (MRI) with a focus on non-ionizing radiation will be discussed. Emerging imaging modalities including diffuse optical tomography (DOT), Fluorescence Molecular Tomography (FMT), and photoacoustic tomography (PAT) will also be introduced.

BME 6522 Biomedical Multivariate Signal Processing 3 Credits
Grading Scheme: Letter Grade
Statistical analysis of biomedical signals, emphasizing multivariate time series. Introduces analysis concepts and methods in the time domain and the spectral domain. Uses actual recordings from biomedical applications to demonstrate the methods.
Prerequisite: multivariate calculus and a basic knowledge of probability and statistics.

BME 6534 Advanced Therapeutic Radiological Physics 3 Credits
Grading Scheme: Letter Grade
Advanced course in therapeutic radiation therapy physics covering special topics targeted to those pursuing careers in radiation therapy physics.
Prerequisite: ENU 6627: Therapeutic Radiological Physics

BME 6535 Radiological Physics, Measurements and Dosimetry 3 Credits
Grading Scheme: Letter Grade
Interacting and measuring techniques for x-rays, gamma rays, neutrons and charged particles with matter; radioactive decay processes ion chamber measurements, scintillation detectors, and dosimetry techniques. Applications of cavity theory and dosimetry measurement in medical physics.
Prerequisite: Upper level college physics

BME 6592 Therapeutic Radiological Physics II 3 Credits
Grading Scheme: Letter Grade
Building upon the basic principles of radiation therapy studying more advanced radiation treatment planning, electron beam and brachytherapy techniques. Topics of clinical and regulatory significance including radiation shielding and quality assurance.
Prerequisite: BME 6591 (Therapeutic Radiological Physics I) or permission of instructor.

BME 6593 Therapeutic Radiological Physics III 3 Credits
Grading Scheme: Letter Grade
Exploring state-of-the-art radiation therapy techniques in clinical practice. Examining the physical principles and clinical implementation of three-dimensional conformal therapy, Intensity modulated radiation therapy, stereotactic radiosurgery, high dose rate brachytherapy, image guided radiation therapy, proton beam therapy, and other techniques as they become integrated into clinical practice.
Prerequisite: BME 6592 (Therapeutic Radiological Physics II) or permission of instructor.

BME 6705 Mathematical Modeling of Biological and Physiological Systems 3 Credits
Grading Scheme: Letter Grade
Mathematical modeling of biological and physiological phenomena. Starting from basic theory of linear systems, introduces qualitative analysis of nonlinear ordinary differential equations and maps. Examples from biomedical applications show concepts and methods.
Prerequisite: calculus, linear algebra, and passing knowledge of differential equations.

BME 6905 Individual Work in Biomedical Engineering 1-4 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Individual Work in Biomedical Engineering

BME 6907 BME Project 1-9 Credits, Max 12 Credits
Grading Scheme: S/U
BME Project
Prerequisite: BME MS non-thesis status.

BME 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

BME 6936 Biomedical Engineering Seminar 1 Credit, Max 4 Credits
Grading Scheme: S/U
Biomedical Engineering Seminar

BME 6938 Special Topics in Biomedical Engineering 1-4 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Special Topics in Biomedical Engineering

BME 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching
BME 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

BME 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

BME 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

EGN 5949 Practicum/Internship/Cooperative Work Experience 1-6 Credits, Max 6 Credits
Grading Scheme: S/U
Practical cooperative engineering work under approved industrial and faculty supervision.
Prerequisite: graduate student.

EGN 6651 Clinical Rotation in Radiation Therapy 3 Credits
Grading Scheme: S/U
Experience in clinical therapeutic radiological procedures, patient dosimetry, and treatment planning.
Prerequisite: working knowledge of therapeutic radiological physics.

EGN 6627 Therapeutic Radiological Physics 3 Credits
Grading Scheme: Letter Grade
Prerequisite: ENU 5615C, ENU 6051.

Botany

BOT 5225C Plant Anatomy 4 Credits
Grading Scheme: Letter Grade
Origin, structure, and function of principal cells, tissues, and vegetative and reproductive organs of seed plants. Offered fall term.
Prerequisite: BOT 2011C or 3303C, or consent of instructor.

BOT 5305 Paleobotany 3 Credits
Grading Scheme: Letter Grade
Comparative study of plants through geologic time with attention to morphology and evolution of major groups of land plants, based on the fossil record. Offered fall term in odd-numbered years.
Prerequisite: upper-level course in botany or geology; or consent of instructor.

BOT 5505C Intermediate Plant Physiology 3 Credits
Grading Scheme: Letter Grade
Fundamental processes underlying water relations, metabolism, growth, and reproduction of plants. Overview of plant physiological and biochemical processes for plant science students. Basic information about plant processes integrated with agronomical and environmental considerations.
Prerequisite: BOT 3503/3503L and CHM 2200/2200L or equivalent.

BOT 5625 Plant Geography 2 Credits
Grading Scheme: Letter Grade
Geography of the floras and types of vegetation throughout the world, with emphasis on problems in the distribution of taxa, and the main factors influencing types of vegetation. Offered fall term in even-numbered years.
Prerequisite: BOT 3151C or BOT 5725C.

BOT 5655C Physiological Plant Ecology 3 Credits
Grading Scheme: Letter Grade
Traits affecting success in different environments (emphasizing energy balance, carbon balance, water relations, and nutrient relations). Introduction to ecophysiological methods and instrumentation. Offered fall term in even-numbered years.
Prerequisite: basic plant physiology or consent of instructor.

Botany

BOT 5505C Intermediate Plant Physiology 3 Credits
Grading Scheme: Letter Grade
Fundamental processes underlying water relations, metabolism, growth, and reproduction of plants. Overview of plant physiological and biochemical processes for plant science students. Basic information about plant processes integrated with agronomical and environmental considerations.
Prerequisite: BOT 3503/3503L and CHM 2200/2200L or equivalent.

BOT 5625 Plant Geography 2 Credits
Grading Scheme: Letter Grade
Geography of the floras and types of vegetation throughout the world, with emphasis on problems in the distribution of taxa, and the main factors influencing types of vegetation. Offered fall term in even-numbered years.
Prerequisite: BOT 3151C or BOT 5725C.

BOT 5655C Physiological Plant Ecology 3 Credits
Grading Scheme: Letter Grade
Traits affecting success in different environments (emphasizing energy balance, carbon balance, water relations, and nutrient relations). Introduction to ecophysiological methods and instrumentation. Offered fall term in even-numbered years.
Prerequisite: basic plant physiology or consent of instructor.

BOT 5685C Tropical Botany 5 Credits
Grading Scheme: Letter Grade
Study of tropical plants using the diverse habitats of South Florida (emphasizing uses, anatomy and morphology, physiology and ecology, and systematics of these plants). Field trips and the Fairchild Tropical Garden supplement laboratory experiences. Offered summer term.
Prerequisite: elementary biology/botany; consent of instructor.

BOT 5695C Ecosystems of Florida 3 Credits
Grading Scheme: Letter Grade
Major ecosystems of Florida in relation to environmental factors and human effects.
Prerequisite: basic ecology; and consent of instructor.

BOT 5725C Taxonomy of Vascular Plants 4 Credits
Grading Scheme: Letter Grade
Introduction to systematic principles and techniques used in classification; field and herbarium methods. Survey of vascular plants, their classification, morphology, and evolutionary relationships. Offered spring term in odd-numbered years.
Prerequisite: BOT 2011C and 3303C or equivalent.

BOT 6505C Intermediate Plant Physiology 3 Credits
Grading Scheme: Letter Grade
Fundamental processes underlying water relations, metabolism, growth, and reproduction of plants. Overview of plant physiological and biochemical processes for plant science students. Basic information about plant processes integrated with agronomical and environmental considerations.
Prerequisite: BOT 3503/3503L and CHM 2200/2200L or equivalent.

BOT 6516 Plant Metabolism 3 Credits
Grading Scheme: Letter Grade
Metabolism of carbohydrates, fats, and nitrogen compounds in higher plants; cell structures as related to metabolism; metabolic control mechanisms. Offered fall term.
Prerequisite: BOT 5505C, BCH 4024.

BOT 6556 Plant Growth and Development 3 Credits
Grading Scheme: Letter Grade
Fundamental concepts of plant growth and development with emphasis on the molecular biological approach. Offered fall term in even-numbered years.
Prerequisite: BOT 5505C.
BOT 6716C Advanced Taxonomy 2 Credits
Grading Scheme: Letter Grade
Survey of vascular plant families of limited distribution and/or of phylogenetic significance not covered in BOT 5725C. Discuss their classification, morphology, and evolutionary relationships. Review published studies to demonstrate principles and methods involved in classification. Offered on demand.
Prerequisite: BOT 5725C or equivalent.

BOT 6726C Principles of Systematic Biology 4 Credits
Grading Scheme: Letter Grade
Theory of biological classification, taxonomy, nomenclature, and phylogenetics. Discussion of issues in systematic biology including species concepts and reticulate evolution. Laboratory experience in phylogenetic methods, including parsimony, maximum likelihood, Bayesian inference, divergence time estimation, and ancestral state reconstruction.

BOT 6905 Individual Studies in Botany 1-3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
All credits in excess of 3 must be approved by department chair or graduate coordinator. Individual nonthesis, research problem in one of the following areas of botany: ecology, physiology and biochemistry, cryptogamic botany, morphology and anatomy of vascular plants, systematics, cytology, genetics, and ultrastructure. Topics selected to meet the interests and needs of students.

BOT 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

BOT 6927 Advances in Botany 1-3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Supervised study in specific areas.

BOT 6935 Special Topics 1-4 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Special Topics

BOT 6936 Graduate Student Seminar 1-2 Credits, Max 9 Credits
Grading Scheme: S/U
Readings and oral presentation on general topics in botany.

BOT 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

BOT 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

BOT 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

PCB 5398 Principles of Ecosystem Ecology 3 Credits
Grading Scheme: Letter Grade
Examines principles that govern the structure and function of terrestrial ecosystems. Ecosystem Ecology is the study of flows of energy and materials between organisms and their environment.
Prerequisite: BSC 2010 or BSC 2011, and PCB 3034C or PCB 4044C.

PCB 5396 Tropical Ecology 3 Credits
Grading Scheme: Letter Grade
Global overview of tropical environments, natural history, biological communities, and their structure and function. Addresses basic and applied ecological issues in the tropics.
Prerequisite: elementary biology or consent of instructor.

PLP 6656C Fungal Biology 4 Credits
Grading Scheme: Letter Grade
Introducing groups of fungi and fungi-like organisms. Discussion of the structure, development, physiology, genetics, ecology and systematics of fungi.
Prerequisite: BSC 2010 and BSC 2011 or PLP 3002C/PLP 5005C.

Chemical Engineering

BME 6221 Biomolecular Cell Mechanics 3 Credits
Grading Scheme: Letter Grade
Biomolecular basis of cell mechanics and cell motility, emphasizing quantitative models and systems-biology approaches.

BME 6322 Dynamics of Cellular Processes 3 Credits
Grading Scheme: Letter Grade
Develops research skills, including generation of questions, hypotheses testing, reporting, interpretation, and discussion of findings.
Prerequisite: a course on kinetics and/or transport, or consent of instructor.

BME 6644 Pharmacokinetics 3 Credits
Grading Scheme: Letter Grade
Basic pharmacokinetic and pharmacodynamic concepts and models. Use of these concepts in the drug discovery process.

CHM 5275 The Organic Chemistry of Polymers 2 Credits
Grading Scheme: Letter Grade
Prerequisite: CHM 2200, 2210, or equivalent.

CHM 5511 Physical Chemistry of Polymers 2 Credits
Grading Scheme: Letter Grade
Structure, configuration, conformation, and thermodynamics of polymer solutions, gels, and solids. Thermal, mechanical, optical, and rheological properties of plastics and rubbers.
Prerequisite: CHM 4411 or equivalent.

ECH 5938 Topics in Colloid Science 3 Credits
Grading Scheme: Letter Grade
Colloids and interfacial phenomena, colloid interaction forces, electrokinetic phenomena, transport phenomena influenced by colloidal forces, and electrokinetic phenomena. Examples and applications.
Prerequisite: PHY 2049 and 2056L, CHM 2046 and 2046L, MAC 2312 or equivalent.
ECH 6126 Thermodynamics of Reaction and Phase Equilibria 3 Credits
Grading Scheme: Letter Grade
Methods of treating chemical and phase equilibria in multi-component systems through application of thermodynamics and molecular theory.

ECH 6270 Continuum Basis of Chemical Engineering 3 Credits
Grading Scheme: Letter Grade
Integrated introduction to transport processes in continuous media with emphasis on fluid mechanics and heat and mass transfer.

ECH 6272 Molecular Basis of Chemical Engineering 3 Credits
Grading Scheme: Letter Grade
Statistical mechanics and microscopic explanation of macroscopic laws of classical thermodynamics, transport phenomena, and chemical kinetics. Statistical mechanical theories that connect molecular structure to macroscopic properties.

ECH 6285 Transport Phenomena 1-3 Credits, Max 3 Credits
Grading Scheme: Letter Grade
Transport Phenomena
Prerequisite: ECH 6270.

ECH 6326 Computer Control of Processes 3 Credits
Grading Scheme: Letter Grade
Introduction to digital computers, sampled data systems and Z-transforms, control of multiple input-multiple output systems, optimal control, state estimation and filtering, and self-tuning regulators.

ECH 6506 Chemical Engineering Kinetics 3 Credits
Grading Scheme: Letter Grade
Fundamental aspects of chemical reactors, including collision theory, transition rate theory, unimolecular rate theory, homogeneous gas and liquid phase kinetics, and heterogeneous kinetics.

ECH 6526 Reactor Design and Optimization 3 Credits
Grading Scheme: Letter Grade
Fundamentals of heterogeneous reactor design including the characterization of catalytic reactions and support, the development of global rate of the intrinsic reaction affected by chemical and physical deactivation of catalyst, intraphase and interphase mass and heat transfer, and the design and optimization of various types of heterogeneous reactors.

ECH 6709 Electrochemical Engineering Fundamentals and Design 3 Credits
Grading Scheme: Letter Grade
Fundamentals of электродics and ionsics applied to systems of interest in electrochemical engineering.

ECH 6726 Interfacial Phenomena I 2 Credits
Grading Scheme: Letter Grade
Air-liquid and liquid-liquid interfaces; surface-active molecules, adsorption at interfaces, foams, micro- and macro-emulsions, retardation of evaporation and damping of waves by films, surface chemistry of biological systems.

ECH 6727 Interfacial Phenomena II 2 Credits
Grading Scheme: Letter Grade
Solid-gas, solid-liquid, solid-solid interfaces. Adsorption of gases and surface-active molecules on metal surfaces, contact angle and spreading of liquids, wetting and dewetting, lubrication, biolubrication, flotation, adhesion, biological applications of surfaces.
Prerequisite: CHM 2046 and 2046L.

ECH 6829 Polymer Processing 3 Credits
Grading Scheme: Letter Grade
Polymer Processing

ECH 6843 Experimental Basis of Chemical Engineering 3 Credits
Grading Scheme: Letter Grade
Statistical design of experiments and treatment of data including regression analysis, interpolation, and integration. Introduction to analytical techniques including electron and photon spectroscopes, chromatography, and mass spectrometry.

ECH 6847 Mathematical Basis of Chemical Engineering 3 Credits
Grading Scheme: Letter Grade
Methods of linear systems, chemical engineering applications in finite and infinite dimensional spaces, concepts of stability, application to transport phenomena.

ECH 6851 Impedance Spectroscopy 3 Credits
Grading Scheme: Letter Grade
Intended for chemists, physicists, materials scientists, and engineers with an interest in applying electrochemical impedance techniques to study a broad variety of electrochemical processes.
Prerequisite: familiarity with applications of differential equations.

ECH 6905 Individual Work 1-6 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Individual engineering projects suitable for a nonthesis Master of Engineering degree.

ECH 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

ECH 6926 Graduate Seminar 1 Credit, Max 10 Credits
Grading Scheme: Letter Grade
Graduate Seminar

ECH 6937 Topics in Chemical Engineering I 1-4 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Separations processes, reactor design, applied molecular and kinetic theory, thermodynamics, particulate systems. Properties of chemical substances, transport phenomena, non-Newtonian fluid dynamics, turbulence, applied mathematics, computer science, biochemical and electrochemical engineering.

ECH 6939 Topics in Chemical Engineering III 1-4 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Topics in Chemical Engineering III

ECH 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

ECH 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

ECH 7938 Advanced Special Chemical Engineering Topics for Doctoral Candidates 1-4 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Advanced Special Chemical Engineering Topics for Doctoral Candidates

ECH 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ECH 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation
EGN 5949 Practicum/Internship/Cooperative Work Experience 1-6
Credits, Max 6 Credits
Grading Scheme: S/U
Prerequisite: graduate student.

EGN 6640 Entrepreneurship for Engineers 3 Credits
Grading Scheme: Letter Grade
Introduction to entrepreneurship, idea generating and feasibility analysis, and business planning. Lectures, case studies, student-led discussions, team business plans, and investor presentations.

EGN 6913 Engineering Graduate Research 0-3 Credits
Grading Scheme: S/U
Course will provide the student with supervised research in a laboratory setting.

Chemistry

CHM 5224 Basic Principles for Organic Chemistry 3 Credits
Grading Scheme: Letter Grade
A review for those students intending to enroll in the Advanced Organic Sequence CHM 6225, CHM 6226.
Prerequisite: one year of undergraduate organic chemistry.

CHM 5235 Organic Spectroscopy 3 Credits
Grading Scheme: Letter Grade
Advanced study of characterization and structure proof of organic compounds by special methods, including IR, UV, NMR, and mass spectrometry.
Prerequisite: CHM 2211.

CHM 5275 The Organic Chemistry of Polymers 2 Credits
Grading Scheme: Letter Grade
Prerequisite: CHM 2200, 2210, or equivalent.

CHM 5305 Chemistry of Biological Molecules 3 Credits
Grading Scheme: Letter Grade
Mechanistic organic biochemistry. Emphasis on model systems, enzyme active sites, and physical and organic chemistry of biomacromolecules.
Prerequisite: CHM 2211 and 4412.

CHM 5416L Advanced Physical Chemistry Laboratory 2 Credits
Grading Scheme: Letter Grade
Techniques used in experimental research; techniques of design and fabrication of scientific apparatus. Advanced experiments involving optical, electronic, and high vacuum equipment.
Prerequisite: CHM 4411L.

CHM 5511 Physical Chemistry of Polymers 2 Credits
Grading Scheme: Letter Grade
Structure, configuration, conformation, and thermodynamics of polymer solutions, gels, and solids. Thermal, mechanical, optical, and rheological properties of plastics and rubbers.
Prerequisite: CHM 4411 or equivalent.

CHM 6036 Chemical Biology 3 Credits
Grading Scheme: Letter Grade
In depth examination of current research directions in the field of chemical biology. Topics covered include aptamers, chemical synthesis of proteins, in vitro incorporation of unnatural amino acids into proteins, directed evolution of enzymes, natural product discovery and their biosynthesis mechanisms, chemically synthesized small-molecule libraries, chemical genetics, chemical screening, and target identification.
Prerequisite: Admission to the graduate program and CHM 5305 (Bioorganic Chemistry), or permission of the professor.

CHM 6037 Chemical Biology and Biochemistry Seminar 1 Credit, Max 12 Credits
Grading Scheme: S/U
Weekly seminar series from graduate students and outside speakers in chemical biology/biochemistry areas. Attendance and participation of graduate students required.

EGN 6913 Engineering Graduate Research 0-3 Credits
Grading Scheme: S/U
Course will provide the student with supervised research in a laboratory setting.

CHM 6038 Chemical Biology 3 Credits
Grading Scheme: Letter Grade
In depth examination of current research directions in the field of chemical biology. Topics covered include aptamers, chemical synthesis of proteins, in vitro incorporation of unnatural amino acids into proteins, directed evolution of enzymes, natural product discovery and their biosynthesis mechanisms, chemically synthesized small-molecule libraries, chemical genetics, chemical screening, and target identification.
Prerequisite: Admission to the graduate program and CHM 5305 (Bioorganic Chemistry), or permission of the professor.

CHM 6037 Chemical Biology and Biochemistry Seminar 1 Credit, Max 12 Credits
Grading Scheme: S/U
Weekly seminar series from graduate students and outside speakers in chemical biology/biochemistry areas. Attendance and participation of graduate students required.

EGN 6913 Engineering Graduate Research 0-3 Credits
Grading Scheme: S/U
Course will provide the student with supervised research in a laboratory setting.

Chemistry

CHM 5224 Basic Principles for Organic Chemistry 3 Credits
Grading Scheme: Letter Grade
A review for those students intending to enroll in the Advanced Organic Sequence CHM 6225, CHM 6226.
Prerequisite: one year of undergraduate organic chemistry.

CHM 5235 Organic Spectroscopy 3 Credits
Grading Scheme: Letter Grade
Advanced study of characterization and structure proof of organic compounds by special methods, including IR, UV, NMR, and mass spectrometry.
Prerequisite: CHM 2211.

CHM 5275 The Organic Chemistry of Polymers 2 Credits
Grading Scheme: Letter Grade
Prerequisite: CHM 2200, 2210, or equivalent.

CHM 5305 Chemistry of Biological Molecules 3 Credits
Grading Scheme: Letter Grade
Mechanistic organic biochemistry. Emphasis on model systems, enzyme active sites, and physical and organic chemistry of biomacromolecules.
Prerequisite: CHM 2211 and 4412.

CHM 5416L Advanced Physical Chemistry Laboratory 2 Credits
Grading Scheme: Letter Grade
Techniques used in experimental research; techniques of design and fabrication of scientific apparatus. Advanced experiments involving optical, electronic, and high vacuum equipment.
Prerequisite: CHM 4411L.

CHM 5511 Physical Chemistry of Polymers 2 Credits
Grading Scheme: Letter Grade
Structure, configuration, conformation, and thermodynamics of polymer solutions, gels, and solids. Thermal, mechanical, optical, and rheological properties of plastics and rubbers.
Prerequisite: CHM 4411 or equivalent.

CHM 6036 Chemical Biology 3 Credits
Grading Scheme: Letter Grade
In depth examination of current research directions in the field of chemical biology. Topics covered include aptamers, chemical synthesis of proteins, in vitro incorporation of unnatural amino acids into proteins, directed evolution of enzymes, natural product discovery and their biosynthesis mechanisms, chemically synthesized small-molecule libraries, chemical genetics, chemical screening, and target identification.
Prerequisite: Admission to the graduate program and CHM 5305 (Bioorganic Chemistry), or permission of the professor.

CHM 6037 Chemical Biology and Biochemistry Seminar 1 Credit, Max 12 Credits
Grading Scheme: S/U
Weekly seminar series from graduate students and outside speakers in chemical biology/biochemistry areas. Attendance and participation of graduate students required.

EGN 6913 Engineering Graduate Research 0-3 Credits
Grading Scheme: S/U
Course will provide the student with supervised research in a laboratory setting.

Chemistry

CHM 5224 Basic Principles for Organic Chemistry 3 Credits
Grading Scheme: Letter Grade
A review for those students intending to enroll in the Advanced Organic Sequence CHM 6225, CHM 6226.
Prerequisite: one year of undergraduate organic chemistry.

CHM 5235 Organic Spectroscopy 3 Credits
Grading Scheme: Letter Grade
Advanced study of characterization and structure proof of organic compounds by special methods, including IR, UV, NMR, and mass spectrometry.
Prerequisite: CHM 2211.

CHM 5275 The Organic Chemistry of Polymers 2 Credits
Grading Scheme: Letter Grade
Prerequisite: CHM 2200, 2210, or equivalent.

CHM 5305 Chemistry of Biological Molecules 3 Credits
Grading Scheme: Letter Grade
Mechanistic organic biochemistry. Emphasis on model systems, enzyme active sites, and physical and organic chemistry of biomacromolecules.
Prerequisite: CHM 2211 and 4412.

CHM 5416L Advanced Physical Chemistry Laboratory 2 Credits
Grading Scheme: Letter Grade
Techniques used in experimental research; techniques of design and fabrication of scientific apparatus. Advanced experiments involving optical, electronic, and high vacuum equipment.
Prerequisite: CHM 4411L.

CHM 5511 Physical Chemistry of Polymers 2 Credits
Grading Scheme: Letter Grade
Structure, configuration, conformation, and thermodynamics of polymer solutions, gels, and solids. Thermal, mechanical, optical, and rheological properties of plastics and rubbers.
Prerequisite: CHM 4411 or equivalent.
CHM 6225 Advanced Principles of Organic Chemistry 4 Credits
Grading Scheme: Letter Grade
Principles of organic chemistry and their application to reaction mechanisms.
Prerequisite: CHM 2211.

CHM 6226 Advanced Synthetic Organic Chemistry 3 Credits
Grading Scheme: Letter Grade
Discussion and application of synthetic methodology.
Prerequisite: CHM 6225.

CHM 6227 Topics in Synthetic Organic Chemistry 2 Credits
Grading Scheme: Letter Grade
Synthesis of complex organic molecules, with emphasis on recent developments in approaches and methods.
Prerequisite: CHM 6226.

CHM 6251 Organometallic Compounds 3 Credits
Grading Scheme: Letter Grade
Properties of organometallic compounds, the nature of the carbon-metal bond, compounds of metals in groups 1, 2, 3, and 4, and transition metals.

CHM 6271 The Chemistry of High Polymers 2 Credits
Grading Scheme: Letter Grade
Fundamental polymer chemistry, with emphasis on the mechanisms of polymerization reactions and the relationship of physical properties to chemical constitution.

CHM 6301 Enzyme Mechanisms 3 Credits
Grading Scheme: Letter Grade
Principles of enzyme structure; isolation and purification; physical chemistry of enzyme/substrate interactions; general overview of classes; transition state theory and catalysis; types of chemical catalysis; survey of cofactors; example mechanisms; catalytic antibodies; ribozyme structure and catalysis.

CHM 6302 Chemistry and Biology of Nucleic Acids 3 Credits
Grading Scheme: Letter Grade
Principles of nucleic acid structure and function; protein/nucleic acid interactions with particular emphasis on transcriptional regulators and DNA and RNA polymerases; chemistry of phosphate hydrolysis and its application to enzyme mechanisms; evolution of novel RNA molecules capable of specific binding and catalysis.

CHM 6303 Methods in Computational Biochemistry and Structural Biology 3 Credits
Grading Scheme: Letter Grade
Modeling and protein structures enzyme reaction mechanisms using empirical as well as quantum-mechanical methods.

CHM 6306 Special Topics in Biological Chemistry Mechanisms 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Molecular evolution, bioinformatics and protein structure prediction, principles of molecular recognition, rational protein design, biotechnology, reengineered organisms, advanced biophysical techniques, and computational biology.

CHM 6381 Special Topics in Organic Chemistry 1-3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Chemistry of selected types of organic compounds, such as alkaloids, carbohydrates, natural products, steroids.
Prerequisite: CHM 6225, CHM 6226.

CHM 6390 Organic Chemistry Seminar Presentation 1 Credit, Max 20 Credits
Grading Scheme: Letter Grade
Attendance required of graduate majors in the organic area. Presentation of one seminar.

CHM 6391 Organic Chemistry Seminar Discussion 1 Credit
Grading Scheme: S/U
Attendance at weekly seminars reporting current advances in organic chemistry.
Prerequisite: graduate standing.

CHM 6430 Chemical Thermodynamics 3 Credits
Grading Scheme: Letter Grade
Energetics, properties of ideal and nonideal systems primarily from the standpoint of classical thermodynamics.

CHM 6461 Statistical Thermodynamics 3 Credits
Grading Scheme: Letter Grade
Fundamental principles with applications to systems of chemical interest.
Prerequisite: CHM 6430.

CHM 6470 Chemical Bonding and Spectra I 3 Credits
Grading Scheme: Letter Grade
Basic methods and applications of quantum chemistry; atomic structure; chemical bonding in diatomic and polyatomic molecules. Brief introduction to molecular spectroscopy.

CHM 6471 Chemical Bonding and Spectra II 3 Credits
Grading Scheme: Letter Grade
Theory of symmetry and its chemical applications; semi-empirical molecular orbital treatment of simple inorganic and organic molecules; further applications to inorganic and organic chemistry.
Prerequisite: CHM 6470.

CHM 6480 Elements of Quantum Chemistry 3 Credits
Grading Scheme: Letter Grade
Brief treatment of the Schrödinger equation, followed by a survey of applications to chemical problems.
Prerequisite: CHM 6471.

CHM 6490 Theory of Molecular Spectroscopy 3 Credits
Grading Scheme: Letter Grade
Coreq: CHM 6471. Molecular energy levels, spectroscopic selection rules; rotational, vibrational, electronic, and magnetic resonance spectra of diatomic and polyatomic molecules.

CHM 6580 Special Topics in Physical Chemistry 1-3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Lecture or conferences covering selected topics of current interest in physical chemistry.

CHM 6586 Computational Chemistry 3 Credits
Grading Scheme: Letter Grade
Software for computational chemistry; model building and molecular mechanics; molecular orbitals and electronic structure; optical, infrared, and magnetic resonance spectra; solvation effects and molecular dynamics; building large systems.
Prerequisite: undergraduate physical chemistry.

CHM 6590 Physical Chemistry Seminar 1 Credit, Max 20 Credits
Grading Scheme: S/U
Attendance required of graduate majors in physical chemistry. Presentation of one seminar.
CHM 6620 Advanced Inorganic Chemistry I 3 Credits  
Grading Scheme: Letter Grade  
Crystalline state; covalent bonding; acids, bases, and solvents, nonmetallic compounds of Groups II through VII with emphasis on structure and reactivity.

CHM 6621 Advanced Inorganic Chemistry II 3 Credits  
Grading Scheme: Letter Grade  
Electronic structure of metals and transition metal complexes; solution chemistry and reaction mechanisms at metal centers; redox reactions; introduction to organometallic and bioinorganic chemistry.  
Prerequisite: CHM 6620.

CHM 6626 Applications of Physical Methods in Inorganic Chemistry 3 Credits  
Grading Scheme: Letter Grade  
Principles and applications of spectroscopic methods to the solution of inorganic problems. Those techniques used most extensively in current inorganic research are treated.  
Prerequisite: graduate standing or consent of instructor.

CHM 6628 Chemistry of Solid Materials 3 Credits  
Grading Scheme: Letter Grade  
Structure and properties of solids; semiconductors and superconductors.

CHM 6670 Inorganic Biochemistry 3 Credits  
Grading Scheme: Letter Grade  
Role of elements in biology. Modern spectroscopic and physical methods for study of Group I and II metals, metalloenzymes, metal ion transport and storage, functions of nonmetals in biochemical systems, and biomedical/biotechnical applications of metals.  
Prerequisite: graduate standing or consent of instructor.

CHM 6680 Special Topics in Inorganic Chemistry 1-3 Credits, Max 12 Credits  
Grading Scheme: Letter Grade  
Lectures or conferences on selected topics of current research interest in inorganic chemistry.

CHM 6690 Inorganic Chemistry Seminar 1 Credit, Max 20 Credits  
Grading Scheme: Letter Grade  
Attendance required of graduate majors in inorganic chemistry. graduate course in inorganic chemistry. Presentation of one seminar.

CHM 6720 Chemical Dynamics 3 Credits  
Grading Scheme: Letter Grade  
Basic concepts of rate laws, collision theory, and transition state theory; an introduction to reaction dynamics, structural dynamics, and quantitative structure-reactivity correlations.

CHM 6905 Individual Problems, Advanced 1-5 Credits, Max 10 Credits  
Grading Scheme: S/U  
Double registration permitted. Assigned reading program or development of assigned experimental problem.  
Prerequisite: consent of faculty member supervising the work.

CHM 6910 Supervised Research 1-5 Credits, Max 5 Credits  
Grading Scheme: S/U  
Supervised Research

CHM 6934 Advanced Topics in Chemistry 1 Credit, Max 8 Credits  
Grading Scheme: S/U  
Discussion and evaluation of chemical research advances reported in current chemical literature. S/U  
Prerequisite: consent of instructor.

CHM 6935 Chemistry Colloquium 1 Credit, Max 7 Credits  
Grading Scheme: S/U  
Topics presented by visiting scientists and local staff members.

CHM 6943 Internship in College Teaching 2-4 Credits, Max 6 Credits  
Grading Scheme: Letter Grade  
Required for Master of Science in Teaching students but available for students needing additional practice and direction in college-level teaching.  
Prerequisite: graduate standing.

CHM 6971 Research for Master's Thesis 1-15 Credits  
Grading Scheme: S/U  
Research for Master's Thesis

CHM 7485 Special Topics in Theory of Atomic and Molecular Structure 1-3 Credits, Max 9 Credits  
Grading Scheme: Letter Grade  
Mathematical techniques used in atomic, molecular, and solid-state theory. The one-electron approximation and the general quantum-mechanical manybody problems. Selected advanced topics.  
Prerequisite: PHZ 6426 or equivalent.

CHM 7979 Advanced Research 1-12 Credits  
Grading Scheme: S/U  
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

CHM 7980 Research for Doctoral Dissertation 1-15 Credits  
Grading Scheme: S/U  
Research for Doctoral Dissertation

CHS 5110 Radiochemistry 2 Credits  
Grading Scheme: Letter Grade  
Radioactivity detection, radiochemical separations and analyses, radiochemistry laboratory techniques, the practice of radiological safety, and tracer applications of radioisotopes in chemistry and other fields.

PHA 6435 Biosynthetic Logic of Medicinal Natural Products 3 Credits  
Grading Scheme: Letter Grade  
Covers topics of biosynthesis of the major families of medical natural products, structural and biochemical understanding of their biosynthetic logic, gene cluster identification, genome mining, and production of bioactive "unnatural products" for drug discovery and development.  
Prerequisite: Students are expected to have the background of Biochemistry, Enzymology, and Bioorganic Chemistry. Or permission of instructors.

Civil and Coastal Engineering

CCE 5035 Construction Planning and Scheduling 3 Credits  
Grading Scheme: Letter Grade  
Planning, scheduling, organizing, and control of civil engineering projects with CPM and PERT. Application of optimization techniques.  
Prerequisite: Knowledge or experience with theory and practice of construction operations, equipment utilization and construction methods, and analysis of costs.

CCE 5405 Construction Equipment and Procedures 3 Credits  
Grading Scheme: Letter Grade  
Design and optimization of equipment systems for heavy construction.  
Prerequisite: Knowledge or experience with theory and practice of construction operations, equipment utilization and construction methods, and analysis of costs.
CCE 6016 Advanced Engineering Cost Estimating 3 Credits  
Grading Scheme: Letter Grade  
The application of scientific principles and techniques to the problem of cost estimation, cost control and profitability of infrastructure renewal projects, in support of engineering planning, design and construction practice.  
Prerequisite: Graduate Standing.

CCE 6037 Civil Engineering Operations I 3 Credits  
Grading Scheme: Letter Grade  
Advanced construction engineering and management procedures at the project level to support quantitative decision making.  
Prerequisite: graduate status.

CEG 5105 Geotechnical Engineer 3 Credits  
Grading Scheme: Letter Grade  
Shallow foundations, bearing capacity, settlements, deep foundations, pile testing, earth pressures, excavations, retaining structures, dewatering.

CEG 5114 Advanced Geotechnical Aspects of Landfill Design 3 Credits  
Grading Scheme: Letter Grade  
Settlement analysis, slope stability, liner design, and LCRR design.  
Prerequisite: Fundamentals of Geotechnical Engineering including soil classification, soil strength assessment, consolidation, slope stability, retaining walls and seepage.

CEG 5115 Foundation Design 3 Credits  
Grading Scheme: Letter Grade  
Investigations, bearing capacity, and the analysis and design of shallow footings, walls, and deep pile foundations.  
Prerequisite: Fundamentals of Geotechnical Engineering including soil classification, soil strength assessment, consolidation, slope stability, retaining walls and seepage.

CEG 5205C Insitu Measurement of Soil Properties 3 Credits  
Grading Scheme: Letter Grade  
Methods of soil exploration; techniques of soil sampling and insitu testing; field performance of insitu testing.  
Prerequisite: Fundamentals of Geotechnical Engineering including soil classification, soil strength assessment, consolidation, slope stability, retaining walls and seepage.

CEG 5805 Ground Modification Design 2 Credits  
Grading Scheme: Letter Grade  
Introduction to design of ground modification techniques for improvement of marginal construction sites.  
Prerequisite: Fundamentals of Geotechnical Engineering including soil classification, soil strength assessment, consolidation, slope stability, retaining walls and seepage.

CEG 6015 Advanced Soil Mechanics 3 Credits  
Grading Scheme: Letter Grade  
Nature and origin of soil. Stresses within a soil body. Stress-strain behavior and shear strength of dry, saturated no flow, saturated transient flow soils.  
Prerequisite: Fundamentals of Geotechnical Engineering including soil classification, soil strength assessment, consolidation, slope stability, retaining walls and seepage.

CEG 6116 Advanced Shallow Foundation Design 3 Credits  
Grading Scheme: Letter Grade  
Application of soil mechanics to design and analysis of shallow foundations.  
Prerequisite: Fundamentals of Geotechnical Engineering including soil classification, soil strength assessment, consolidation; fundamentals of structural analysis including loads, shear and moment diagrams, and classical methods for determining displacements.

CEG 6117 Advanced Deep Foundation Design 3 Credits  
Grading Scheme: Letter Grade  
Application of soil mechanics to design and analysis of deep foundations.  
Prerequisite: Fundamentals of Geotechnical Engineering including soil classification, soil strength assessment, consolidation, slope stability, retaining walls and seepage.

CEG 6405 Seepage in Soils 3 Credits  
Grading Scheme: Letter Grade  
Focusing on Darcy’s law, coefficient of permeability, flownets, seepage forces; engineering applications: use of computer software for seepage and slope stability analyses in dewatering systems, embankment design, filter design, earth dams, and drainage problems.  
Prerequisite: Fundamentals of Geotechnical Engineering including soil classification, soil strength assessment, consolidation, slope stability, retaining walls and seepage.

CEG 6505 Numerical Methods of Geomechanics 3 Credits  
Grading Scheme: Letter Grade  
Application of computer solutions to geotechnical engineering problems.  
Prerequisite: Fundamentals of Geotechnical Engineering including soil classification, soil strength assessment, consolidation, slope stability, retaining walls and seepage.

CEG 6515 Earth Retaining Systems and Slope Stability 3 Credits  
Grading Scheme: Letter Grade  
Applications of soil mechanics to design and analysis of earth retaining systems and slope stability.  
Prerequisite: Fundamentals of Geotechnical Engineering including soil classification, soil strength assessment, consolidation, slope stability, retaining walls and seepage.

CES 5010 Probabilistic and Stochastic Methods in Civil Engineering 3 Credits  
Grading Scheme: Letter Grade  
Fundamental aspects of uncertainty and their roles in determining system reliability. Probability and statistics, stochastic processes, random data analysis, and reliability methods.  
Prerequisite: Fundamentals of structural analysis including loads, shear and moment diagrams, and classical methods for determining displacements.

CES 5116 Finite Elements in Civil Engineering 3 Credits  
Grading Scheme: Letter Grade  
Introduction to finite elements, use of finite element concepts for structural analysis. Application of 1-; 2-; and 3-D elements of structural problems.  
Prerequisite: Theory and application of the direct stiffness method.
CES 5325 Design of Highway Bridges 3 Credits
Grading Scheme: Letter Grade
Analysis by influence lines, slab and girder bridges, composite design, prestressed concrete, continuity, arch bridges, design details, highway specifications.
Prerequisite: Behavior and design of reinforced concrete members subjected to flexure, shear, and compression. Behavior and design of steel members and connections subjected to tension, compression, flexure, and torsion.

CES 5606 Topics in Steel Design 3 Credits
Grading Scheme: Letter Grade
Plate girders, torsion, biaxial bending, frame design, composite beams and columns, fatigue, monosymmetric members, and moment connections.
Prerequisite: Behavior and design of steel members and connections subjected to tension, compression, flexure, and torsion.

CES 5607 Behavior of Steel Structures 3 Credits
Grading Scheme: Letter Grade
Plastic analysis and designs of beams and frames. Buckling and stability problems. Shear and torsion.
Prerequisite: Behavior and design of steel members and connections subjected to tension, compression, flexure, and torsion.

CES 5715 Prestressed Concrete 3 Credits
Grading Scheme: Letter Grade
Analysis and design of prestressed concrete flexural members; pre-and post-tensioned construction, allowable stress, strength evaluation; design for bending moments and shear; evaluation of serviceability requirements; design of simple bridges.
Prerequisite: Behavior and design of reinforced concrete members subjected to flexure, shear, and compression.

CES 5801 Design and Construction in Timber 3 Credits
Grading Scheme: Letter Grade
Analysis and design of beams, columns, connections, and diaphragm/shearwall structures using sawn timber, laminated timber, and plywood and including a comprehensive design project.
Prerequisite: Fundamentals of structural analysis including loads, shear and moment diagrams, and classical methods for determining displacements.

CES 5835 Design of Reinforced Masonry Structures 3 Credits
Grading Scheme: Letter Grade
Properties, specifications, and construction requirements for structures incorporating clay brick, concrete block, and mortar; analysis and design of masonry structures including a comprehensive diaphragm/shearwall masonry structure design project.
Prerequisite: Behavior and design of reinforced concrete members subjected to flexure, shear, and compression.

CES 606 Advanced Structural Analysis 3 Credits
Grading Scheme: Letter Grade
Traditional methods of analyses for forces and deformations; modern matrix methods including the direct stiffness method.
Prerequisite: Fundamentals of structural analysis including loads, shear and moment diagrams, and classical methods for determining displacements.

CES 6108 Structural Dynamics 3 Credits
Grading Scheme: Letter Grade
Evaluating structural response to the effect of dynamic loads for single-degree and multidegree of freedom systems. Considers seismic and wind effects, modal analysis, numerical methods, structural idealization, response spectra, and design codes.
Prerequisite: Fundamentals of structural analysis including loads, shear and moment diagrams, and classical methods for determining displacements.

CES 6551 Design of Folded Plates and Shells 3 Credits
Grading Scheme: Letter Grade
Prerequisite: Behavior and design of reinforced concrete members subjected to flexure, shear, and compression. Behavior and design of steel members and connections subjected to tension, compression, flexure, and torsion.

CES 6571 Design of Temporary Structures 3 Credits
Grading Scheme: Letter Grade
Introduction to structural engineering principles in the design of temporary structures and operations used in the construction of permanent structures.

CES 6585 Wind Engineering 3 Credits
Grading Scheme: Letter Grade
The nature of wind related to wind-structure interaction and design loads for extreme winds, tornadoes and hurricanes.
Prerequisite: Fundamentals of structural analysis including loads, shear and moment diagrams, and classical methods for determining displacements.

CES 6588 Protective Structures 3 Credits
Grading Scheme: Letter Grade
Addressing a range of tissues to mitigate blast, shock, and impact effects. It will include extensive course notes, references, manuals, handouts, and special computer codes. Also, it is expected that guest lectures on several topics will be given by invited experts.
Prerequisite: BS in Civil Eng; CES 6108

CES 6590 Impact Engineering 3 Credits
Grading Scheme: Letter Grade
Addressing a broad range of technical issues on mitigating the severe loading effects associated with impact loading incidents. The course will address static and dynamic structural behavior of elastic and elastic-perfectly-plastic systems that include: contact between bodies, classical impact problems for ideal systems, beams under concentrated or distributed loads, transverse shear and rotary inertia, strain rate effects, and instability.
Prerequisite: B.S. in Civil Engineering; CES 6108

CES 6591 Applied Protective Structures 3 Credits
Grading Scheme: Letter Grade
Expanding knowledge gained from the course on protective structures for expedient applications that can be deployed under emergency situations associated with abnormal loading incidents (e.g., blast, shock, impact, etc.).
Prerequisite: B.S. in Civil Engineering; CES 6588
CES 6592 Retrofit Protective Structures 3 Credits
Grading Scheme: Letter Grade
Focusing on engineering approaches, innovative materials, and structural systems for enhancing the performance of protective structures against blast, shock, impact.
Prerequisite: B.S. in Civil Engineering; CES 6588: Protective Structures

CES 6593 Advanced Protective Structures 3 Credits
Grading Scheme: Letter Grade
Expanding the basic knowledge gained by the students in the previous course on Protective Structures by deeper treatments of the various key topics handled there.
Prerequisite: B.S. in Civil Engineering; CES 6588

CES 6706 Advanced Reinforced Concrete 3 Credits
Grading Scheme: Letter Grade
Torsion in structural members. Ultimate load theories and application to design. Columns and beam columns. Shear walls, combined shear walls and frames. Research topics.
Prerequisite: Fundamentals of structural analysis including loads, shear and moment diagrams, and classical methods for determining displacements. Behavior and design of reinforced concrete members subjected to flexure, shear, and compression.

CGN 5125 Legal Aspects of Civil Engineering 3 Credits
Grading Scheme: Letter Grade
Engineer’s view of contracts for design and construction. Legislation and policy affecting labor-management relationships in construction.

CGN 5315 Civil Engineering Systems 3 Credits
Grading Scheme: Letter Grade
Civil engineering applications of operations research techniques, models of scheduling, linear programming, queuing theory, and simulation.

CGN 5605 Public Works Planning 3 Credits
Grading Scheme: Letter Grade
Functional approach to planning and implementing public works needs with emphasis on role of engineer.

CGN 5606 Public Works Management 3 Credits
Grading Scheme: Letter Grade
Nature of profession, duties, and administrative responsibilities. Organization and management of operating divisions with emphasis on role of engineer.

CGN 5715 Experimentation and Instrumentation in Civil Engineering Materials Research 3 Credits
Grading Scheme: Letter Grade
Fundamentals and applications of testing and measuring systems commonly used; constitutive models, testing methods, instrumentation, and error analysis.

CGN 6150 Engineering Project Management 3 Credits
Grading Scheme: Letter Grade
Engineering project management skills and procedures in support of engineering project development and management.

CGN 6155 Civil Engineering Practice I 3 Credits
Grading Scheme: Letter Grade
Advanced construction engineering management skills and procedures in support of design and construction practice at the project level.
Prerequisite: Graduate Standing

CGN 6156 Construction Engineering II 3 Credits
Grading Scheme: Letter Grade
Advanced construction engineering management skills and procedures in support of design and construction practice above the project level.
Prerequisite: Knowledge or experience with theory and practice of construction operations, equipment utilization and construction methods, and analysis of costs Advanced construction engineering management skills and procedures in support of design and construction practice above the project level.

CGN 6505 Properties, Design and Control of Concrete 3 Credits
Grading Scheme: Letter Grade
Portland cement and aggregate properties relating to design, control, and performance of concrete. Concrete forming and construction methods. Laboratory testing and analysis.
Prerequisite: Course in introduction to civil engineering materials.

CGN 6506 Bituminous Materials 3 Credits
Grading Scheme: Letter Grade
Analysis of strength and deformation mechanism for asphalt concrete, properties, and their effect on flexible pavement performance. Pavement construction and quality assurance methods, testing and evaluation of asphalts and mixture.
Prerequisite: Course in introduction to pavement design.

CGN 6525 Sustainable Materials 3 Credits
Grading Scheme: Letter Grade
Providing a contemporary perspective to the sustainability problems associated with our dependence on materials and the consequences of their use. It introduces a method of decision making regarding materials selection, and design with materials, that considers the environmental and social impacts, in addition to the traditional assessment of the economic impact.
Prerequisite: Graduate standing.

CGN 6905 Special Problems in Civil Engineering 1-6 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Studies in areas not covered by other graduate courses.

CGN 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Credits do not apply to any graduate degree.

CGN 6936 Civil Engineering Graduate Seminar 1 Credit, Max 6 Credits
Grading Scheme: S/U
Lectures by graduate students, faculty members, and invited speakers.

CGN 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

CGN 6971 Research for Master’s Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master’s Thesis

CGN 6974 Master of Engineering or Engineer Degree Report 1-6 Credits, Max 6 Credits
Grading Scheme: S/U
Individual work culminating in a professional practice-oriented report suitable for the requirements of the Master of Engineering or Engineer degree. Three credits only are applicable toward the requirements of each degree.
Dynamics, Hydrodynamics (Fluid Mechanics), and Hydraulics.

Prerequisite:

Applying fluid mechanics to problems of turbulent mixing and transport

Grading Scheme:

CWR 6240 Mixing and Transport in Turbulent Flow 3 Credits
Grading Scheme: Letter Grade

CWR 6525 Groundwater Flow II 3 Credits
Grading Scheme: Letter Grade

Prerequisite: CWR 5125.

CWR 6536 Stochastic Subsurface Hydrology 3 Credits
Grading Scheme: Letter Grade

Stochastic modeling of subsurface flow and transport including geostatistics, time series analysis, Kalman filtering, and physically based stochastic models.

Prerequisite: senior-level course in probability and statistics, calculus through differential equations, soil physics, and/or subsurface hydrology.

CWR 6537 Contaminant Subsurface Hydrology 3 Credits
Grading Scheme: Letter Grade

Physical-chemical-biological concepts and modeling of retention and transport of water and solutes in unsaturated and saturated media. Applications of environmental aspects of soil and groundwater contamination.

Prerequisite: None.

EGM 5816 Intermediate Fluid Dynamics 3 Credits
Grading Scheme: Letter Grade

Basic laws of fluid dynamics. Introduction to potential flow, viscous flow, boundary layer theory, and turbulence.

Prerequisite: EGN 3353C (or CWR 3201), MAP 2302.

EGN 5949 Practicum/Internship/Cooperative Work Experience 1-6 Credits, Max 6 Credits
Grading Scheme: S/U

Prerequisite: graduate student.

EGN 6640 Entrepreneurship for Engineers 3 Credits
Grading Scheme: Letter Grade

Introduction to entrepreneurship, idea generating and feasibility analysis, and business planning. Lectures, case studies, student-led discussions, team business plans, and investor presentations.

EGN 6913 Engineering Graduate Research 0-3 Credits
Grading Scheme: S/U

Course will provide the student with supervised research in a laboratory setting.

EOC 5860 Port and Harbor Engineering 3 Credits
Grading Scheme: Letter Grade

Principles of port design; wave penetration; harbor oscillations; sediment movement and pollutant mixing; port structures, port operations; case studies.

Grading Scheme: EGN 3353C (or CWR 3201), MAP 2302 or equivalent.

EOC 6196 Littoral Processes 3 Credits
Grading Scheme: Letter Grade

Shoreline developments; nearshore hydrodynamics; sediment transport phenomena by waves and wind; methods of determining littoral transport quantities; effects of groins, jetties, and other coastal structures on littoral processes.

Grading Scheme: OCP 6165.

EOC 6430 Coastal Structures 3 Credits
Grading Scheme: Letter Grade

Planning and design for beach nourishment, breakwaters, jetties, seawalls and coastal protection structures.

Grading Scheme: OCP 6165.
EOC 6850 Numerical Simulation Techniques in Coastal and Ocean Engineering 3 Credits
Grading Scheme: Letter Grade
Numerical treatment of problems in ordinary and partial differential equations with application to incompressible geophysical fluid flows.

EOC 6905 Individual Study in Coastal and Oceanographic Engineering 1-4 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Individual Study in Coastal and Oceanographic Engineering

EOC 6934 Advanced Topics in Coastal and Oceanographic Engineering 1-6 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Waves; wave-structure interaction; coastal structures; ocean structures; sediment transport; instrumentation; advanced data analysis techniques; turbulent flow and its applications.

EOC 6939 Graduate Seminar 1 Credit, Max 6 Credits
Grading Scheme: S/U
Guest lecturers; lectures by COE faculty and students.

EOC 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

EOC 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

EOC 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

OCP 6050 Physical Oceanography 3 Credits
Grading Scheme: Letter Grade
Structure of ocean basins; physical and chemical properties of sea water; basic physical laws used in oceanography; ocean current; thermohaline effects; numerical models; heat budget.
Prerequisite: MAP 2302, EGN 3353C (or CWR 3201).

OCP 6165 Ocean Waves I: Linear Theory 3 Credits
Grading Scheme: Letter Grade
Ocean wave classification, solution of the linearized boundary value problem; simple harmonic waves; shoaling effects; internal waves.
Prerequisite: MAP 2302, EGN 3353C (or CWR 3201).

OCP 6167 Ocean Waves II: Nonlinear Theory 3 Credits
Grading Scheme: Letter Grade
Perturbation development of nonlinear water wave theories; regions of validity of various theories; dynamics and kinematics of nonlinear wave trains composed of single and multiple fundamental components.
Prerequisite: OCP 6165: Ocean Waves I: Linear Theory.

OCP 6168 Data Analysis Techniques for Coastal and Ocean Engineers 3 Credits
Grading Scheme: Letter Grade
Data editing, fundamentals of spectral analysis, subsurface and surface signal analysis, directional spectral analysis.

OCP 6295 Estuarine and Shelf Hydrodynamics I 3 Credits
Grading Scheme: Letter Grade
Kinematics and dynamics of estuaries, small scale motions, tidal hydrodynamics, nontidal circulations, shelf waves, estuary and shelf interactions, mathematical models.
Prerequisite: OCP 6050.

OCP 6297 Coastal and Estuarine Sediment Transport 3 Credits
Grading Scheme: Letter Grade
Sediment properties including size, mineralogy and plasticity, cohesion and floculation; settling velocity and initiation of motion; coarse and fine sediment transport; wave-sediment interaction; fluid mud rheology and transport; consolidation; sedimentation in estuaries and at coasts.

OCP 6298 Coastal Sediment Transport Processes 3 Credits
Grading Scheme: Letter Grade
Physical sedimentation processes, including boundary layer hydrodynamics, suspended sediment dynamics, and bedload mechanics under wave and current conditions.
Prerequisite: CWR 6236, OCP 6165.

TTE 5006 Advanced Urban Transportation Planning 3 Credits
Grading Scheme: Letter Grade
Analytical techniques for estimating future travel demands; and for for planning transportation facilities and locations. Review of transportation technology and future systems.
Prerequisite: Students are expected to be familiar with elementary statistics and have the ability for analytical/quantitative problem solving.

TTE 5256 Traffic Engineering 3 Credits
Grading Scheme: Letter Grade
Traffic characteristics, studies and analyses, street operations, level of service analysis, congestion and access management, signs and markings, pedestrians, bicycles, parking, roadway lighting.
Prerequisite: Students are expected to be familiar with elementary statistics and have the ability for analytical/quantitative problem solving.

TTE 5305 Advanced Transportation Systems Analysis 3 Credits
Grading Scheme: Letter Grade
Systems analysis in transportation planning and engineering, including supply, demand, equilibrium, evaluation, and decision analysis.
Prerequisite: Students are expected to be familiar with elementary statistics and have the ability for analytical/quantitative problem solving.

TTE 5805 Geometric Design of Transportation Facilities 3 Credits
Grading Scheme: Letter Grade
Geometric design criteria and controls of highways and intersections.
Prerequisite: Students are expected to be familiar with elementary statistics and have the ability for analytical/quantitative problem solving.

TTE 5837 Pavement Management Systems 3 Credits
Grading Scheme: Letter Grade
Evaluation, analysis, design, performance prediction, planning, and maintenance of pavements.
Prerequisite: Background in fundamentals of Civil Engineering Materials and Pavement Design.

TTE 6205 Freeway Operations and Simulation 3 Credits
Grading Scheme: Letter Grade
TTE 6207 Advanced Highway Capacity Analysis 3 Credits
Grading Scheme: Letter Grade
Procedures defined within the current Highway Capacity Manual (HCM), including analytical chapters for uninterrupted and interrupted flow.
Prerequisite: Students are expected to be familiar with elementary statistics and have the ability for analytical/quantitative problem solving.

TTE 6259 Urban Streets Simulation and Control 3 Credits
Grading Scheme: Letter Grade
Principles of simulation modeling and applications. Simulating urban street operations using commercially available packages; traffic signal control and optimization for urban streets; signal control hardware.
Prerequisite: TTE 5256.

TTE 6267 Traffic Flow Theory 3 Credits
Grading Scheme: Letter Grade
Vehicle-roadway-infrastructure interactions, equations of motion, and car-following; microscopic and macroscopic traffic characteristics and traffic stream models; simulation, queueing theory, and shockwave analysis.
Prerequisite: TTE 5256.

TTE 6306 Computational Methods in Transportation Engineering 3 Credits
Grading Scheme: Letter Grade
Applying numeric methods to traffic engineering/analysis. Key issues in implementing a computational methodology into a software format. Fundamentals of developing simulation software.
Corequisite: TTE 5256.

TTE 6315 Highway Safety Analysis 3 Credits
Grading Scheme: Letter Grade
Statistics and characteristics of accidents, accident reconstruction, accident causation and reduction.

TTE 6505 Discrete Choice Analysis 3 Credits
Grading Scheme: Letter Grade
Theory and models of individual choice behavior; unordered and ordered multinomial choice models, empirical specifications, maximum likelihood estimation, state-of-the-art methods, travel modeling applications.

TTE 6606 Urban Transportation Models 3 Credits
Grading Scheme: Letter Grade
Mathematical models for decision making in planning and operations of urban highway and transit systems.
Prerequisite: TTE 5305.

CLA 6125 Augustan Age 3 Credits
Grading Scheme: Letter Grade
In-depth investigation of history, political organization, literature, and society of Augustan Rome.
Prerequisite: B.A. in classics.

CLA 6795 Greek and Roman Archeology 3 Credits
Grading Scheme: Letter Grade
Grounding in monuments of ancient Greece and Roman, and history and methodology of classical archeology.
Prerequisite: B.A. in classics or related field.

CLA 6805 The Classical Research Tradition 3 Credits
Grading Scheme: Letter Grade
Research methods in the classics.

CLA 6895 Athenian Law and Society 3 Credits
Grading Scheme: Letter Grade
Comprehensive assessment of structures of classical Athens, offering detailed study of Athenian law, constitution, society, gender relations, and culture. Ancient life linked with modern debate on similar issues.
Prerequisite: B.A. in classics or related field.

CLA 6905 Individual Work 2-4 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Readings and reports in Classical civilization.

CLA 6930 Greece and the Near East 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Rotating topics concerning political, economic, diplomatic, and cultural interaction between Greek world and its neighbors in the East.

Computer and Information Science and Engineering

CAP 5100 Human-Computer Interaction 3 Credits
Grading Scheme: Letter Grade
Topics related to interaction with technology, including interface design, software tools, 3-D interaction, virtual environments, interaction devices, collaboration, and visualization.
Prerequisite: COP 3530, and any one programming course (COP 2800, COP 3275, or COP 3229).

CAP 5108 Research Methods for Human-Centered Computing 3 Credits
Grading Scheme: Letter Grade
Introduces the fundamental methods and techniques to evaluate technologies and collect data from humans, including experimental design, types of variables, types of errors, hypothesis testing, survey design, behavioral and psychophysical methods.
Prerequisite: STA 3032, COT 3100, COP 3530, or equivalent.

CAP 5416 Computer Vision 3 Credits
Grading Scheme: Letter Grade
Introduction to image formation and analysis. Monocular imaging system projections, camera model calibration, and binocular imaging. Low-level vision techniques, segmentation and representation techniques, and high-level vision.
Prerequisite: Prerequisites MAC 2312 or equivalent, COT 4501 or equivalent and Proficiency in MATLAB or C++ or Java. Course instructor will determine equivalency.

CAP 5510 Bioinformatics 3 Credits
Grading Scheme: Letter Grade
Basic concepts of molecular biology and computer science. Sequence comparison and assembly, physical mapping of DNA, phylogenetic trees, genome rearrangements, gene identification, biomolecular cryptology, and molecular structure prediction.
Prerequisite: CIS 3020 or equivalent.

CAP 5515 Computational Molecular Biology 3 Credits
Grading Scheme: Letter Grade
Algorithms related to molecular biology. Sequence comparisons, pattern matching, pattern extraction, graph techniques in phylogeny construction, secondary structure prediction, multiple sequence alignment, contig search, DNA computing, computational learning theory, and genetic algorithms.
CAP 5635 Artificial Intelligence Concepts 3 Credits
Grading Scheme: Letter Grade
Heuristic search, game theory, knowledge representation, logic, machine learning, AI languages and tools. Applications such as planning, natural language understanding, expert systems, and computer vision.
Prerequisite: COP 3530.

CAP 5705 Computer Graphics 3 Credits
Grading Scheme: Letter Grade
Display device characteristics; system considerations, display algorithms. Curve and surface generation. Lighting models and image rendering.
Prerequisite: COP 3530.

CAP 5771 Introduction to Data Science 3 Credits
Grading Scheme: Letter Grade
Introducing the basics of data science including programming for data analytics, file management, relational databases, classification, clustering and regression. The foundation is laid for big data applications ranging from social networks to medical and business informatics.
Prerequisite: COP 3530 Data Structures and Algorithms or equivalent.

CAP 6137 Malware Reverse Engineering 3 Credits
Grading Scheme: Letter Grade
Introducing the theory and practice of software reverse engineering applied to analysis of malicious software (malware). Students learn techniques of static and dynamic analysis to help identify the behavior of programs presented without documentation or source code and to identify possible remediation and avoidance techniques.
Prerequisite: CDA 3101; Corequisite: COP 5615 or consent of instructor.

CAP 6516 Medical Image Analysis 3 Credits
Grading Scheme: Letter Grade
Image formation, reconstruction mathematics (Fourier slice theorem, Abel, Hankel and Radon transforms), PDE-based denoising and segmentation, multidimensional clustering algorithms, iso-surface extraction, basic differential geometry of curves and surfaces, multidimensional splines, active 2D/3D models, image matching/registration with application to multimodal co-registration.
Prerequisite: expertise in image proc./comp. vision, proficiency in C language or MATLAB.

CAP 6610 Machine Learning 3 Credits
Grading Scheme: Letter Grade
Concepts in developing computer programs that learn and improve with experience. Emphasis on methods based on probability, statistics, and optimization.
Prerequisite: Mathematics for Intelligent Systems.

CAP 6615 Neural Networks for Computing 3 Credits
Grading Scheme: Letter Grade
Neural network models and algorithms. Adaptive behavior, associative learning, competitive dynamics and biological mechanisms. Applications include computer vision, cognitive information processing, control, and signal analysis.
Prerequisite: CAP 5635.

CAP 6617 Advanced Machine Learning 3 Credits
Grading Scheme: Letter Grade
Advanced concepts in developing computer programs that learn and improve with experience. Emphasis on methods based on probability, statistics, and optimization.
Prerequisite: CAP 6610.

CAP 6685 Expert Systems 3 Credits
Grading Scheme: Letter Grade
Production systems, meta-knowledge, heuristic discovery, in-depth examination of several expert systems including TEIRESIAS, AM, DENDRAL, MYCIN, IRIS, CASNET, INTERNIST, BACON, PROSPECTOR.
Prerequisite: CAP 5635.

CAP 6701 Advanced Computer Graphics 3 Credits
Grading Scheme: Letter Grade
Curved surface representations, representation and visualization of higher-dimensional fields, advanced rendering, collision detection and collision response, and scene navigation in context of high-level graphics environments.
Prerequisite: CAP 4730 or CAP 5705 or consent of instructor.

CAP 6769 Advanced Topics in Data Science 3 Credits
Grading Scheme: Letter Grade
Advanced topics in data science such as relational databases and parallel and distributed processing in the cloud, tree-based classifiers and support vector machines, dimensionality reduction and theories of visualization.

Prerequisite: Graduate standing, CAP 5771

CAP 6779 Projects in Data Science 3 Credits
Grading Scheme: Letter Grade
Advanced topics in data science, individual projects in application areas such as vision, natural language processing, computational fluid dynamics, social networks, bioinformatics, etc.
Prerequisite: Graduate standing, CAP 5XXX: Introduction to Data Science

CDA 5155 Computer Architecture Principles 3 Credits
Grading Scheme: Letter Grade
Fundamental design issues of processor and computer architecture, a variety of design approaches for CPU, memory, and system structure.
Prerequisite: CDA 3101, COP 3530, and COP 4600.

CDA 5636 Embedded Systems 3 Credits
Grading Scheme: Letter Grade
Design and verification of embedded systems including system-level modeling/specification, design space exploration, hardware-software partitioning, architecture synthesis, compilation for area/power/performance code compression, real-time operating systems/databases, and functional validation of embedded systems.
Prerequisite: CDA 3101, COP 3530, and any one programming course (CGS 2414, CGS 3460, or CGS 3464).

CEN 5035 Software Engineering 3 Credits
Grading Scheme: Letter Grade
Topics in projects organization, specification techniques, reliability measurement, documentation.
Prerequisite: COP 3504 and COT 3100.

CEN 5726 Natural User Interaction 3 Credits
Grading Scheme: Letter Grade
Introducing design, development, and evaluation of Natural User Interaction (NUI) technologies (e.g., non-keyboard and mouse technologies, such as touchscreen interaction, gesture interaction, speech interaction, etc.). Key concepts include hardware-to-software NUI pipeline and considerations in NUI software development (including existing platforms, toolkits, and APIs used to create NUI software).
Prerequisite: COP 3530(C)
CEN 5728 User Experience Design 3 Credits
Grading Scheme: Letter Grade
Introduces methods and tools used in User Experience Design (UXD): the early stages of software design focused on meeting user needs. Key concepts include user research, contextual design, design thinking, ideation, iterative design, prototyping, and design documentation. Software tools used in industry are used in class projects.
Prerequisite: COP 3530 or equivalent.

CEN 6070 Software Testing and Verification 3 Credits
Grading Scheme: Letter Grade
Concepts, principles, and methods for software testing and verification. Topics include human and machine-based testing strategies, formal proofs of correctness, and software reliability.
Prerequisite: CEN 5035.

CEN 6075 Software Specification 3 Credits
Grading Scheme: Letter Grade
Concepts, principles, and methods for practical specification. System modeling, requirements exploration, validation and prototyping, and documentation techniques.
Prerequisite: CEN 5035.

CIS 5370 Computer and Information Security 3 Credits
Grading Scheme: Letter Grade
Covers systematic threat and risk assessment; programmed threats and controls in hardware, software, and human procedures; security policies, models, and mechanisms; theoretical limitations and practical implementations; certification and accreditation standards; and case study reviews. Coursework includes a significant term project.
Prerequisite: COP 4600 Operating Systems or equivalent

CIS 5371 Introduction to Cryptology 3 Credits
Grading Scheme: Letter Grade
Introducing classical and modern cryptography and cryptanalysis, including symmetric and asymmetric (public key) ciphers. It covers cryptographic hash functions, block and stream ciphers, as well as differential and linear cryptanalysis. It reviews BAN logic, applications of cryptography, cryptographic standards and protocols, and analyzes case studies of failed implementations.
Prerequisite: COT 3100 Applications of Discrete Structures or equivalent ; Corequisite: COT 5405 Analysis of Algorithms or equivalent

CIS 6905 Individual Study 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Individual Study
Prerequisite: consent of faculty member supervising the study.

CIS 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research
Prerequisite: graduate status in CIS.

CIS 6930 Special Topics in CIS 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Special Topics in CIS
Prerequisite: vary depending on topics.

CIS 6935 Graduate Seminar 1-12 Credits, Max 12 Credits
Grading Scheme: S/U
Presentations by visiting researchers, faculty members, and graduate students.

CIS 6940 Supervised Teaching 3 Credits, Max 5 Credits
Grading Scheme: S/U
A supervised teaching experience.

CIS 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

CIS 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

CIS 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

CNT 5106C Computer Networks 3 Credits
Grading Scheme: Letter Grade

CNT 5410 Computer and Network Security 3 Credits
Grading Scheme: Letter Grade
Issues, analysis, and solutions. Viruses, worms, logic bombs, network attacks, covert channels, steganography, cryptology, authentication, digital signatures, electronic commerce.
Prerequisite: COP 3530, COT 5405.; Corequisite: COP 4600.

CNT 5412 Network and System Security 3 Credits
Grading Scheme: Letter Grade
Examining networked threats and vulnerabilities; trust, identification, authentication, and authorization in networked and distributed systems; secure network protocols and standards; certification of network products; firewall configurations, intrusion detection, and anomaly detection; security flaws in network protocols and distributed applications. Coursework includes a significant term project.
Prerequisite: CNT 5106C: Computer Networks or equivalent; COP 4600 - Operating Systems or equivalent ; Corequisite: COT 5405. Analysis of Algorithms or equivalent.

CNT 5517 Mobile Computing 3 Credits
Grading Scheme: Letter Grade
Examining modern networked mobile computing and communications, with focus on emerging mobile and wireless computing platforms. Topics include mobile computing models, mobile-IP, adhoc networks, Bluetooth, and 802.11b. Mobile database access and mobile transactions in context of emerging field of M-commerce.
Prerequisite: CNT 4007C.

CNT 6107 Advanced Computer Networks 3 Credits
Grading Scheme: Letter Grade
Computer network architecture, including topologies, media, switching, routing, congestion control, protocols, and case studies.
Prerequisite: COP 5615 , COP 5536 , and CNT 5106C

CNT 6885 Distributed Multimedia Systems 3 Credits
Grading Scheme: Letter Grade
Design issues; survey of recent advances, including compression, networking, and operating system issues.

COP 5536 Advanced Data Structures 3 Credits
Grading Scheme: Letter Grade
Development of efficient data structures used to obtain more efficient solutions to classical problems, such as those based on graph theoretical models, as well as problems that arise in application areas of contemporary interest.
Prerequisite: COP 3530.
COP 5556 Programming Language Principles 3 Credits  
**Grading Scheme:** Letter Grade  
History of programming languages, formal models for specifying languages, design goals, run-time structures, and implementation techniques, along with survey of principal programming language paradigms.  
**Prerequisite:** COP 3530.

COT 5520 Computational Geometry 3 Credits  
**Grading Scheme:** Letter Grade  
Design, analysis, and implementation of algorithms and data structures to solve geometric problems. Applications in graphics, robotics, computational biology, data mining, and scientific computing. Convex hulls, Voronoi diagrams, triangulations, arrangements, and range searching.  
**Prerequisite:** COP 3530.

COT 5615 Distributed Operating System Principles 3 Credits  
**Grading Scheme:** Letter Grade  
Concepts and techniques for efficient management of computer system resources.  
**Prerequisite:** COP 4600.

COT 5618 Concurrent Programming 3 Credits  
**Grading Scheme:** Letter Grade  
Overview of principles and programming techniques. Reasoning about concurrency, synchronization, program structuring, multi-threaded server applications.  
**Prerequisite:** COP 3100, 3530.

COT 5625 Programming Language Translators 3 Credits  
**Grading Scheme:** Letter Grade  
Anatomy of translators for high-level programming languages.  
**Prerequisite:** COP 5556.

COP 5725 Database Management Systems 3 Credits  
**Grading Scheme:** Letter Grade  
Introduction to systems and procedures for managing large computerized databases.  
**Prerequisite:** COP 3530, 4600, or equivalent.

COP 6726 Database System Implementation 3 Credits  
**Grading Scheme:** Letter Grade  
DBMS architecture, query processing and optimization, transaction processing, index structures, parallel query processing, object-oriented and object-relational databases, and related topics.  
**Prerequisite:** COP 4600 and 4720 or COP 5725.

COT 5405 Analysis of Algorithms 3 Credits  
**Grading Scheme:** Letter Grade  
Introduction and illustration of basic techniques for designing efficient algorithms and analyzing algorithm complexity.  
**Prerequisite:** COP 3530.

COT 5442 Approximation Algorithms 3 Credits  
**Grading Scheme:** Letter Grade  
Fundamentals of algorithmic paradigms, analysis, techniques, and software. Topics include greedy methods, randomized algorithms, IP-rounding, approximability, covering, packing, clustering, and network problems.  
**Prerequisite:** COP 3530 or COP 5405.

COT 5519 Sparse Matrix Algorithms 3 Credits  
**Grading Scheme:** Letter Grade  
Many applications in computational science rely on algorithms for large-scale sparse matrices (circuit simulation, finite-element methods, 'big data', Google StreetView, etc). Course equips students to understand and design methods that exploit sparsity in matrix computations. Focus is direct methods, which rely on combinatorics, graph theory and algorithms, and numerical methods.  
**Prerequisite:** COT 3100, COT 4501, COP 3530.

COT 6315 Formal Languages and Computation Theory 3 Credits  
**Grading Scheme:** Letter Grade  
Introduction to theoretical computer science including formal languages, automata theory, Turing machines, and computability.  
**Prerequisite:** COP 3530 and familiarity with discrete mathematics and data structures.

EGN 5949 Practicum/Internship/Cooperative Work Experience 1-6 Credits, Max 6 Credits  
**Grading Scheme:** S/U  
Practical cooperative engineering work under approved industrial and faculty supervision.  
**Prerequisite:** graduate student.

EGN 6913 Engineering Graduate Research 0-3 Credits  
**Grading Scheme:** S/U  
Course will provide the student with supervised research in a laboratory setting.

**Construction Management**

BCN 5470 Construction Methods Improvements 3 Credits  
**Grading Scheme:** Letter Grade  
Methods of analyzing and evaluating construction techniques to improve project time and cost control. Work sampling, productivity ratings, crew balance studies, time lapse photography, and time management.  
**Prerequisite:** graduate standing.

BCN 5618C Comprehensive Estimating 3 Credits  
**Grading Scheme:** Letter Grade  
Classification of work and quantity survey techniques. Analysis and determination of costs of construction operations including direct and overhead costs, cost analysis, and preparation of bid proposals.  
**Prerequisite:** graduate standing.

BCN 5625 Construction Cost Analysis 3 Credits  
**Grading Scheme:** Letter Grade  
Study of cost engineering and cost distribution and comparative analysis of actual and estimated cost as used for project control.  
**Prerequisite:** BCN 4612C/BCN 5618C, 4720/BCN 5722 graduate standing.

BCN 5705C Project Management for Construction 3 Credits  
**Grading Scheme:** Letter Grade  
Project organization, site planning, and implementation.  
**Prerequisite:** BCN 5618C, BCN 6748, non-BCN graduate.
BCN 5715 Advanced Construction Labor Problems 3 Credits  
**Grading Scheme:** Letter Grade  
Labor problems in the construction industry and associated legislation. How to work effectively with unionized labor on construction projects.  
**Prerequisite:** graduate standing.

BCN 5722 Advanced Construction Planning and Control 3 Credits  
**Grading Scheme:** Letter Grade  
Time-cost relationships for various construction operations.  
**Prerequisite:** BCN 4720, graduate standing.

BCN 5729 Design-Build Delivery Methods 3 Credits  
**Grading Scheme:** Letter Grade  
This course will be focusing on an in depth examination of the advantages and disadvantages of design-build, the methodology of the design-build delivery process and implementation of this process. The class will be featuring inter-disciplinary instructors, industry speakers, and a design-build team competition with industry and faculty judges.

BCN 5737 Advanced Issues in Construction Safety and Health 3 Credits  
**Grading Scheme:** Letter Grade  
Current construction safety and health issues. Development of specific methodology to provide hazard reduction on job sites.  
**Prerequisite:** BCN 4735, graduate standing.

BCN 5776 International Construction Business Management 3 Credits  
**Grading Scheme:** Letter Grade  
Construction contracting, emphasis on international economics, marketing, contracts, design, and specifications.  
**Prerequisite:** BCN 6748, graduate standing.

BCN 5778 Facilities Operation and Maintenance 3 Credits  
**Grading Scheme:** Letter Grade  
Facilities management as a specialized professional career; study of how a facility, its people, equipment, and operations are served and maintained.  
**Prerequisite:** graduate standing.

BCN 5780 Advanced Construction Planning 3 Credits  
**Grading Scheme:** Letter Grade  
How to work effectively with unionized labor on construction projects.

BCN 5795 Special Studies in Construction 1-5 Credits, Max 12 Credits  
**Grading Scheme:** Letter Grade  
For students requiring supplemental work in the building construction area.  
**Prerequisite:** graduate standing.

BCN 5849 Graduate Construction Management Internship 1-3 Credits, Max 6 Credits  
**Grading Scheme:** S/U  
Two-term employment in construction management position.  
**Prerequisite:** approval of graduate coordinator.

BCN 5957 Advanced International Studies in Construction 1-4 Credits, Max 6 Credits  
**Grading Scheme:** S/U  
Issues of local construction techniques, construction marketing, international construction, sustainability, global economics, and influence on construction of local culture, traditions, architecture, history, and political climate.  
**Prerequisite:** graduate standing or supervising instructor's approval; admission to approved study abroad program.

BCN 6036 Research Methods in Construction 3 Credits  
**Grading Scheme:** Letter Grade  
Research proposal development process and statistical, computational, visualization, and presentation tools available to researcher.  
**Prerequisite:** graduate standing.

BCN 6558C Building Integrated Renewable Energy Systems 3 Credits  
**Grading Scheme:** Letter Grade  
Addressing the emergence of economically and technically viable renewable energy systems and US and European Union policies calling for a net zero built environment. Provides the renewable energy piece for the Sustainable Construction (SCN) track in the BCN Masters program. It also provides additional capabilities and opportunities for students interested in employment in the renewable energy sector.  
**Prerequisite:** Graduate standing in Construction Management, Engineering or Architecture

BCN 6580 High-Performance Green Building Delivery Systems 3 Credits  
**Grading Scheme:** Letter Grade  
High-performance green buildings; emerging delivery systems, evaluating their sustainability, and details on LEED criteria.  
**Prerequisite:** graduate standing. BCN 6585/ICM 6680, or consent of instructor.

BCN 6585 Methods and Management for Heavy Construction 3 Credits  
**Grading Scheme:** Letter Grade  
Project control from conception through the construction phase: procurement of design professional, prime contractor, subcontractor construction manager, project/program manager, etc., and the definition of and delineation between each entity; construction contract types; delivery systems; heavy/highway plans reading; quality assurance / quality control; nuances of planning and bidding a unit price project.
BCN 6585 Sustainable Construction 3 Credits
Grading Scheme: Letter Grade
Sustainability principles applied to planning, design, operation, renovation, and deconstruction of built environment. Emphasis on resource efficiency, environmental protection, and waste minimization.
Prerequisite: graduate standing.

BCN 6586 Construction Ecology and Metabolism 3 Credits
Grading Scheme: Letter Grade
Sustainability principles and concepts related to reducing environmental impacts of creating, operating, and deconstruction built environment.
Prerequisite: graduate standing.

BCN 6641 Construction Value Engineering 3 Credits
Grading Scheme: Letter Grade
Principles and applications of value engineering in construction industry.
Prerequisite: BCN 4612C/BCN 5618C, graduate standing.

BCN 6748 Construction Law 3 Credits
Grading Scheme: Letter Grade
Formation of a company, licensing, bid process, contracts, plans and specifications, mechanics liens, insurance bonds, and remedies as they relate to the building constructor and construction manager. Case studies.
Prerequisite: graduate standing.

BCN 6785 Construction Information Systems 3 Credits
Grading Scheme: Letter Grade
Potential applications of computer and information systems in construction industry.
Prerequisite: CGS 2531 or equivalent, graduate standing.

BCN 6905 Directed Independent Study in Construction 1-3 Credits, Max 3 Credits
Grading Scheme: Letter Grade
Directed Independent Study in Construction
Prerequisite: graduate standing.

BCN 6933 Advanced Construction Management 1-5 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Financial and technological changes affecting construction and the management of construction projects.
Prerequisite: graduate standing.

BCN 6940 Supervised Teaching 1-3 Credits, Max 3 Credits
Grading Scheme: S/U
Supervised Teaching
Prerequisite: graduate standing.

BCN 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis
Prerequisite: graduate standing.

BME 6585C Bldg Energy Modeling 3 Credits
Grading Scheme: Letter Grade
Bldg Energy Modeling

FES 6705 Communications in Emergency Management 3 Credits
Grading Scheme: Letter Grade
Discussing several aspects of communication: communication coordination among emergency responders and agencies; effective communication with the public, including education programs; and guidelines for media relations and the use of new and traditional media to communicate during a crisis

FES 6724 Fire and Emergency Services Response Planning 3 Credits
Grading Scheme: Letter Grade
Comprehensive response planning including theory and value of response planning are examined. Steps to develop a strategic response plan are examined and discussed.

FES 6726 Hazard Mitigation and Preparedness 3 Credits
Grading Scheme: Letter Grade
Introducing major principles involved in preparing for and mitigating the impact of hazards in the context of ES/DM including key features and characteristics of both natural and man-made hazards, the risk assessment process that is used to determine community vulnerability, and in-depth discussion of hazard mitigation planning.

FES 6735 International Emergency/Disaster Management 3 Credits
Grading Scheme: Letter Grade
Applying science and technology, planning, risk analysis, and management in dealing with events that have the potential to kill and injure large numbers of people, do extensive property damage, and destroy our economic and physical infrastructure.

FES 6736 Homeland Security and Emergency Management 3 Credits
Grading Scheme: Letter Grade
Understanding of issues related to domestic and international terrorism, understanding of key terms and incidents, and development of practical plans for providing emergency services before, during, and after a terrorist incident.

FES 6786 Research Methods in FES 3 Credits
Grading Scheme: Letter Grade
Covering the research proposal development process and the statistical, computational, visualization, and presentation tools available to the researcher.
Prerequisite: Completion of 18 graduate credit hours in FES

FES 6806 Disaster Response and Recovery 3 Credits
Grading Scheme: Letter Grade
Exploring response and recovery operations in the emergency / disaster management profession. Typical challenges to be expected during response efforts along with tools and techniques to enhance the ability to protect lives, reduce property damage and minimize disruption through multi-organizational preparedness, coordination and improvisation will be examined.

FES 6824 Fire and Emergency Services Response Planning 3 Credits
Grading Scheme: Letter Grade
Introducing the process and practice of emergency/disaster planning. The relationship between emergency planning and disaster management and the principles of social psychology, communication theory and approaches to public education are explored.

FES 6827 Business Continuity and Disaster Planning 3 Credits
Grading Scheme: Letter Grade
Addressing risks from cyber attacks, rioting, protests, product tampering, bombs, explosions, and terrorism. Extensive disaster planning and readiness checklists and developing alternate work and computing sites and emergency facilities.

FES 6836 Impacts of Natural and Man-made Disasters on Buildings 3 Credits
Grading Scheme: Letter Grade
Impacts of natural and man-made disasters, including terrorist attacks, on buildings.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisite</th>
<th>Grading Scheme</th>
<th>Credits</th>
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<td>Research for Master's Report 3 Credits</td>
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<td>Research for Masters Report</td>
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<td>FES 6940</td>
<td>Practicum in FES 1-3 Credits, Max 3 Credits</td>
<td>Completion of 18 graduate credit hours in FES</td>
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<td>Research for Master's Thesis 1-6 Credits, Max 6 Credits</td>
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<td>ICM 5905</td>
<td>Special Studies 1-3 Credits, Max 12 Credits</td>
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<td>Commercial Management and Cost Control 3 Credits</td>
<td>Graduate</td>
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<td>Construction Value Management 3 Credits</td>
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<td>ICM 6642</td>
<td>Lean for Construction 1-3 Credits</td>
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<td>ICM 6680</td>
<td>Principles of International Sustainable Construction 3 Credits</td>
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<td>ICM 6682</td>
<td>Construction Ecology and Metabolism 3 Credits</td>
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<td>High-Performance Green Building Delivery Systems 3 Credits</td>
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<td>ICM 6710</td>
<td>Construction Human Resource Management 3 Credits</td>
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<td>ICM 6716</td>
<td>Construction Productivity and Methods Improvement 3 Credits</td>
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<td>ICM 6750</td>
<td>Managing Construction Information Technology 3 Credits</td>
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<td>ICM 6761</td>
<td>Advanced Planning, Scheduling, and Logistics 3 Credits</td>
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<td>ICM 6762</td>
<td>Construction Risk Management 3 Credits</td>
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<td>ICM 6767</td>
<td>Advanced Project Safety Management 3 Credits</td>
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<td>ICM 6775</td>
<td>Manufactured Construction Processes 3 Credits</td>
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<td>ICM 6905</td>
<td>Directed Independent Study in International Construction 1-3</td>
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<tr>
<td>ICM 6910</td>
<td>Supervised Research 1-3 Credits, Max 3 Credits</td>
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<td>ICM 6930</td>
<td>Construction Communication and Research 3 Credits</td>
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<td>ICM 6934</td>
<td>International Construction Research 1-6, Max 12 Credits</td>
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Criminology

CCJ 5934 Contemporary Issues in Criminology and Law 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Policy, theory, and research issues in crime, criminal justice, and law.

CCJ 6285 Criminal Justice Process 3 Credits
Grading Scheme: Letter Grade
Police, courts, and the correction system.

CCJ 6619 Crime and the Life Course 3 Credits
Grading Scheme: Letter Grade
Intensive examination of crime and the life course. How criminal activity is patterned over time.

CCJ 6643 White Collar Crime 3 Credits
Grading Scheme: Letter Grade
White collar and corporate crime.

CCJ 6705 Research Methods in Crime, Law, and Justice 3 Credits
Grading Scheme: Letter Grade
Research issues (qualitative, quantitative, and historical) associated with crime, law, and justice, including skills to become consumers and producers of research.

CCJ 6712 Evaluation Research 3 Credits
Grading Scheme: Letter Grade
Provides skills for evaluating criminology and criminal justice programs.

CCJ 6905 Independent Study 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Reading or research areas in criminology, law, and society. Topics not available in current courses.

CCJ 6910 Supervised Research 1-3 Credits, Max 3 Credits
Grading Scheme: S/U
Supervised Research

CCJ 6920 Seminar in Criminological Theory 3 Credits
Grading Scheme: Letter Grade
Classic and contemporary explanations of criminal activity.

CCJ 6936 Proseminar in Crime, Law, and Justice 3 Credits
Grading Scheme: Letter Grade
Interdisciplinary examination of the relationship between legal and social orders. Focuses on various functions of law, different forms of legal thought, development of law, and the impact of law/sanctions on society.

CCJ 6971 Research for Master's Thesis 1-9 Credits
Grading Scheme: S/U
Research for Master's Thesis

CCJ 7742 Research Methods in Crime, Law, and Justice II 3 Credits
Grading Scheme: Letter Grade
Quantitative and qualitative methods.
Prerequisite: CCJ 6705.

CCJ 7921 Professional Development in Criminology, Law, and Society 3 Credits
Grading Scheme: S/U
Professional aspects of research, teaching, and service activities in the areas of crime, justice, law, and society.

CCJ 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

CCJ 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

CJC 6120 Corrections and Public Policy 3 Credits
Grading Scheme: Letter Grade
Issues associated with corrections and public policy. Incarceration, community corrections, and probation.

CJL 6039 Law and Society 3 Credits
Grading Scheme: Letter Grade
The interface between law and knowledge from various social scientific disciplines, including psychology, sociology, history, and anthropology.

CJL 6090 Law and Social Science 3 Credits
Grading Scheme: Letter Grade
The interface between law and knowledge from various social scientific disciplines, including psychology, sociology, history, and anthropology.

Digital Worlds Institute

DIG 5555C Digital Media Projection Design I 3 Credits
Grading Scheme: Letter Grade
Students will be learning theoretical, technical and historical production-oriented perspectives of using projections for a variety of events. Students collaboratively design, construct and present a digital projection media project. Students work as "projection designer" on two main projects and write a research paper on an approved topic in projection design.
Prerequisite: Enrollment in the MA in DAS program or DAR program, or consent of Instructor.

DIG 5930 Special Topics 3 Credits
Grading Scheme: Letter Grade
Special Topics

DIG 5931C Special Topics 1-4 Credits
Grading Scheme: Letter Grade
Complements theory-based digital arts offerings with an up-to-the-minute examination of emergent cultural and technological events and developments.
Prerequisite: Admission in MA DAS program or consent of instructor.

DIG 6027 Digital Storytelling 1-4 Credits, Max 4 Credits
Grading Scheme: Letter Grade
Investigates participation and storytelling as foundations of interactivity. Explores how storytelling is incorporated into contemporary digital delivery platforms including games, social networks, and both linear and interactive media. Online and open-source tools are used to create content, taking advantage of mobile hardware already in students' possession.
Prerequisite: admission in MA DAS program or consent of instructor.
DIG 6028 Roots of Digital Culture 1-3 Credits
Grading Scheme: Letter Grade
Interdisciplinary approach to technological and cultural underpinnings shaping current digital media (video games, the Internet, computer-animated movies, virtual reality and online social networking), exploring and presenting individuated perspectives in both written and digital media assignments.
Prerequisite: admission in MA DAS program or consent of instructor.

DIG 6050C Entertainment Technology 1-4 Credits
Grading Scheme: Letter Grade
Evolving digital entertainment technologies and techniques, providing a forum to discuss current and future multimedia and hybrid media technologies, including the completion of an original design, script or treatment for a digital entertainment artifact.
Prerequisite: admission in MA DAS program or consent of instructor.

DIG 6125C Digital Design & Visualization 1-3 Credits
Grading Scheme: Letter Grade
Creation of 2D and 3D content for large-scale visualization systems employed in the creative services and industrial design fields. Providing participatory experience in controlling multi-screen sound and visualization environments in both intermediate and large-scale display environments.
Prerequisite: admission in MA DAS program or consent of instructor.

DIG 6126C Interaction Design 1-3 Credits
Grading Scheme: Letter Grade
Extend theoretical and practical perspectives into several focused projects using interaction principles prevalent in the entertainment and simulation industries, by creating and evaluating solutions across iterative design and testing cycles researching usability and affective influence. Emphasizes principles of cognitive psychology, including mental models, targeting and interface metaphors.
Prerequisite: admission in MA DAS program or consent of instructor.

DIG 6256C Audio Design For Digital Production 1-3 Credits
Grading Scheme: Letter Grade
Capturing, storing, processing, and retrieving audio in analog and digital domains for visual media and information systems. Recording, editing, processing, and mixing sound for 2-D and 3-D artifacts.
Prerequisite: Admission into the M.A. in DAS program or consent of instructor.

DIG 6358C Applied 3D Modeling and Animation 2 Credits
Grading Scheme: Letter Grade
3D asset production skills are essential for modelers and animators working in Digital Arts, Communications, Film, Interaction Design, Game, Industrial Design, and Architecture Industries. This course instructs students in the best industry standard practices and pipelines for creating 3D assets, with a special concentration in producing content for interactive media.
Prerequisite: (MAJOR DAS OR DAR) & CLASS GE7

DIG 6556C Digital Media Projection Design II 3 Credits
Grading Scheme: Letter Grade
Students will be completing a full Digital Media Projection Design working as “Lead Projection Designer” of a visual digital media presentation and prepare the design for live execution. This class requires attendance at all design, production and technological meetings pertaining to the project. This class applies skills added in Digital Media Projection Design 1 with LEAD DESIGNER project duties and responsibilities.
Prerequisite: (MAJOR DAS OR DAR) & CLASS GE7 & DIG 5555C

DIG 6589C Digital Portfolio 3 Credits
Grading Scheme: Letter Grade
Providing students with technical and design skills for the creation of a digital portfolio with interactive media suitable for distribution including DVD and a portfolio website. It also covers techniques for using and linking social media, digital branding and personal marketing.
Prerequisite: NONE. Intended for NON-DAS majors

DIG 6719 Videogame Theory and Analysis 2-4 Credits
Grading Scheme: Letter Grade
Surveying the emerging interdisciplinary study of videogames. Examine contemporary and historical scholarship on the medium. Focus on video games as socially-situated semiotic spaces that exist in dialogue with society at large.
Prerequisite: Admission into the MA in DAS program for either the 12-hour certificate or as a full-time Major or written consent of Instructor.

DIG 6744C Movement, Media and Machines 1-4 Credits
Grading Scheme: Letter Grade
Exploring existing and emergent relationships between human movement, interactive post-produced media and various electro-mechanical and digital machines. Texts, techniques and presentations from the spectrum of movement-based inquiry provide an interdisciplinary forum for transdisciplinary investigation.
Prerequisite: Admission into the MA in DAS program as a full-time Major or written consent of Instructor.

DIG 6751C Protocols for Multimedia Interfaces 2-4 Credits
Grading Scheme: Letter Grade
Covering protocols that control the interface components of a wide range of human-computer interaction devices including computers, mobile phones, multimedia players etc. Principles of interactive event handling and skills in coding touch screen interaction using contemporary platforms and mobile device environments, virtual world interaction, web-based interaction, as well as standard interaction methods for computer applications.
Prerequisite: Admission into the MA in DAS program as a full-time Major or written consent of Instructor.

DIG 6788C Digital Production & Game Design 1-4 Credits
Grading Scheme: Letter Grade
Students form small production teams and collaborate on a semester-long project with appointed production milestones, exploring intermediate and advanced 2-D and 3-D game design and visualization paradigms.
Prerequisite: Admission in MA DAS program or consent of instructor.

DIG 6837C Digital Tools for Arts and Humanities 3 Credits
Grading Scheme: Letter Grade
The study of digital applications, games, tools, and social networks to enhance research in the arts humanities. The course examines and expands on current theoretical discussions, applications, and methodologies. An interdisciplinary group project will further engage students in collaborative research and offer hands-on experience with digital tools.
Prerequisite: Class GE7.
DIG 6840 Interdisciplinary Research Seminar in Digital Arts & Sciences
1-4 Credits, Max 6 Credits
Grading Scheme: Letter Grade
An interdisciplinary exploration of current topics and trajectories with a goal of enabling the rapid-prototyping of ideas, inventions, and interactions utilizing the digital arts sciences. Single or multiple areas will be chosen and investigated with the intention of a resultant prototype publication, media artifact or research presentation.
Prerequisite: admission in MA DAS program or consent of instructor.

DIG 6850 Digital Arts & Sciences Convergence 1-4 Credits, Max 4 Credits
Grading Scheme: Letter Grade
Explores implications, ramifications, and transformations resulting from the convergence of traditional and digital technologies with cultural phenomena. Interdisciplinary teams study and undertake projects integrating aspects of global cultures, film, video games, animation, communications, and the recording arts.
Prerequisite: admission in MA DAS program or consent of instructor.

DIG 6906 Independent Study - Graduate Level 1-4 Credits, Max 4 Credits
Grading Scheme: Letter Grade
Independent study of individual Digital Arts Sciences projects and issues, under faculty supervision.
Prerequisite: Consent of faculty member supervising the study.

DIG 6931C Special Topics 1-3 Credits
Grading Scheme: Letter Grade
Special Topics

DIG 6950C Digital Performance Production 1-4 Credits
Grading Scheme: Letter Grade
Provides instruction on the configuration, assembly and execution of events in venues using streaming technologies for a variety of entertainment, business and research applications. Students demonstrate individuated achievement in performance technologies and integrated techniques via a final event of their own design.
Prerequisite: admission in MA DAS program or consent of instructor.

DIG 6971 Research for Master's Thesis 1-3 Credits, Max 6 Credits
Grading Scheme: S/U
Research for Master's Thesis
Prerequisite: CLASS GE7 & MAJOR DAR

DIG 6972C Capstone Project 2-4 Credits
Grading Scheme: S/U
Completion of an original project that addresses an identified issue or need within the field of Digital Arts and Sciences.
Prerequisite: Advanced standing in the MA in DAS graduate program; Permission of the Instructor.

DIG 6973 Capstone Project in Lieu of Thesis 1-6 Credits, Max 6 Credits
Grading Scheme: S/U
Submission of an original project based upon extended study of a topic within the field of Digital Arts Sciences (DAS). DIG 6973 is the course for students interested in completing a capstone project in lieu of a Thesis for a Master's of Arts degree.
Prerequisite: CLASS GE7 & MAJOR DAR

Economics

ECO 5114 Microeconomic Analysis 4 Credits
Grading Scheme: Letter Grade
Develops the foundational theoretical models employed in understanding market interactions. Examines consumer choice, profit maximization by suppliers, market equilibrium in settings that vary with respect to their competitiveness, economic efficiency, and policy interventions in markets.

ECO 5207 Macroeconomic Analysis 4 Credits
Grading Scheme: Letter Grade
Develops foundational tools of modern macroeconomic analysis. Examines consumption-labor decisions and consumption-savings decisions by households, profit maximization by firms, and the impacts of fiscal and monetary policy on the aggregate economy. Identifies optimal fiscal and monetary policies. Presents prominent theories of long-run economic growth.

ECO 5216 Monetary Economics 4 Credits
Grading Scheme: Letter Grade
Develops foundational theoretical models employed by modern monetary economics. Examines individual and aggregate money demands and analyzes their effect on interest rate determination. Examines liquidity effect of monetary injections on interest rates and currency exchange rates.

ECO 5426 Econometric Analysis 1 4 Credits
Grading Scheme: Letter Grade
Introduces concepts and methods employed in empirical economic analysis. Examines ordinary least squares, instrumental variables, maximum likelihood estimation, and model specification. Covers topics needed to plan and implement empirical projects, and understand potential problems with the empirical analyses of others.

ECO 5427 Econometric Analysis 2 4 Credits
Grading Scheme: Letter Grade
Introduces advanced concepts and methods employed in empirical economic analysis. Examines logit, probit, tobit, and categorical dependent variable models. Examines estimation of economic panel data. Covers topics needed to plan and implement empirical projects in the presence of limited dependent variables.
Prerequisite: ECO 5426

ECO 5435 Economic Data Analysis 4 Credits
Grading Scheme: Letter Grade
Introduces coding for data manipulations and statistical analysis in Stata. Investigates construction and calculation of economic indicators. Identifies imperfections inherent to common indicators. Examines microdata and aggregate-level economic data using panel data and fixed-effects regression models.

ECO 5464 Game Theory and Industrial Organization 4 Credits
Grading Scheme: Letter Grade
Introduces strategic behavior?what to do when your preferred action depends on others' choices of their own preferred actions?to the analysis of imperfectly competitive markets. Develops and examines Nash Equilibrium and numerous equilibrium refinements. Applies these solution refinements to important issues of imperfect competition.
ECO 5715 Open Economy Macroeconomics 2 Credits
Grading Scheme: Letter Grade
International linkages arising from capital flows and exchange rates as well as comparison on macroeconomic policies and performance across countries. Effect of macroeconomic events on international business environment.
Prerequisite: ECP 5702. Designed primarily for M.B.A. students.

ECO 5745 Global Trade and Policy 3 Credits
Grading Scheme: Letter Grade
Provides overview of theory, policy, and institutions that govern international flow of goods and services. Examines evolution of global trade, causes and effects of globalization, foreign outsourcing, effects of globalization on income distribution, international factor movements, strategic trade policy, multilateral and regional trade agreements, and global environmental issues.

ECO 6409 Game Theory Applied to Business Decisions 2 Credits
Grading Scheme: Letter Grade
Business settings analyzed wherein a few decision makers profoundly affect one another's well being. Oligopoly competition and coordination, nonprice choices, entry deterrence, reputation formation, contract design, and management of work teams.
Prerequisite: ECP 5702 or equivalent. Designed primarily for MBA students.

ECO 6716 International Macroeconomics 3 Credits
Grading Scheme: Letter Grade
Macroeconomic policies and their effects on the international business environment.
Prerequisite: ECP 5705. Designed primarily for M.B.A. students. Not designed for doctoral students in economics.

ECO 6906 Individual Work in Economics 1-4 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Individual Work in Economics

ECO 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

ECO 6936 Special Topics 1-4 Credits, Max 16 Credits
Grading Scheme: Letter Grade
Special Topics

ECO 6957 International Studies in Economics 1-4 Credits, Max 12 Credits
Grading Scheme: S/U
International Studies in Economics
Prerequisite: admission to approved study abroad program and permission of department.

ECO 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

ECO 6977 Financial Economics Capstone 3 Credits
Grading Scheme: Letter Grade
Introduces fundamentals of financial project management. Examines project financing for private and public projects. Covers numerous application-based topics including funds sourcing, legal frameworks and regulation, and credit risk. Includes capstone project in financial economics.
Prerequisite: Admission into the Master of Arts in Economics program.

ECO 7113 Information Economics 1-2 Credits, Max 2 Credits
Grading Scheme: Letter Grade
Analysis of information problems, remedies through contracting or adoption of different procedures and organization when complete contracting is infeasible.
Prerequisite: ECO 7115 and ECO 7408.
Corequisite: ECO 7404.

ECO 7115 Microeconomic Theory 3 Credits
Grading Scheme: Letter Grade
Analysis of optimization applied to consumer and product theory including comparative statistics and duality.
Corequisite: ECO 7408 or equivalent.

ECO 7118 Markets and Institutions 1-2 Credits
Grading Scheme: Letter Grade
Partial equilibrium analysis of four basic market structures: competition, monopoly (monopsony), oligopoly, and monopolistic competition. Topics include pricing strategies, vertical integration, and bilateral monopoly. Examination of policy implications.

ECO 7119 Information, Incentives, and Agency Theory 3 Credits
Grading Scheme: Letter Grade
Recent theoretical work in literature on design of incentive schemes in presence of limited information. Mathematical modeling and proof techniques emphasized.
Prerequisite: ECO 7115.

ECO 7120 General Equilibrium and Welfare Economics 1-2 Credits, Max 2 Credits
Grading Scheme: Letter Grade
Introduction to general equilibrium analysis, including existence of equilibrium, core convergence, and fundamental theorems of welfare economics.
Prerequisite: ECO 7115.

ECO 7206 Macroeconomic Theory I 3 Credits
Grading Scheme: Letter Grade

ECO 7272 Economic Growth I 1-2 Credits
Grading Scheme: Letter Grade
Introduction and overview of theoretical and empirical developments in determinants of long-run standards of living.
Prerequisite: ECO 7115 and ECO 7415.
Corequisite: ECO 7406.

ECO 7404 Game Theory for Economists 1-2 Credits, Max 2 Credits
Grading Scheme: Letter Grade
Introduction to modern game theory as used in economics. Emphasis on use of techniques in simple applications.
Prerequisite: ECO 7115 and ECO 7408.

ECO 7405 Mathematical Economics: Game Theory 3 Credits
Grading Scheme: Letter Grade
Advanced game theory including incomplete information games with application to economics.
Prerequisite: ECO 7404 and ECO 7408 or consent of instructor.
ECO 7406 Dynamic Economics: Theory and Applications 1-2 Credits, Max 2 Credits
Grading Scheme: Letter Grade
Review of techniques and applications of dynamic optimization and growth with introduction to modern dynamic techniques to analyze growth, resource management, stabilization policy, capital accumulation, asset pricing, search behavior, and incentive contracting.
Prerequisite: ECO 7115 and ECO 7408.

ECO 7408 Mathematical Methods and Applications to Economics 1-2 Credits, Max 2 Credits
Grading Scheme: Letter Grade
Mathematical techniques used in graduate work in economics and finance. Linear algebra and differential equations, with emphasis on results used in economic theory and econometrics.

ECO 7415 Statistical Methods in Economics 3 Credits
Grading Scheme: Letter Grade
Coreq: ECO 7408. Introduction to fundamental statistical concepts: estimation, hypothesis testing, linear regression, and analysis of variance.

ECO 7424 Econometric Models and Methods 3 Credits
Grading Scheme: Letter Grade
Introduction to classical econometric theory, linear models, and estimation methods.
Prerequisite: ECO 7415.

ECO 7426 Econometric Methods I 3 Credits
Grading Scheme: Letter Grade
Stochastic models. The general linear model and problems associated with its use in econometric research. Theory of the simultaneous equation approach, model construction, and estimation techniques.
Prerequisite: ECO 7424 or departmental approval.

ECO 7427 Econometric Methods II 3 Credits
Grading Scheme: Letter Grade
Advanced econometric theory with applications to topics such as nonlinear estimation, limited dependent variable models, time-series analysis, and specification testing.
Prerequisite: ECO 7424 or AEB 7571.

ECO 7452 Best Empirical Practices in Economics 1-2 Credits
Grading Scheme: Letter Grade
Analysis of empirical papers to develop skills for evaluating and conducting empirical testing of economic theory.

ECO 7467 Financial Econometrics 3 Credits
Grading Scheme: Letter Grade
Covers econometric applications to financial economics. Examines common and desirable properties of financial data, determination of financial asset prices and returns, modeling of stationary and nonstationary variables, and modeling volatility. Introduces financial forecasting.
Prerequisite: ECO 7424: Econometric Models and Methods

ECO 7525 Welfare Economics and The Second Best 1-2 Credits
Grading Scheme: Letter Grade
Introduction and overview of public sector economics. Basic welfare economics, optimal commodity and income taxation, and public goods and welfare.
Prerequisite: ECO 7115

ECO 7534 Empirical Public Economics I 1-2 Credits, Max 2 Credits
Grading Scheme: Letter Grade
Taxation, expenditures, marketplace of local governments, federalism and sources of inefficiency in government, voter turnout.
Prerequisite: ECO 7424 and 7525.

ECO 7535 Empirical Public Economics II 1-2 Credits
Grading Scheme: Letter Grade
Education, welfare policy, health policy, and environmental policy.

ECO 7536 Theoretical Public Economics 1-2 Credits
Grading Scheme: Letter Grade
The course is concerned primarily with public goods and their provision.
Prerequisite: ECO 7115.

ECO 7706 Theory of International Trade 3 Credits
Grading Scheme: Letter Grade
Historical and economic background of foreign trade; theory of international trade; fundamentals of international exchange; international commercial policies and international trade; exchange fluctuations and their control; international monetary institutions.

ECO 7707 International Economic Relations 3 Credits
Grading Scheme: Letter Grade
International trade and income distribution, international technology diffusion, foreign direct investment and multinational enterprise, formation and reform of trade and investment policy.

ECO 7925 Research Skills Workshop 3 Credits
Grading Scheme: S/U
Transition from learning about work of others to doing research. Selecting area of research, surveying literature, narrowing to specific topic, formulating model, collecting data if appropriate, working through theoretical or empirical analysis, and writing first draft.
Prerequisite: passed written qualifying exams.

ECO 7938 Advanced Economics Seminar 1-4 Credits, Max 8 Credits
Grading Scheme: Letter Grade
For advanced graduate students in economics. Student must have completed graduate core program and have preliminary dissertation topic.

ECO 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ECO 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

ECP 5702 Managerial Economics 2 Credits
Grading Scheme: Letter Grade
Microeconomic forces that influence decisions made by firms. Cost concepts, pricing strategies, capital investment, human resource management, innovation, and the influence of the competitive environment of firms.
Prerequisite: Designed primarily for M.B.A. students.

ECP 5705 Economics of Business Decisions 3 Credits
Grading Scheme: Letter Grade
Synthesis and application of microeconomic theory and related business administration principles to managerial decision making through a problem-solving orientation.
Prerequisite: Designed primarily for M.B.A. students.

ECP 6701 Competitive Strategies in Expanding Markets 2 Credits
Grading Scheme: Letter Grade
Identify and analyze strategies in expanding markets created by technological change and accelerated globalization.
Prerequisite: ECP 5702; MBA and other master's students.
EDA 6195 Educational Policy Development 3 Credits
Grading Scheme: Letter Grade
Contemporary research on political power in policy decision making and role of educational leaders in policy development.

EDA 6215 Communications in Educational Leadership 3 Credits
Grading Scheme: Letter Grade
School/community relations and communication implications for educational leaders.

EDA 6222 Administration of School Personnel 3 Credits
Grading Scheme: Letter Grade
Problems of the professional school staff and administration of staff personnel in public schools.

EDA 6232 Public School Law 3 Credits
Grading Scheme: Letter Grade
The law as it affects public school operation in America. Religion; desegregation; compulsory attendance; torts; curriculum; student control and discipline; and teacher freedoms, employment, and dismissal.

EDA 6242 Public School Finance 3 Credits
Grading Scheme: Letter Grade
State, local, and federal financing of education.

EDA 6271 Technology Leadership for Educational Administrators 3 Credits
Grading Scheme: Letter Grade
Application of computer technology to leadership and management of educational enterprise.

EDA 6326 Turnaround Schools 3 Credits
Grading Scheme: Letter Grade
This course examines the themes in the contemporary use of school turnaround as a strategy for improving chronically underperforming schools. This course examines (1) the need for turnaround, (2) best practices in turnaround, (3) turnaround leadership, (4) the human costs of turnaround, and (5) the effectiveness of school turnaround.

EDA 6370 Mentoring for Career Development 3 Credits
Grading Scheme: Letter Grade
Assists graduate students in their careers in any field through the discovery of how mentoring, a commonly accepted support structure in business, industry, medicine, and academia, can enhance their professional development. In addition, students will gain knowledge to become mentors or lead mentoring programs.
Prerequisite: Graduate standing.

EDA 6423 Data-Driven Decision Making in Educational Organizations 3 Credits
Grading Scheme: Letter Grade
Analytical and leadership issues related to conducting data-driven decision making in a professional, legal, ethical, and methodologically sound manner.

EDA 6503 The Principalship 3 Credits
Grading Scheme: Letter Grade
Organization and administration of the school; emphasis on competencies necessary for leadership and management of the school center, both elementary and secondary.

EDA 6509 The Superintendent 3 Credits
Grading Scheme: Letter Grade
The course will focus on the superintendent’s leadership responsibilities and specific job functions. Attention will be centered on acquiring the knowledge and skills to address contemporary challenges facing superintendents.
EDA 6905 Individual Work 1-6 Credits, Max 12 Credits  
Grading Scheme: Letter Grade  
For advanced students who wish to study individual problems under faculty guidance.  
Prerequisite: students must have approval of proposed project before registering.

EDA 6931 Special Topics 1-5 Credits, Max 10 Credits  
Grading Scheme: Letter Grade  
Special Topics

EDA 6948 Supervised Practice in School Administration 1-15 Credits, Max 15 Credits  
Grading Scheme: S/U  
Opportunity to perform administrative duties under supervision.  
Prerequisite: open only to advanced students.

EDA 6971 Research for Master's Thesis 1-15 Credits  
Grading Scheme: S/U  
Research for Master's Thesis

EDA 7206 Organizational Leadership in Education 3 Credits  
Grading Scheme: Letter Grade  
Developing concepts and refining skills associated with planning and organizing in educational institutions.  
Prerequisite: EDA 6192.

EDA 7945 Practicum in Supervision and Administration 1-15 Credits, Max 15 Credits  
Grading Scheme: S/U  
A seminar and an internship in administration and supervision.

EDA 7979 Advanced Research 1-12 Credits  
Grading Scheme: S/U  
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

EDA 7980 Research for Doctoral Dissertation 1-15 Credits  
Grading Scheme: S/U  
Research for Doctoral Dissertation

EDA 7985 Research Design in Educational Administration 3 Credits  
Grading Scheme: Letter Grade  
Conceptualizing problems in administration and determining appropriate research procedures.  
Prerequisite: EDF 7486 or equivalent. Open only to advanced graduate students.

EDF 5441 Assessment in General and Exceptional Student Education 3 Credits  
Grading Scheme: Letter Grade  
Basic measurement concepts, designing classroom assessments, and interpreting results from traditional or alternative assessments; using these to plan instruction and evaluate student performance.  
Prerequisite: STA 3122.

EDF 6113 Educational Psychology: Human Development 3 Credits  
Grading Scheme: Letter Grade  
Current research and theories in the area of human development.

EDF 6211 Educational Psychology: General 3 Credits  
Grading Scheme: Letter Grade  
Basic principles, techniques, and research; designed for graduate students preparing to teach who have a minimal background in psychology.

EDF 6215 Educational Psychology: Learning Theory 3 Credits  
Grading Scheme: Letter Grade  
Logic and methodologies of theories of learning.  
Prerequisite: consent of instructor.

EDF 6400 Quantitative Foundations of Education Research Overview 3 Credits  
Grading Scheme: Letter Grade  
Overview of quantitative methods: validity, reliability, research design, and inferential statistics.  
Prerequisite: STA 2023, STA 2122 or equivalent.

EDF 6401 Educational Statistics 3 Credits  
Grading Scheme: Letter Grade  
Application to educational data and problems.  

EDF 6402 Quantitative Foundations in Educational Research: Inferential Statistics 3 Credits  
Grading Scheme: Letter Grade  
Analysis of variance: One-way ANOVA, two-way ANOVA, ANOVA, repeated measures, and split plot.  
Prerequisite: EDF 6400.

EDF 6403 Quantitative Foundations of Educational Research 6 Credits  
Grading Scheme: Letter Grade  
Integrated coverage of fundamentals in the general field of education research. Includes statistics, experimental design, and data processing.  
Prerequisite: STA 2023, 2122, or equivalent.

EDF 6416 Quantitative Methods for Evaluation in Educational Environments 3 Credits  
Grading Scheme: Letter Grade  
Integrated coverage of advanced quantitative methods for evaluation research in education. A conceptual approach with an emphasis on reading and writing research results sections. Topics include data management and specific applications of univariate and multivariate statistical procedures to educational data.

EDF 6436 Theory of Measurement 4 Credits  
Grading Scheme: Letter Grade  
Introductory study of true score models, reliability, validity, norms, scaling, item analysis, and basic elements of instrument construction.  
Prerequisite: STA 2023; EDF 4430.

EDF 6463 Culturally Responsive Evaluation in Educational Environments 3 Credits  
Grading Scheme: Letter Grade  
Theory, models, and methods applicable to the planning and implementation of culturally responsive evaluations with the recognition that evaluation takes place within cultural, social, economic, and political contexts.  
Prerequisite: EDF 6401.

EDF 6464 Reading and Designing Qualitative Research 3 Credits  
Grading Scheme: Letter Grade  
Enterprises students to basic concepts and theories in qualitative research to enable them to design and conduct qualitative studies. Examples of different types of qualitative research designs and approaches are analyzed in relation to specific evaluative criteria.

EDF 6468 Evaluation Management for Grants in Educational Environments 3 Credits  
Grading Scheme: Letter Grade  
Coverage of the theory and tools applicable to the planning, implementing, and completing a grant-funded evaluation.  
Prerequisite: EDF 6401
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Prerequisite</th>
<th>Grading Scheme</th>
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<tbody>
<tr>
<td>EDF 6471</td>
<td>Survey Design and Analysis in Educational Research 3 Credits</td>
<td>3</td>
<td>EDF 6403.</td>
<td>Letter Grade</td>
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<tr>
<td></td>
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<td></td>
<td>Techniques of protocol development, data collection, analysis, and reporting.</td>
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<td>EDF 6475</td>
<td>Qualitative Foundations of Educational Research 4 Credits</td>
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<td>Letter Grade</td>
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<td>Introduction to philosophical, historical, sociological, and other methodologies as aspects of qualitative educational research.</td>
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<td>EDF 6481</td>
<td>Quantitative Research Methods in Education 4 Credits</td>
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<td>Letter Grade</td>
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<td>Design and data analysis for educational research.</td>
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<td>EDF 6492</td>
<td>Evaluation Communication and Ethics in the Educational Environment 3 Credits</td>
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<td>Letter Grade</td>
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<td>Provides a twofold emphasis: one on strategies for communicating and reporting evaluation processes and findings, and another on the understandings and applications of ethics to evaluation research.</td>
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<td>EDF 6905</td>
<td>Individual Study 1-3 Credits, Max 12 Credits</td>
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<td>STA 2023, 2122 or equivalent.</td>
<td>S/U</td>
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<td>For advanced students who wish to study individual problems in psychological, social, or philosophical foundations of education, or research and measurement under faculty guidance.</td>
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<td>EDF 6910</td>
<td>Supervised Research 1-5 Credits, Max 5 Credits</td>
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<td>Supervised Research</td>
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<tr>
<td>EDF 6938</td>
<td>Special Topics 1-3 Credits, Max 12 Credits</td>
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<td>Special Topics</td>
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<tr>
<td>EDF 6940</td>
<td>Supervised Teaching 1-5 Credits, Max 5 Credits</td>
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<td>Supervised Teaching</td>
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<tr>
<td>EDF 6941</td>
<td>Practicum in Educational Research 2-9 Credits, Max 9 Credits</td>
<td>9</td>
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<td></td>
<td>Experience in conducting various phases of quantitative or qualitative educational research under individual supervision.</td>
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<tr>
<td>EDF 6971</td>
<td>Research for Master's Thesis 1-15 Credits</td>
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<td>Research for Master's Thesis</td>
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<td>EDF 6973</td>
<td>Project in Lieu of Thesis 1-6 Credits</td>
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<td>Develop a comprehensive evaluation plan for a program in an educational environment. Provide strong theoretical and practical rationale for the plan and approach. Implement and conduct the evaluation and provide a final report.</td>
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<tr>
<td>EDF 7405</td>
<td>Advanced Quantitative Foundations of Educational Research 4 Credits, Max 8 Credits</td>
<td>8</td>
<td>EDF 6403.</td>
<td>Letter Grade</td>
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<td>Integrated coverage of important approaches to educational research. Includes application of experimental design, regression analysis, and computer processing to selected educational research problems.</td>
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<tr>
<td>EDF 7412</td>
<td>Structural Equation Models 3 Credits</td>
<td>3</td>
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<td>Letter Grade</td>
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<td>Confirmatory factor analysis and causal models.</td>
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<tr>
<td>EDF 7413</td>
<td>Advanced Topics in Structural Equation Modeling 3 Credits</td>
<td>3</td>
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<td>Methods for conducting methodological research about structural equation modeling (SEM) and advanced techniques in SEM: multilevel SEM, mixture models, latent variable interactions, advanced latent growth models and SEM with complex survey data.</td>
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<tr>
<td>EDF 7435</td>
<td>Rating Scale Design and Analysis in Educational Research 3 Credits</td>
<td>3</td>
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<td>Letter Grade</td>
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<td>Psychometric models for test scores; estimation of ability and item parameters; applications of and current issues in IRT.</td>
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<tr>
<td>EDF 7445</td>
<td>Multilevel Models 3 Credits</td>
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<td>Models and methods for analysis of multilevel data.</td>
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<tr>
<td>EDF 7479</td>
<td>Qualitative Data Analysis: Approaches and Techniques 3 Credits</td>
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<td></td>
<td>Theories, approaches, and techniques of qualitative data analysis.</td>
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<tr>
<td>EDF 7482</td>
<td>Quasi-experimental Design and Analysis in Educational Research 3 Credits</td>
<td>3</td>
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<td>Examining quasi-experimental educational research designs and methods for data analysis for treatment comparisons that do not use random assignment of participants to conditions. Topics include matched designs, regression discontinuity designs, and control of selection bias using propensity scores, instrumental variables, and fixed effects.</td>
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<tr>
<td>EDF 7483</td>
<td>Qualitative Data Collection: Approaches and Techniques 3 Credits</td>
<td>3</td>
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<td></td>
<td></td>
<td>Qualitative Data Collection: Approaches and Techniques</td>
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<td>Permission of the department.</td>
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</table>
EDF 7486 Methods of Educational Research 3 Credits  
**Grading Scheme:** Letter Grade  
Examination of research methodologies. Problem identification as well as organization and presentation of data.  
**Prerequisite:** STA 2023. Primarily for Ed.D. candidates.

EDF 7491 Evaluation of Educational Products and Systems 3 Credits  
**Grading Scheme:** Letter Grade  
Models and methods for formative and summative evaluation of educational products and programs.  
**Prerequisite:** EDF 6403 or equivalent.

EDF 7931 Seminar in Educational Research 3 Credits, Max 6 Credits  
**Grading Scheme:** Letter Grade  
In-depth examination of specific methodological approaches to educational research.  
**Prerequisite:** EDF 6403.

EDF 7932 Multivariate Analysis in Educational Research 3 Credits  
**Grading Scheme:** Letter Grade  
Review of selected studies, focusing on methods of data analysis. Emphasis on using multivariate techniques.  
**Prerequisite:** EDF 6403 and EDF 7405.

EDF 7979 Advanced Research 1-12 Credits  
**Grading Scheme:** S/U  
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

EDF 7980 Research for Doctoral Dissertation 1-15 Credits  
**Grading Scheme:** S/U  
Research for Doctoral Dissertation

EDG 6285 Evaluation in the School Program 3 Credits  
**Grading Scheme:** Letter Grade  
Procedures and techniques of evaluation in school programs. Emphasizes needs assessment, school self-study, and course evaluation.

EDH 6006 The College Student 3 Credits  
**Grading Scheme:** Letter Grade  
Examines the trends and nature of the changing demographic of college student subpopulations, including race, gender, and socioeconomic status. Additionally, the course examines the various educational and societal outcomes associated with college attendance, including intellectual development, psychosocial change, moral development, and career and economic impacts after college.

EDH 6040 Theory of College Student Development 3 Credits  
**Grading Scheme:** Letter Grade  
Introduction to history, roles, and functions.

EDH 6051 Educational Outcomes of American Colleges and Universities 3 Credits  
**Grading Scheme:** Letter Grade  
Exploration of impact of postsecondary educational institutions and barriers to student development.

EDH 6053 The Community Junior College in America 3 Credits  
**Grading Scheme:** Letter Grade  
Programs, issues, and problems.

EDH 6065 History of American Higher Education 3 Credits  
**Grading Scheme:** Letter Grade  
Focuses on the development of American colleges and universities. Emphasis is placed on the historical natures of institutional types, the history of inclusion and exclusion of people with a variety of identities, and the relevance of historical context to current and emergent professional practice.

EDH 6066 American Higher Education 3 Credits  
**Grading Scheme:** Letter Grade  
History, philosophy, and policies, with emphasis on current practices and problems.

EDH 6305 College and University Teaching 3 Credits  
**Grading Scheme:** Letter Grade  
Contemporary issues, problems, and research related to the role of the college faculty member and the teaching-learning process.

EDH 6360 Foundations and Functions of College Student Personnel 3 Credits  
**Grading Scheme:** Letter Grade  
Introduction to history, roles, and functions.

EDH 6361 Theories and Assessment of Higher Educational Environments 3 Credits  
**Grading Scheme:** Letter Grade  
Examines theoretical approaches that define and describe various elements of higher educational environments.

EDH 6503 Resource Development in Higher Education 3 Credits  
**Grading Scheme:** Letter Grade  
Exploration of financial resource development in higher education institutions and organizations.

EDH 6632 Current Issues in Community College Leadership 3 Credits  
**Grading Scheme:** Letter Grade  
Case-based approach to examining current issues on community college campuses.

EDH 6637 Crisis Management in Higher Education 3 Credits  
**Grading Scheme:** Letter Grade  
Introduction to real crisis situations. Students form emergency plans based on different crisis response models.

EDH 6664 Public Policy in Higher Education 3 Credits  
**Grading Scheme:** Letter Grade  
Explores the conceptual and theoretical frameworks used to situate the public policy process in the higher education context. Students will evaluate the effectiveness of policies and will examine the historical and contemporary practices, procedures, and protocols used to address the changing political landscape of American postsecondary education.

EDH 6905 Individual Work 1-3 Credits, Max 12 Credits  
**Grading Scheme:** Letter Grade  
For advanced students who wish to study individual problems in higher education administration under faculty guidance.  
**Prerequisite:** Students must have approval of proposed project before registering.

EDH 6931 Special Topics in Higher Education 1-3 Credits, Max 10 Credits  
**Grading Scheme:** Letter Grade  
Special Topics in Higher Education
EDH 6935 Capstone Seminar in Student Personnel in Higher Education 3 Credits
Grading Scheme: S/U
Culminating seminar integrating core curriculum and practitioner experience.
Prerequisite: consent of instructor.
EDH 6947 Practicum in Student Personnel 3 Credits, Max 6 Credits
Grading Scheme: S/U
Practicum in Student Personnel
Prerequisite: adviser's consent, and written application to practicum coordinator.
EDH 7050 Exploration of Research Literature in Higher Education 3 Credits
Grading Scheme: Letter Grade
Facilitates the selection of significant research topics and preparation of a literature review. This course will familiarize students with the characteristics of the research proposal and help students develop the skills to write an integrative literature review.
EDH 7225 Seminar: Curriculum in Higher Education 3 Credits
Grading Scheme: Letter Grade
Issues and problems in college and university curricula. Curriculum planning, implementation, and evaluation.
EDH 7405 The Law and Higher Education 3 Credits
Grading Scheme: Letter Grade
The legal structure of higher education, religion, academic freedom of faculty, employment, due process, students' rights of speech and expression, search and seizure, desegregation, and tort liability.
EDH 7505 The Financing of Higher Education 3 Credits
Grading Scheme: Letter Grade
Junior college through university. Theoretical basis for use of tax funds for education, student fees and tuition, state methods for financing, planning, cost benefit, budgeting, federal role, and capital outlay.
EDH 7631 Administration of Instruction in Higher Education 3 Credits
Grading Scheme: Letter Grade
Skills and knowledge for current and future college leaders.
EDH 7634 Student Affairs Administration in Higher Education 3 Credits
Grading Scheme: Letter Grade
Major issues. Purposes, structure, program evaluation, and budgeting.
EDH 7635 Higher Education Administration 3 Credits
Grading Scheme: Letter Grade
Educational policies, functions, and practices.
EDH 7636 Organizational Theory in Higher Education 3 Credits
Grading Scheme: Letter Grade
Evaluates the major theories and practices used to examine higher education institutions and their governing forces from multiple perspectives.
EDH 7800 Practicum in Higher Education 3 Credits
Grading Scheme: S/U
Practicum in Higher Education
Prerequisite: written application to internship coordinator before registration.
EDH 7947 Internship in Student Personnel 5 Credits
Grading Scheme: S/U
Internship in Student Personnel
Prerequisite: adviser's consent; and written application to internship coordinator before registration.
EDH 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.
EDH 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for doctoral candidates
Prerequisite: Candidacy
EDH 7982 Research Proposal Development in Higher Education 3 Credits
Grading Scheme: Letter Grade
Provides students with research strategies and writing skills to complete a research proposal in higher education administration.
Prerequisite: EDH 7050.
EPD 6052 Cognitive Psychology Applied to Education 3 Credits
Grading Scheme: Letter Grade
Introduction to cognitive-psychological research and applications to education.
MHS 5005 Introduction to Counseling 3 Credits
Grading Scheme: Letter Grade
Introduction to Counseling
MHS 6000 Assessment and Treatment of Family Violence 3 Credits
Grading Scheme: Letter Grade
Clinically oriented, research-based overview of assessing and treating family violence.
Prerequisite: MHS 6401.
MHS 6020 Counseling in Community Settings 3 Credits
Grading Scheme: Letter Grade
Counseling in Community Settings
Prerequisite: MHS 7800.
MHS 6061 Spiritual Issues in Multicultural Counseling 3 Credits
Grading Scheme: Letter Grade
Spiritual/religious/transpersonal issues expressed in counseling from both client and counselor perspective.
MHS 6071 Diagnosis and Treatment of Mental Disorders 3 Credits
Grading Scheme: Letter Grade
Diagnosis and Treatment of Mental Disorders
Prerequisite: MHS 6401.
MHS 6200 Assessment in Counseling 3 Credits
Grading Scheme: Letter Grade
Assessment in Counseling
Prerequisite: course in basic statistics.
MHS 6340 Career Development 3 Credits
Grading Scheme: Letter Grade
Career Development
MHS 6401 Counseling Theories and Applications 3 Credits
Grading Scheme: Letter Grade
Counseling Theories and Applications
MHS 6421 Play Counseling and Play Process with Children 3 Credits  
Grading Scheme: Letter Grade  
Play Counseling and Play Process with Children  
Prerequisite: MHS 6401.

MHS 6428 Multicultural Counseling 3 Credits  
Grading Scheme: Letter Grade  
Multicultural Counseling  
Prerequisite: MHS 6401.

MHS 6430 Introduction to Family Counseling 3 Credits  
Grading Scheme: Letter Grade  
Introduction to Family Counseling

MHS 6440 Marriage and Couples Counseling 3 Credits  
Grading Scheme: Letter Grade  
Marriage and Couples Counseling

MHS 6450 Substance Abuse Counseling 3 Credits  
Grading Scheme: Letter Grade  
Substance Abuse Counseling

MHS 6466 Trauma and Crisis Intervention: Theory and Practice 3 Credits  
Grading Scheme: Letter Grade  
Theories and practice models related to trauma and crisis intervention.

MHS 6471 Sexuality and Mental Health 3 Credits  
Grading Scheme: Letter Grade  
Sexuality and Mental Health  
Prerequisite: MHS 6400, MHS 6401.

MHS 6480 Developmental Counseling Over the Life Span 3 Credits  
Grading Scheme: Letter Grade  
Developmental Counseling Over the Life Span

MHS 6495 Counseling Lesbian, Gay, Bisexual, and Transgender Clients 3 Credits  
Grading Scheme: Letter Grade  
Explores lesbian, gay, bisexual, and transgender (LGBT) identity formation and theory, vocabulary, resources, and developmental life stages.  
Prerequisite: MHS 5005, MHS 6401, or EDA 6931 Diversity Issues in Higher Education and EDA 6931 Theory and Assessment of Student Development.

MHS 6500 Group Counseling: Theories and Procedures 3 Credits  
Grading Scheme: Letter Grade  
Group Counseling: Theories and Procedures  
Prerequisite: MHS 6401.

MHS 6705 Professional, Ethical, and Legal Issues in Marriage and Family Counseling 3 Credits  
Grading Scheme: Letter Grade  
Professional, Ethical, and Legal Issues in Marriage and Family Counseling

MHS 6720 Professional Identity and Ethics in Counseling 3 Credits  
Grading Scheme: Letter Grade  
Professional Identity and Ethics in Counseling

MHS 6735 Applied Research in Counseling 3 Credits  
Grading Scheme: Letter Grade  
Focuses on developing and initiating a counselor education research project that includes constructing a research question, developing a research proposal, and initiating data collection.

MHS 6831 Supervision for a Split Internship 3-6 Credits, Max 6 Credits  
Grading Scheme: S/U  
Required first enrollment for students participating in internship over two semesters.  
Prerequisite: adviser’s consent, completion of practicum sequence, and written application to internship coordinator at least 6 weeks before registering.  
Corequisite: MHS 7804, MHS 7807, SDS 7820, or 7802.

MHS 6910 Supervised Research 1-5 Credits, Max 5 Credits  
Grading Scheme: S/U  
Supervised Research

MHS 6940 Supervised Teaching 0-5 Credits, Max 5 Credits  
Grading Scheme: S/U  
Supervised Teaching

MHS 6971 Research for Master’s Thesis 1-15 Credits  
Grading Scheme: S/U  
Research for Master’s Thesis

MHS 7407 Advanced Counseling Theories 3 Credits  
Grading Scheme: Letter Grade  
Advanced preparation in individual, group, career, multicultural, and ecosystemic (marriage and family) theories of counseling.  
Prerequisite: enrollment in doctoral program.

MHS 7431 Advanced Family Counseling 4 Credits  
Grading Scheme: Letter Grade  
Advanced Family Counseling  
Prerequisite: MHS 6430.

MHS 7600 Consultation Procedures 3 Credits  
Grading Scheme: Letter Grade  
Consultation Procedures  
Prerequisite: MHS 7800  
Corequisite: registration in practicum or internship.

MHS 7610 Counseling Supervision Theories and Practice 3 Credits  
Grading Scheme: Letter Grade  
Focuses on the understanding of supervision theories and the practice of clinical supervision to prepare doctoral students to become Reflective Practitioners of Clinical Supervision.

MHS 7730 Advanced Counseling Research 3 Credits  
Grading Scheme: Letter Grade  
Issues in designing and implementing counseling and psychotherapy dissertation research.  
Prerequisite: satisfactory completion of EDF 6403.

MHS 7740 Research in Counseling 3 Credits  
Grading Scheme: Letter Grade  
Research in Counseling  
Prerequisite: MHS 6200.

MHS 7804 Group Supervision in Agency Counseling 3 Credits, Max 15 Credits  
Grading Scheme: S/U  
Clinical aspects of intervention for children and adults who have language disabilities, focusing on identification, diagnosis, and treatment of emergent literacy and language disorders.  
Prerequisite: written application to practicum/internship coordinator at least 6 weeks before registration.  
Corequisite: MHS 7800, 6805; SDS 7380 or MHS 6831.
Prerequisite:
Emphasis on theoretical background and implications for applied work.

Grading Scheme:
Max 15 Credits

PCO 6939 Seminar: Current Topics in Counseling Psychology 3 Credits
Grading Scheme: Letter Grade
Emphasis on theoretical background and implications for applied work.
Prerequisite: MHS 6401 or consent of instructor.

PCO 7217 Professional Ethics and Skills in Counseling Psychology 3 Credits
Grading Scheme: Letter Grade
Professional issues, ethics, relationships, and skills pertaining to practice of counseling psychology.
Prerequisite: graduate student status in counseling psychology or consent of instructor.

PCO 7949 Internship in Counseling Psychology 1 Credit, Max 12 Credits
Grading Scheme: Letter Grade
Full-time or equivalent work in a university or community agency where counseling functions are carried out under supervision. Open only to students in the counseling psychology program.
Prerequisite: written application to the Counseling Psychology Internship Coordinator.

SDS 6401 Counseling Skills for Non-Counselors 3 Credits
Grading Scheme: Letter Grade
Counseling skills in dyadic communication and in small groups.

SDS 6411 Counseling with Children 3 Credits
Grading Scheme: Letter Grade
Prereq or coreq: MHS 6401.

SDS 6436 Family-School Intervention 3 Credits
Grading Scheme: Letter Grade
Examines common patterns of family-school interaction and the major types of family-school interventions used to support children’s learning and development including school-wide interventions to engage families, parent and teacher case consultation, and family referral for community services.
Prerequisite: MHS 5005, MHS 6401.
Corequisite: SDS 6411, SDS 6413.

SDS 6620 Organization and Administration of School Counseling Programs 3 Credits
Grading Scheme: Letter Grade
Organization and Administration of School Counseling Programs
Prerequisite: SDS 6411.

SDS 6831 Supervision for a Split Internship 3 Credits, Max 6 Credits
Grading Scheme: S/U
Required first enrollment for students participating in internship over 2 semesters.
Prerequisite: adviser’s consent, completion of practicum sequence, and written application to internship coordinator at least 6 weeks before registering.
Corequisite: MHS 7804, MHS 7807, SDS 7820, or 7802.

SDS 6905 Individual Work 1-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Individual Work
Prerequisite: consent of instructor and graduate coordinator; approval of proposed project.

SDS 6936 Seminar in Counselor Education 3 Credits
Grading Scheme: Letter Grade
Seminar in Counselor Education
Prerequisite: consent of instructor. Open to doctoral students in department.

SDS 6938 Special Topics 1-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Special Topics
Prerequisite: consent of department chair.
### SDS 7800 Practicum in School Counseling 3 Credits
**Grading Scheme:** S/U
Practicum in School Counseling
**Prerequisite:** MHS 7800, SDS 6411; adviser's consent; and written application to practicum coordinator at least 6 weeks before registration.
**Corequisite:** MHS 5005, MHS 6401, 6411, 6413, MHS 6421, MHS 6720.

### SDS 7820 Group Supervision in School Counseling 3 Credits
**Grading Scheme:** S/U
Group Supervision in School Counseling
**Prerequisite:** written application to practicum/internship coordinator at least 6 weeks before registration.
**Corequisite:** MHS 7800, SDS 7800 or SDS 7830, or MHS 6831.

### SDS 7830 Internship in Counseling and Development-600 Hours 6 Credits, Max 5 Credits
**Grading Scheme:** S/U
Internship in Counseling and Development-600 Hours
**Prerequisite:** adviser's consent, completion of all practica required for M.Ed. or Ed.S. degree, and written application to internship coordinator at least 6 weeks before registration.
**Corequisite:** SDS 7802, MHS 7804, MHS 7807, or SDS 7820.

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### Education, School of Special Education, School Psychology and Early Childhood Studies

#### EEC 6205 Early Childhood Curriculum 3 Credits
**Grading Scheme:** Letter Grade
Students develop and/or implement instructional strategies consistent with their personal philosophies of early childhood education.

#### EEC 6304 Creativity in the Early Childhood Curriculum 3 Credits
**Grading Scheme:** Letter Grade
Techniques for teaching all areas of the early childhood curriculum to support the development of children's creativity with an emphasis on art and music.

#### EEC 6326 Social and pre-academic instructional methods for young children 3 Credits
**Grading Scheme:** Letter Grade
Social and Pre-Academic Instructional Methods for Young Children is designed to expose students to evidence-informed intervention methods to address the needs of young children who are at risk for or have disabilities and their families.

#### EEC 6419 Families, Disabilities, and Diversity 3 Credits
**Grading Scheme:** Letter Grade
Provides for the study of familial and ecological factors affecting families of young children who are receiving early childhood intervention services. The course focuses on the development and implementation of evidence-based services for families and children. Cultural and linguistic diversity is also a focus.

#### EEC 6525 Issues in Child Care Administration 3 Credits
**Grading Scheme:** Letter Grade
Child care background, curriculum, organization, staffing, training of staff, parent education and involvement, funding, and research.

#### EEC 6615 Early Childhood Education: Background and Concepts 3 Credits
**Grading Scheme:** Letter Grade
Trends in the teaching of nursery and kindergarten children as shown in past and current educational theory.

#### EEC 6905 Individual Work 1-4 Credits, Max 12 Credits
**Grading Scheme:** S/U
Supervised Research
**Prerequisite:** Consent of instructor.

#### EEC 6910 Supervised Research 1-5 Credits, Max 5 Credits
**Grading Scheme:** S/U
Supervised Research

#### EEC 6933 Special Topics 1-12 Credits, Max 12 Credits
**Grading Scheme:** Letter Grade
Selected topics in the theory and practice of early childhood education not included in the established curriculum.
**Prerequisite:** Consent of instructor.

#### EEC 7056 Early Childhood Policy and Advocacy 3 Credits
**Grading Scheme:** Letter Grade
Focuses on understanding, analyzing, and evaluating early childhood policies at federal, state, and local levels and internationally. Analyzes relationships among early childhood policies, research, and practices.
**Prerequisite:** Intended for doctoral students only

#### EEC 7366 Theory and Research in Early Childhood Studies 3 Credits
**Grading Scheme:** Letter Grade
Encountering issues related to the ethical conduct of research in applied theory and applied early childhood research. Discussions of commonly encountered issues related to the ethical conduct of research in applied contexts.
**Prerequisite:** Intended for doctoral students; permission of instructor.

#### EEC 7517 Early Childhood Assessment & Evaluation 3 Credits
**Grading Scheme:** S/U
Doctoral students will explore in depth the role of assessment and evaluation in research, practice, and policy as it relates to the field of early childhood studies.
**Prerequisite:** EDF 6400 and EDF 6402; or EDF 6403; or consent of instructor

#### EEC 7666 Theory and Research in Early Childhood Studies 3 Credits
**Grading Scheme:** S/U
Reading, evaluating, synthesizing, and discussing early childhood theory and applied early childhood research. Discussions of commonly encountered issues related to the ethical conduct of research in applied contexts.
**Prerequisite:** Intended for doctoral students; permission of instructor.

#### EEC 7979 Advanced Research 1-12 Credits, Max 12 Credits
**Grading Scheme:** S/U
Research for doctoral students before admission to candidacy.
**Prerequisite:** Designed for students with a masters' degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

#### EEC 7980 Research for Doctoral Dissertation 1-15 Credits
**Grading Scheme:** S/U
Research for Doctoral Dissertation
EEX 6053 Foundations of Special Education 3 Credits
Grading Scheme: Letter Grade
Providing an overview of special education, students with disabilities, and students at risk of being identified with disabilities including those who are culturally or linguistically diverse or otherwise disadvantaged. It is appropriate for students preparing to work in high need schools, inclusive settings, and school programs serving K-12 students. Advanced issues in identification of students with disabilities and delivery of services to meet their academic, developmental, and functional needs.

EEX 6072 Accessing Academic and Social Communities for Students with Disabilities 3 Credits
Grading Scheme: Letter Grade
Information and expertise related to meeting effectively academic and social needs of full range of students in inclusive settings.

EEX 6098 Students with Disabilities in Higher Education 3 Credits
Grading Scheme: Letter Grade
Introducing participants to the nature and needs of students with disabilities in higher education settings. The focus of this course will be on the effects of various types of disabilities on learning. Relevant laws and issues of compliance and professional ethics will also be addressed.

EEX 6099 Social Perspectives on Disability 3 Credits
Grading Scheme: Letter Grade
Provides a framework for understanding disabilities and disability-related issues within societal contexts. It examines (1) historical and contemporary views of people with disabilities, (2) disability-related issues with respect to education, inclusion, and advocacy, and (3) perceptions of people with disabilities with respect to acceptance and inclusion in society.

EEX 6117 Language and Literacy Interventions in Early Childhood 3 Credits
Grading Scheme: Letter Grade
Focuses on caregiver and classroom-based strategies for promoting language and literacy development of young children birth to 8 years of age who are at risk for or have disabilities. In addition, the current approaches to assistive technology, augmentative communication and their application in the classroom will be discussed.
Prerequisite: Admission to graduate program.

EEX 6125 Interventions for Language and Learning Disabilities 3 Credits
Grading Scheme: Letter Grade
Language development and disorders and their impact on learning for students with (or at risk for) disabilities. Classroom-based intervention strategies for promoting language and literacy development.

EEX 6135 Foundations of Literacy Development and Dyslexia 3 Credits
Grading Scheme: Letter Grade
Addresses the critical components of literacy development and introduces participants to the nature and needs of students with dyslexia. The focus is on the effects of dyslexia on learning to read and write. The course will also address the historical development of the field, relevant laws, and policies.

EEX 6136 Dyslexia: Language and the Brain 3 Credits
Grading Scheme: Letter Grade
Addresses dyslexia's neurobiological origins, its effect on language and literacy development, and the variations in the processing and development of the various elements of language and literacy among students with and without dyslexia. The course also addresses linguistic structures of and historical influences on the English language.
Prerequisite: EEX 6135

EEX 6137 Dyslexia: Assessment for Intervention 3 Credits
Grading Scheme: Letter Grade
Addresses the principles and practices of effective assessment for students with dyslexia, including the various purposes of assessment, the psychometric properties of high-quality assessment tools, and issues related to test administration. Students will identify effective assessment tools, develop informal assessment procedures, and interpret assessment data to design intervention.
Prerequisite: EEX 6135 and EEX 6136

EEX 6138 Dyslexia: Methods for Intervention 3 Credits
Grading Scheme: Letter Grade
Addresses principles and practices of evidence-based literacy intervention for students with dyslexia, including the stages of literacy development, the varied challenges that students may encounter as they develop literacy, effective intervention in various components of literacy, and the issues involved in designing a comprehensive literacy intervention program.
Prerequisite: EEX 6135 and EEX 6136

EEX 6219 Reading Assessment and Intervention for Students with Disabilities 3 Credits
Grading Scheme: Letter Grade
The reading process and dyslexia; particularly the special educator's role in preventing and remediating reading disabilities.

EEX 6222 Evaluation in Special Education 3 Credits
Grading Scheme: Letter Grade
Issues and practices related to educational assessment of students with special needs.
Prerequisite: or coreq: prior experience with exceptional students; introductory courses in measurement, statistics.
Corequisite: undefined

EEX 6233 Designing Instruction for Inclusive Classrooms 3 Credits
Grading Scheme: Letter Grade
Providing students with theoretical background and practical strategies needed to successfully teach students with disabilities and other learning needs across the continuum of services in various K-12 settings. Particular focus is placed on the classroom environment and individualizing assessment and instruction to meet a range of learner needs.
Prerequisite: admission to graduate status.

EEX 6269 Academic Strategies for Postsecondary Students with Disabilities 3 Credits
Grading Scheme: Letter Grade
Using and developing appropriate academic strategies for postsecondary students with disabilities. The course will include strategies for learning new content, retaining information, expressing knowledge, and appropriate use of technology to support students' academic needs. Participants will learn to effectively match strategies to students' needs.
Prerequisite: EEX 6098 Students with Disabilities in Higher Education and EEX 6299 Understanding Assessment for Postsecondary Students with Disabilities

EEX 6296 Differentiated Instruction 3 Credits
Grading Scheme: Letter Grade
Provides teachers, administrators, and other professionals with information and expertise related to differentiating instruction to effectively meet the academic needs of the full range of students in their schools in inclusive settings.
Prerequisite: graduate status or consent of instructor.
EEX 6299 Understanding Assessment for Postsecondary Students with Disabilities 3 Credits
Grading Scheme: Letter Grade
Introducing participants to the role of assessment in identification and intervention for students with disabilities in higher education. Participants will learn about various approaches to diagnosis and types of assessments commonly used. One focus of the course is on the interpretation of assessment reports for developing accommodations and interventions.
Prerequisite: EEX 6098 Students with Disabilities in Higher Education

EEX 6525 Disability Related Policy and Legislation 3 Credits
Grading Scheme: Letter Grade
Covers the development and enactment of laws and policies designed to protect the rights of persons with disabilities including the Americans with Disabilities Act and other significant legislation. Students will review recent and pending court cases that affect various aspects of adult life for persons with disabilities.
Prerequisite: None

EEX 6661 Teaching and Managing Behavior for Student Learning 3 Credits
Grading Scheme: Letter Grade
Practical strategies and techniques for teaching children and youths with behavioral problems.

EEX 6750 Families and Transition for Students with Disabilities 3 Credits
Grading Scheme: Letter Grade
Information and strategies for using family-centered approach to planning and implementing transitions for students with disabilities.

EEX 6777 Organizational and Life Skills for Postsecondary Students with Disabilities 3 Credits
Grading Scheme: Letter Grade
Addressing the skills necessary for academic and life success for postsecondary students with disabilities and the challenges these students face. Participants will learn to help students develop self-determination and self-advocacy skills, as well as organization and time management. Strategies for developing communication skills will also be addressed.
Prerequisite: EEX 6098 Students with Disabilities in Higher Education and EEX 6299 Understanding Assessment for Postsecondary Students with Disabilities

EEX 6778 Community and Work Access for Individuals with Disabilities 3 Credits
Grading Scheme: Letter Grade
Covers aspects of the community, work and postsecondary education experience for adults with disabilities. Potential concerns of employers, co-workers and friends will be addressed. Effective practices that foster accepting and supporting environments thus ensuring successful life outcomes for adults with disabilities will be discussed.

EEX 6785 Introduction to Education-Healthcare Transition 3 Credits
Grading Scheme: Letter Grade
An increased number of youth with special healthcare needs (SHCN), including chronic illness and disability, are transitioning from school to the workplace, post-secondary education and the community. Throughout the course collaborative efforts between the education and medical fields focused on supporting the transition of youth with SHCN will be studied.

EEX 6786 Collaborative Practice in Inclusive Schools 3 Credits
Grading Scheme: Letter Grade
Collaboration, transition planning, and professional development for serving children and youths with disabilities.
EEX 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

EEX 6930 Seminar in Disabilities 3 Credits
Grading Scheme: Letter Grade
Designed for students to develop a summary project based on the integration of supporting individuals with disabilities in the workplace, postsecondary education, community, and life. Students will develop individual projects.
Prerequisite: Completion of the following courses: EEX6XXX Social Perspectives on Disability and EEX6XXX Community and Work Access for Individuals with Disabilities

EEX 6936 Special Topics 1-3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Special Topics
Prerequisite: consent of department chair.

EEX 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

EEX 6971 Research for Master’s Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master’s Thesis

EEX 6973 Project in Lieu of Thesis 1-6 Credits, Max 6 Credits
Grading Scheme: S/U
A project-in-lieu-of-thesis (PILOT) is for students whose career goals are applied. With a faculty advisor, students develop a PILOT which is based on critical examination of research and theoretical frameworks in the discipline. It may involve the development, implementation or evaluation of technology, curriculum materials, or intervention.
Prerequisite: Intended for students who have completed their first year of study.

EEX 7303 Inquiry in Special Education: Analysis of the Literature 3 Credits
Grading Scheme: Letter Grade
Designed to assist in solidifying knowledge of research design acquired through course work in educational foundations by applying that knowledge to special education literature.
Prerequisite: EDF 6403.

EEX 7304 Introduction to Field of Inquiry in Special Education 3 Credits
Grading Scheme: Letter Grade
Acquisition, organization, and interpretation of information about research. Nature of inquiry and process of generating questions about a broad array of disability-related research topics. Critical analysis of research outcomes.
Prerequisite: EDF 6403; coreq: EDF 6475.
Corequisite: undefined

EEX 7347 Meta-Analysis in Prevention and Intervention Science 3 Credits
Grading Scheme: Letter Grade
This course will provide (a) an overview of meta-analysis in the identification of evidence-based prevention and intervention practices, (b) practical, hands-on training and experience conducting meta-analytic analyses, and (c) an opportunity to conduct a meta-analysis in the prevention and intervention science field.
Prerequisite: Must be graduate student to take course.

EEX 7526 Grant Writing Seminar in Education 3 Credits
Grading Scheme: Letter Grade
Developing basic skills in writing grant proposals for research, training, and/or model demonstration.

EEX 7709 Social-Emotional Learning & Play in Early Childhood 3 Credits
Grading Scheme: Letter Grade
Critical examination of the research and theoretical literature on social-emotional learning and play in the early childhood years. Special attention to implications for practice, policy and professional development.
Prerequisite: consent of instructor.

EEX 7787 School Improvement for All Students 3 Credits
Grading Scheme: Letter Grade
Seminar addressing research and professional literature on changing schools to improve academic and behavioral outcomes for all students.
Prerequisite: advanced graduate status or consent of instructor.

EEX 7865 Internship: Special Education 1-12 Credits, Max 12 Credits
Grading Scheme: Internship: Special Education

EEX 7934 Seminar: Trends in Special Education 3 Credits
Grading Scheme: Letter Grade
Internship: Special Education

EEX 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

EEX 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

SPS 5000 Introduction to Psychoeducational Assessment 3 Credits
Grading Scheme: Letter Grade
Comprehensive overview of the field of psychological testing and assessment, with emphasis on the basic psychometric concepts and principles underlying test development and use, major uses of psychological tests and other tools of assessment in school, clinical, counseling, business, and other settings, and historical, cultural, and legal/ethical context of assessment.

SPS 6052 Issues and Problems in School Psychology 3 Credits
Grading Scheme: Letter Grade
History and foundations of school psychology; legal and ethical. Overview of the role and functions of the school psychologist.
Corequisite: SPS 6941.

SPS 6191 Psychoeducational Assessment I 3 Credits
Grading Scheme: Letter Grade
Techniques for assessing intelligence, adaptive behavior, and achievement of children and school-aged adolescents. Emphasizes standardized instruments.
Corequisite: SPS 6941.

SPS 6192 Psychoeducational Assessment II 3 Credits
Grading Scheme: Letter Grade
Techniques for assessing the social and emotional functioning of the school-aged child; supervised experience in assessment and report writing.
Prerequisite: SPS 6191;
Corequisite: SPS 6941.
SPS 6193 Academic Assessment & Intervention 3 Credits
Grading Scheme: Letter Grade
Assessment approaches and intervention strategies for students experiencing academic difficulties.

SPS 6195 Developmental Psychopathology 3 Credits
Grading Scheme: Letter Grade
Overview of developmental psychopathology and its relationship to diagnosis and intervention for children and adolescents.

SPS 6197 Psychoeducational Assessment III 3 Credits
Grading Scheme: Letter Grade
Synthesis of sources and techniques of psychoeducational assessment for school-related application and problems.
Prerequisite: SPS 6191;
Corequisite: SPS 6941.

SPS 6410 Direct Interventions I: Applied Behavior Analysis for School Psychologists 3 Credits
Grading Scheme: Letter Grade
Theory and research of applied behavior analysis for school psychologists to provide systematic assessment and treatment.
Corequisite: SPS 6941.

SPS 6707 Interventions in School Psychology II: Cognitive Behavioral Interventions 3 Credits
Grading Scheme: Letter Grade
Theory and practice of cognitive behavior.
Prerequisite: SPS 6410.

SPS 6708 Interventions in School Psychology III: System Level Interventions for Children and Youths 3 Credits
Grading Scheme: Letter Grade
Theory, empirical research, and clinical issues related to primary prevention and crisis intervention.
Prerequisite: SPS 6707.

SPS 6815 Law and Ethics in Psychology 3 Credits
Grading Scheme: Letter Grade
Knowledge of laws and ethics that impacts psychological practice with emphasis on children and schools.

SPS 6905 Individual Study 1-3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Individual Study

SPS 6918 Supervised Research 1-5 Credits
Grading Scheme: S/U
Supervised Research

SPS 6937 Special Topics in School Psychology 1-3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Special Topics in School Psychology
Prerequisite: consent of instructor.

SPS 6941 Practicum in School Psychology 1-4 Credits, Max 8 Credits
Grading Scheme: S/U
Practicum in School Psychology
Prerequisite: consent of instructor.

SPS 6942 School Psychology Practicum II 1-6 Credits, Max 6 Credits
Grading Scheme: S/U
Practicum focused on linking assessment and intervention.
Prerequisite: SPS 6941.

SPS 6945 Advanced Practicum in School Psychology 1-6 Credits
Grading Scheme: S/U
Advanced practicum focused on complex case management, specialization area practice, diversity, and peer supervision.
Prerequisite: SPS 6941 and SPS 6942.

SPS 6948 Supervised Teaching 1-5 Credits
Grading Scheme: S/U
Supervised Teaching

SPS 7205 School Psychology Consultation 3 Credits
Grading Scheme: Letter Grade
Concepts, processes, and issues related to the practice of school-based consultation as an intervention technique of school psychologists.
Corequisite: SPS 6941.

SPS 7931 Seminar in School Psychology 1-3 Credits, Max 3 Credits
Grading Scheme: Letter Grade
Issues pertinent to the professional practice of school psychology.
Prerequisite: consent of instructor.

SPS 7949 Internship in School Psychology 3-6 Credits, Max 18 Credits
Grading Scheme: Letter Grade
Internship in School Psychology
Prerequisite: consent of instructor.

SPS 7979 Advanced Research 1-12 Credits, Max 12 Credits
Grading Scheme: S/U
Advanced Research

SPS 7980 Research for Doctoral Dissertation 1-15 Credits, Max 15 Credits
Grading Scheme: S/U
Research for doctoral students after admission to candidacy.
Prerequisite: Admission to candidacy.

Education, School of Teaching and Learning

EDE 5940 Integrated Teaching and Learning 3 Credits
Grading Scheme: Letter Grade
Student interns develop general pedagogical competencies and skills necessary to successful teachers.
Prerequisite: admission to the master's certification program in elementary education plus 15 credits, EDF 6113, and RED 5316 or RED 5355.

EDE 6225 Practices in Childhood Education 3 Credits
Grading Scheme: Letter Grade
Elementary school practices related to the fundamental principles of curriculum development; selecting, organizing, and developing effective teaching-learning situations.
Corequisite: EDE 6948.

EDE 6266 Teaching and Learning in Elementary Classrooms 3 Credits
Grading Scheme: Letter Grade
Introduction to the program.
Prerequisite: admission to the master's certification program in elementary education.

EDE 6325 Teacher Inquiry/Action Research 3 Credits
Grading Scheme: Letter Grade
Purpose, goals, and processes of teacher inquiry and application of this methodology in the classroom.
Prerequisite: EDE 6948.
EDE 6905 Individual Work 1-5 Credits, Max 12 Credits
Grading Scheme: Letter Grade
For advanced students who wish to study individual problems in childhood education and/or early childhood education under faculty guidance.

EDE 6948 Internship in Elementary Schools 3-12 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Supervised teaching in elementary grades K-6.
Prerequisite: consent of the department.
Corequisite: EDE 6225.

EDE 7047 Issues in Teacher Education 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Current issues and theory in teacher education and teacher education reform.

EDF 5552 Role of School in Democratic Society 3 Credits
Grading Scheme: Letter Grade
Common conceptions of democracy, equality, freedom, liberty, and equality and what these conceptions imply for educational aims and practice.

EDF 6520 History of Education 3 Credits
Grading Scheme: Letter Grade
Salient issues in education from the Reformation to the present.

EDF 6544 Philosophical Foundations of Education 3 Credits
Grading Scheme: Letter Grade
Philosophical bases for democracy and education.

EDF 6616 Education and American Culture 3 Credits
Grading Scheme: Letter Grade
Graduate-level introduction to the social foundations of education (history, philosophy, and sociology).

EDF 6812 Comparative Education 3 Credits
Grading Scheme: Letter Grade
Relationships of school and society in different cultural areas of the world.

EDF 7934 Seminar in Educational Foundations 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Advanced study in historical, philosophical, social, and comparative foundations.

EDG 5666 Knowing and Learning in Secondary Schools 3 Credits
Grading Scheme: Letter Grade
Examines theoretical basis for the processes of knowing and learning in disciplines that are taught in secondary schools, supporting development of appropriate instructional strategies. Topics include knowledge and memory structure, early learning foundations, problem solving, reasoning, regulatory processes, representation, and how symbolic thinking emerges from the learner’s community.

EDG 6017 Writing for Academic Purposes 3 Credits
Grading Scheme: Letter Grade
Enhancing the capacity of doctoral students from all academic disciplines to write for academic purposes. Focusing on exploring the ways in which language is used as a creative resource for presenting information, structuring text, embedding perspectives, developing arguments, referencing sources, and addressing audience needs in academic writing.

EDG 6047 Teacher Leadership for Educational Change 3 Credits
Grading Scheme: Letter Grade
Understanding teachers' roles in the educational change and improvement process.

EDG 6207 Transforming the Curriculum 3 Credits
Grading Scheme: Letter Grade
Design more rigorous and engaging curriculum leading to increased student understanding and mastery of subject matter. Examine different ways of assessment.
Prerequisite: EDE 6325.

EDG 6225 Global Studies Methods in K-12 Education 3 Credits
Grading Scheme: Letter Grade
Overview of current issues and strategies for incorporating them into the K-12 curriculum. Intended for non-education majors.

EDG 6226 Foundations of Research in Curriculum & Instruction 3 Credits
Grading Scheme: Letter Grade
Introduction to research in curriculum and instruction, scholars in the field, and expectations of the professoriate. Students will explore Boyer's domains of scholarship that serve as a framework for STL doctoral programs.

EDG 6305 Multiple Perspectives on Teaching and Learning 3 Credits
Grading Scheme: Letter Grade
Graduate seminar designed to provide a survey of major theoretical perspectives on learning and instruction, including classical and contemporary theories as well as emerging views.

EDG 6348 Instructional Coaching for Enhanced Student Learning 3 Credits
Grading Scheme: Letter Grade
This course is designed as a graduate study of instructional coaching, a form of job-embedded professional development focused on improving teaching practice in order to improve student learning. It is designed for educators at all levels and in all roles.

EDG 6356 Teaching, Learning and Assessment 3 Credits
Grading Scheme: Letter Grade
Historical and in-depth exploration of assessment practices related to curricular issues.

EDG 6378 Learning Science with Technology 3 Credits
Grading Scheme: Letter Grade
Examines the role culture plays in teaching and learning. Explores what is needed to establish a culturally responsive classroom in which all students can succeed.

EDG 6415 Culturally Responsive Classroom Management 3 Credits
Grading Scheme: Letter Grade
Examine the integration of technology into the learning and teaching of science in grades 7-12. The course addresses the use of a broad range of technology to investigate theoretical principles and models of learning and teaching, available tools, practical applications, and relevant literature.

EDG 6445 Meeting the Educational Needs of Students Living in Poverty 3 Credits
Grading Scheme: Letter Grade
Enhancing knowledge of the impact of poverty on children, and improve their instructional and management strategies to better meet the needs of children living in poverty.

EDG 6654 Survey of Research on STEM Education 3 Credits
Grading Scheme: Letter Grade
Intended to develop an understanding of the existing research on STEM education. Students will explore the relationships among the complex and multidisciplinary nature, contemporary perspectives, methodologies and methods that are being used to address compelling questions related to curriculum, instruction, learning, and policy.
EDG 6905 Individual Work 1-6 Credits, Max 12 Credits
Grading Scheme: Letter Grade
For advanced students who wish to study individual problems under faculty guidance.
Prerequisite: student must have approval of proposed project before registering.

EDG 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

EDG 6931 Special Topics 1-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Special Topics
Prerequisite: consent of instructor.

EDG 6940 Supervised Teaching 1-5 Credits, Max 2 Credits
Grading Scheme: S/U
For graduate students serving as teaching assistants under the supervision of a faculty member.
Prerequisite: adviser's consent.

EDG 6953 TLSI Online Portfolio Preparation 1-3 Credits, Max 3 Credits
Grading Scheme: Letter Grade
Development of portfolio artifacts. Preparation for defense of program portfolio.
Prerequisite: EDE 6325.

EDG 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

EDG 6973 Project in Lieu of Thesis 1-9 Credits
Grading Scheme: S/U
Developing, testing, and evaluating original educational technology, curricular materials, or an intervention program.

EDG 7224 Critical Pedagogy 3 Credits
Grading Scheme: Letter Grade
Core concepts and practice of critical educational theory.

EDG 7252 Perspectives in Curriculum, Teaching, and Teacher Education 3 Credits
Grading Scheme: Letter Grade
Issues related to curriculum, teaching, and teacher education.

EDG 7303 Teacher Learning and Socialization in High Poverty Schools 3 Credits
Grading Scheme: Letter Grade
Explores theory and research related to teacher learning, focusing on high-poverty schools.

EDG 7359 Professional Development and Teacher Learning 3 Credits
Grading Scheme: Letter Grade
Examining teacher learning within professional development, the essential elements of high quality professional development, how to measure the impact of professional development, and multiple ways in which professional development is being played out in the district, state, and national contexts.

EDG 7941 Field Experience in Curriculum and Instruction 1-4 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Supervised experiences appropriate to the student's professional goals.
Prerequisite: open only to advanced graduate students.

EDG 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

EDG 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

EDG 7982 Practitioner Research: Theory & Practice 3 Credits
Grading Scheme: Letter Grade
Develops a strong theoretical understanding of the purposes of practitioner inquiry, as a form of educator professional development, while helping students to translate this knowledge into practices that support school improvement.
Prerequisite: Intended for doctoral students.

EME 5054 Foundations of Educational Technology 3 Credits
Grading Scheme: Letter Grade
History, foundations, and literature in educational technology.
Prerequisite: consent of instructor.

EME 5207 Designing Technology-Rich Curricula 3 Credits
Grading Scheme: Letter Grade
Extensive work in curriculum development utilizing instructional technologies. Contrasting views of curriculum development.

EME 5403 Instructional Computing I 3 Credits
Grading Scheme: Letter Grade
Explores uses of educational technologies and learning environments.
Prerequisite: baccalaureate degree.

EME 5404 Instructional Computing II 3 Credits
Grading Scheme: Letter Grade
Overview of educational technologies in teaching and learning. Developing meaningful and engaging learning environments that foster critical inquiry in students.
Prerequisite: EME 5403.

EME 5405 Internet in K-12 Instruction 3 Credits
Grading Scheme: Letter Grade
Preparing preservice teachers, in-service teachers, and teacher educators to use the Internet.
Prerequisite: EME 5403 or 4406.

EME 5432 Integrating Technology into Social Science Classroom 3 Credits
Grading Scheme: Letter Grade
Educational technology tools available for integrating into curriculum. Multiple methods using technology to create and enhance appropriate learning environments.

EME 6059 Blended Learning Environments 3 Credits
Grading Scheme: Letter Grade
Expanding blended learning from perspectives of theory and practice. The course is designed for educators and instructional designers in K-12, higher education, corporate environments, and other professional settings.
EME 6065 Human-Computer Interaction and the Learner 3 Credits  
Grading Scheme: Letter Grade  
Explores the interface between pedagogy, educational technology, cognitive science, graphic design, and software engineering, and define effective human-computer interaction. We will discuss relevant methods and seminal research, and deduce implications for learning and design of human computer interfaces such as digital games, mobile applications, and adaptive learning systems.

EME 6066 Issues and Trends in Educational Technology Research 3 Credits  
Grading Scheme: Letter Grade  
Providing an overview of the "what" and "how" in educational technology research. Having knowledge of the conceptual frameworks and research design paradigms in the field enables students to evaluate the rigor of educational technology research and think more critically about their own research efforts.

EME 6074 Mobile Technologies in Education 3 Credits  
Grading Scheme: Letter Grade  
Focuses on diffusion and evaluation as key components to successfully implementing mobile technologies and how these are adapted based on socio-political, economic, and educational contexts.

EME 6155 Games and Simulations for Teaching and Learning 3 Credits  
Grading Scheme: Letter Grade  
The characteristics and terminology of games and simulations; development life cycles; design principles; evaluation; and an emphasis on connecting principles of learning to the design of games and simulations.  
Prerequisite: None.

EME 6208 Designing Integrated Media Environments I 3 Credits  
Grading Scheme: Letter Grade  
Design traditional multimedia environments and learn advanced techniques for creating presentation. Importance of cognitive processes and their relationships to design and instruction.

EME 6209 Designing Integrated Media Environments II 3 Credits  
Grading Scheme: Letter Grade  
Project based. Applying skills Studying the development and problem-solving as applied to real world educational problems with solutions designed and implemented in various programming and scripting languages. Topics include design principles, testing, and debugging. Prior programming experience is not required and theories learned previously. Real-world problems.  
Prerequisite: EME 6208.

EME 6235 Managing Educational Projects 3 Credits  
Grading Scheme: Letter Grade  
Examining principles of planning, scheduling, allocating resources, budgeting, proposals preparation, cost control, risk assessment and personnel management for instructional projects. Students negotiate an effective design project plan, how to implement the plan, and how to control and monitor project activities.

EME 6236 Distance Education Leadership and Management 3 Credits  
Grading Scheme: Letter Grade  
Examining the roles and responsibilities of leaders and managers in distance education programs. Focuses on contributors to quality program delivery in K-12, higher education, corporate, healthcare, and international contexts.

EME 6458 Distance Teaching and Learning 3 Credits  
Grading Scheme: Letter Grade  
Topics assist educators who teach at distance in synchronous time. Effective teaching methodologies, along with various theories about distance learning, examined.  
Prerequisite: EME 5403.

EME 6606 Advanced Instructional Design 3 Credits  
Grading Scheme: Letter Grade  
Focuses on the student who is becoming an instructional design (ID) Professional by refining skills and adding to the skills learned in the beginning Instructional Design course, building on the foundational knowledge about the practice of ID, and encouraging the development of communication skills through formal project management.  
Prerequisite: EME 6609.

EME 6609 Instructional Design 3 Credits  
Grading Scheme: Letter Grade  
Focuses on the application of instructional design principles to the development of instruction. Topics include contemporary issues and trends in instructional design, foundations in learning research, requirements for instruction, task and needs analysis, learning situations and instructional models, learner characteristics, hardware and software innovations, assessing instructional outcomes, and factors affecting utilization.

EME 6935 Seminar: Distance Education Issues and Applications 1 Credit, Max 4 Credits  
Grading Scheme: Letter Grade  
Mechanisms and logistics that support distance education development and delivery.

EME 6945 Practicum in Educational Media and Instructional Design 3-8 Credits, Max 8 Credits  
Grading Scheme: Letter Grade  
Supervised experiences appropriate to the student’s professional goals.

EME 7345 Implementing Educational Technology Innovations (ETIs) 3 Credits  
Grading Scheme: Letter Grade  
Focuses on diffusion and evaluation as key components to successfully implementing ETIs. Students will study innovation diffusion theory, change theory, frameworks and considerations for evaluating ETIs and study designs and instruments for appropriate for ETI implementation. Students will gain authentic practice implementing ETIs.

EME 7938 Seminar in Educational Media and Instructional Design 3 Credits  
Grading Scheme: Letter Grade  
Seminar for advanced degree graduate students.

ESE 5426 Data-Driven Decision Making for Secondary Teachers 3 Credits  
Grading Scheme: Letter Grade  
Data-Driven Decision making focuses on discipline-specific assessments and the use of data to impact learning and teaching practices. Students will develop and adopt an inquiry stance as they integrate authentic assessment practices with standards-based instruction.

ESE 6344 Classroom Practices and Assessment in Secondary Education 3 Credits  
Grading Scheme: Letter Grade  
Practical applications of recent research on effective classroom practices.
ESE 6345 Effective Teaching and Classroom Management 3 Credits
Grading Scheme: Letter Grade
Advanced strategies for planning and presenting the general academic content of mathematics, science, foreign language, social studies, and English in the secondary school.
Prerequisite: consent of departmental.

ESE 6905 Individual Work 1-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Individual Work

ESE 6939 Special Topics 3 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Special Topics

ESE 6945 Student Teaching in Secondary School 3-9 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Supervised teaching in the secondary school, Grades 6-12.
Prerequisite: consent of instructor.

FLE 6165 Bilingual-Bicultural Education 3 Credits
Grading Scheme: Letter Grade
Foundational principles and practices in the field of bilingual-bicultural education in the U.S. and in other nations. Critical examination of theories and practices related to language policy in education.

FLE 6167 Cross-Cultural Communication for Teachers 3 Credits
Grading Scheme: Letter Grade
Critically explores ways educators can establish equitable and culturally responsive classrooms. Examines theories related to language, culture, and social justice.

LA E 6298 Literacy & Language Instruction 3 Credits
Grading Scheme: Letter Grade
Prepares preservice teachers to teach language arts integrated with writing children's literature. The study combines theory practice in language/writing development, differential instruction assessment for diverse students using literature for language writing instruction.

LA E 6339 Curriculum, Methods, and Assessment in Secondary English Language Arts 3 Credits
Grading Scheme: Letter Grade
Introduction to the theory and practice of teaching English.
Prerequisite: 30 hours of upper-division English. Designed for Proteach students only.

LA E 6348 Teaching Multiliteracies 3 Credits
Grading Scheme: Letter Grade
Application of theory and methods in teaching multiple modes of literacy.

LA E 6365 Language Arts: Language and Composition 3 Credits
Grading Scheme: Letter Grade
Methods and materials for teaching language and composition in the secondary school. This course and LAE 6366, in conjunction, comprise methods and materials for teaching English in the secondary school.

LA E 6366 Language Arts: Literature 3 Credits
Grading Scheme: Letter Grade
Theory and method for teaching literature in the secondary school. This course and LAE 6365, in conjunction, comprise methods and materials for teaching English in the secondary schools.

LA E 6407 Early Childhood Children's Literature 3 Credits
Grading Scheme: Letter Grade
Methods of involving young children (birth through kindergarten) with literature and the role of literature in the home and school.
Prerequisite: a course in children's literature.

LA E 6446 Multicultural Literature for Children and Adolescents 3 Credits
Grading Scheme: Letter Grade
Examines diverse cultures and theories in multicultural literature.

LA E 6616 Seminar in Children's Literature 3 Credits
Grading Scheme: Letter Grade
Trends and issues in children's literature and teaching literature. Topics rotate.
Prerequisite: LAE 3005.

LA E 6861 Technology and Media Literacy 3 Credits
Grading Scheme: Letter Grade
Methods and materials for integrating technology and media literacy in secondary English classrooms.
Prerequisite: LAE 6366.

LA E 6865 Teaching Media Literacy with the Internet 3 Credits
Grading Scheme: Letter Grade
Application of literacy theory and pedagogy to teaching multimodal internet texts.

LA E 6869 Teaching Digital Storytelling 3 Credits
Grading Scheme: Letter Grade
Focusing on educators by using storytelling and digital tools to advance literacy, learning, and the meaningful use of technology in educational settings.

LA E 6939 Literacy, Family, and Culture 3 Credits
Grading Scheme: Letter Grade
Examines various literacy patterns of students with non-mainstream cultural, social, and linguistic backgrounds; explores the impact of home literacy on school learning.

LA E 6945 Practicum and Assessment for Teachers of Secondary School English 3 Credits
Grading Scheme: Letter Grade
Directed experiences focused on applying instructional strategies, assessing student progress, and reflecting on ethical issues. Includes experiences in field and laboratory work.
Prerequisite: consent of department chair.

LA E 6946 Children's Literature in Educational Settings 3 Credits
Grading Scheme: Letter Grade
Field studies in library or school settings with high involvement in children's literature.
Prerequisite: LAE 3005.

LA E 7006 Language Acquisition and Education 3 Credits
Grading Scheme: Letter Grade
First language acquisition and implications for curriculum and instruction.

LA E 7519 Language and Inquiry 3 Credits
Grading Scheme: Letter Grade
Examines inquiry and its implications for curriculum and instruction.

LA E 7934 Seminar in Composition Theory and Practice 3 Credits
Grading Scheme: Letter Grade
Examines the theory of composition, and research on the impact of writing.

LA E 7936 Seminar in English Language Arts 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Contemporary developments and research in English language arts and education.
Prerequisite: consent of instructor.
LAE 7938 Lit, Cult and Politics 3 Credits
Grading Scheme: Letter Grade
Lit, Cult and Politics

MAE 5327 Middle School Mathematics Methods 3 Credits
Grading Scheme: Letter Grade
Mathematics materials, planning, and presentation.

MAE 5332 Secondary School Mathematics Methods and Assessment 3 Credits
Grading Scheme: Letter Grade
Patterns of mathematics curriculum; practices in teaching mathematics; preparing, selecting, and using instructional materials; assessment techniques.
Prerequisite: MAE4310 or consent of instructor.

MAE 5347 Teaching K-8 Mathematics for Understanding 3 Credits
Grading Scheme: Letter Grade
Instructional strategies to support young learners' mathematical understanding.
Prerequisite: MAE4310 or consent of instructor.

MAE 5395 Multicultural Mathematics Methods 3 Credits
Grading Scheme: Letter Grade
Mathematics education methods from a multicultural perspective.
Prerequisite: MAE 4310 or MAE 5318.

MAE 5396 Using Formative Assessment to Improve Mathematical Learning 3 Credits
Grading Scheme: Letter Grade
Developing the use of formative assessment in the practicing teacher's mathematics classroom for selecting instructional strategies appropriate for the teacher's particular students. Topics include developing a definition of formative assessment, investigating tiered instruction, supporting low achieving students, challenging high achieving students, and implementing management strategies.
Prerequisite: Admission to graduate status.

MAE 5945 Secondary School Mathematics Practicum 3-6 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Directed experiences emphasizing instructional strategies, selecting instructional materials, sequencing student activities, using instructional moves, and diagnosing student progress. Field and laboratory settings.

MAE 6313 Problem Solving in School Mathematics 3 Credits
Grading Scheme: Letter Grade
Analyzes problem solving as an underlying theme in elementary mathematics for preservice teachers. Emphasizes development of pedagogical content knowledge in elementary school mathematics.

MAE 6349 Classroom Contexts that Support Self-Regulated Learning and Mathematical Understanding 3 Credits
Grading Scheme: Letter Grade
Examining instructional strategies for supporting learners' self-regulated learning and mathematical understanding. Topics include mathematical proficiency and teaching for mathematical proficiency, classroom environments that support mathematical understanding, setting norms for classroom discourse, teaching via problem solving, and developing contexts that support self-regulated learning.

MAE 6916 Inquiry in Mathematics Teaching 3 Credits
Grading Scheme: Letter Grade
Promoting reflective practices in teaching mathematics, this online course will be centering around a self-directed classroom inquiry project. The course first solidifies expertise in key topics in mathematics education. It then moves to the teacher's development, implementation, and evaluation of the classroom inquiry project in his/her classroom.
Prerequisite: EDE 6325 Teacher Inquiry/Action Research

MAE 7899 Mathematics Education Seminar 3 Credits
Grading Scheme: Letter Grade
Issues and problems in mathematics education. Investigating and planning research relevant to selected problems.
Prerequisite: MAE 6138.

MUE 7938 Music Education Seminar 3 Credits
Grading Scheme: Letter Grade
Contemporary issues and problems in music education. Investigating and planning research relevant to selected problems.

RED 5316 Reading in the Primary Grades 3 Credits
Grading Scheme: Letter Grade
Advanced issues related to the emergence and development of literacy in young children.

RED 5337 Reading in the Secondary School 3 Credits
Grading Scheme: Letter Grade
Patterns of reading instruction in the secondary school; methods of teaching reading for teachers of all subject areas; preparing, selecting, and using instructional materials; selected field or micro-teaching experiences.

RED 5355 Reading Instruction in the Intermediate Grades 3 Credits
Grading Scheme: Letter Grade
Emphasizes materials and methods for teaching reading to students in the upper elementary grades, middle, and junior high schools.

RED 5399 Practices in Beginning Reading Instruction 3 Credits
Grading Scheme: Letter Grade
Providing students with deeper knowledge in specific areas related to beginning reading instruction. Course content focuses on instruction in advanced phonics/word study and structural analysis, vocabulary, and comprehension, integrating assessment and instruction for classroom application, and differentiating instruction for students, including ELLs, Gifted and ESE students.
Prerequisite: LIN 3710 Language Acquisition and RED 3XXX Emergent Literacy and Beginning Reading Instruction are required prerequisite courses.

RED 6346 Seminar in Reading 3-6 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Variable topics on reading and literacy.
Prerequisite: consent of instructor.

RED 6520 Classroom Literacy Assessment and Instruction 3 Credits
Grading Scheme: Letter Grade
Using classroom assessment information to guide literacy instruction.
Prerequisite: minimum of 1 introductory reading instruction course.

RED 6546C Diagnosis of Reading Difficulties 3 Credits
Grading Scheme: Letter Grade
Individual assessment techniques for locating difficulties in literacy acquisition.
RED 6548C Remediation of Reading Difficulties 3 Credits
Grading Scheme: Letter Grade
Advanced procedures and practices for remediating reading difficulties in the classroom and clinic.
Prerequisite: RED 6546C.

RED 6647 Trends in Reading 3 Credits
Grading Scheme: Letter Grade
Understanding current trends and issues in literacy education.

RED 6941 Practicum in Diagnosis and Remediation of Reading Difficulties 3 Credits
Grading Scheme: Letter Grade
Diagnosis and remediation of reading difficulties with at-risk K-12 learners.

RED 7019 Foundations of Literacy 3 Credits
Grading Scheme: Letter Grade
Foundational understanding of theories and discussions related to (and research methods involved in) studying literacy and literacy education.

SCE 5140 Science Curriculum Development 3 Credits
Grading Scheme: Letter Grade
Allows teachers to explore science curriculum development from theoretical and practical perspectives. Focuses on reform-based science curriculum and the research and science-specific pedagogical themes underlying their development. The course is divided into three sections: Science Curriculum Reform, Models of Science Curriculum Development, and Curriculum Exemplars.

SCE 5316 Inquiry-Based Science Teaching 3 Credits
Grading Scheme: Letter Grade
Inquiry into science content pedagogy and practice in elementary classrooms.

SCE 5695 Diversity and Equity in Science Teaching 3 Credits
Grading Scheme: Letter Grade
Providing an overview of the challenges and issues that face diverse populations of learners as they struggle to gain acceptance, recognition, and access to an appropriate science education.

SCE 5765 Data-Driven Science Instruction 3 Credits
Grading Scheme: Letter Grade
Focusing on assessment of science instruction and learning. The course will include the study of research-based approaches to assessment, learning, and teaching. In addition, the course will facilitate the adoption of an inquiry stance for integrating assessment data into teaching decisions.

SCE 5825 Foundations of Science Teaching 3 Credits
Grading Scheme: Letter Grade
Transforming unifying science themes into teaching and learning activities appropriate for K8 classrooms.
Prerequisite: SCE 4310 or equivalent.

SCE 6117 Science Education in the Elementary School 3 Credits
Grading Scheme: Letter Grade
Current problems, new materials and teaching techniques, research and recent developments in the sciences.

SCE 6246 Science Instruction in Informal Settings 3 Credits
Grading Scheme: Letter Grade
Review of theory and practice research on instructional techniques and curricula for K-12 science instruction in informal settings such as museums, nature centers, zoos, and outdoor school yards.

SCE 6337 Secondary Science Methods and Assessment 3 Credits
Grading Scheme: Letter Grade
Introduction to the theory and practice of teaching secondary school science, emphasizing planning, instruction, and assessment.

SCE 6647 Global Studies Methods in Science Education 3 Credits
Grading Scheme: Letter Grade
Research and best practices for incorporating global studies into the K-college science curriculum.

SCE 6947 Practicum in Secondary Science Teaching and Assessment 3 Credits
Grading Scheme: Letter Grade
Directed experiences emphasizing instructional strategies, selecting instructional materials, sequencing student activities, using instructional moves, and diagnosing student progress. Field and laboratory settings.
Prerequisite: consent of department chair.

SSE 5945C Practicum in Secondary Social Studies Teaching and Assessment 3 Credits
Grading Scheme: Letter Grade
Directed experiences emphasizing instructional strategies, instructional materials, and student assessment. Field and laboratory settings with microteaching assignments.

SSE 6046 Perspectives in Social Studies Education 3 Credits
Grading Scheme: Letter Grade
Seminar analyzing works written by important social studies educators.

SSE 6117 Social Studies Education?Elementary School 3 Credits
Grading Scheme: Letter Grade
Contributions of social education to the total elementary school program, emphasizing social interaction and programs and procedures in the social studies area.
Prerequisite: graduate curriculum course.

SSE 6133 Secondary School Social Studies Methods and Assessment 3 Credits
Grading Scheme: Letter Grade
Preparing, selecting, and using instructional methods, materials, and assessments in the social studies content area.

SSE 6478 Global Studies Methods in Science Education 3 Credits
Grading Scheme: Letter Grade
Introduction to the theory and practice of teaching secondary school science, emphasizing planning, instruction, and assessment.

TSL 5142 ESOL Curriculum, Methods, and Assessment 3 Credits
Grading Scheme: Letter Grade
Curriculum, methods, and assessment for second language learners in K-12 classrooms.
Prerequisite: TSL 3526.

TSL 5325 Secondary ESOL Teaching Strategies 3 Credits
Grading Scheme: Letter Grade
Teaching skills to be effective with ESOL students in a mainstream content class.

TSL 6145 Curriculum and Materials Development for ESOL K-12 3 Credits
Grading Scheme: Letter Grade
Developing and adapting standards-based curriculum and materials for L2 oral language and literacy, academic content, and K-12 ESOL instruction.
TSL 6245 Language Principles for ESOL Teachers 3 Credits
Grading Scheme: Letter Grade
Applied linguistics for teachers. Language-acquisition theories related to learning a second language in school. Connections between language and literacy development and effective instruction for English language learners.

TSL 6373 Methods of Teaching ESOL K-12 3 Credits
Grading Scheme: Letter Grade
Effective oral language and literacy instruction for K-12 English language learners.

TSL 6440 Testing and Evaluation of ESOL 3 Credits
Grading Scheme: Letter Grade
Introduction to assessment issues and experience in developing assessment techniques for learners of English as a second language.

TSL 6700 Issues in ESOL for School Counselors and Psychologists 3 Credits
Grading Scheme: Letter Grade
Gives school counselors and psychologists an overview of key concepts and issues related to ESOL students in K-12 schools.

Electrical and Computer Engineering

CNT 6805 Network Science and Applications 3 Credits
Grading Scheme: Letter Grade
Introduction to various methodologies and technologies in network science and studies a multitude of applications of network science.  
Prerequisite: EEL 3135 and EEL 5544; knowledge of MATLAB or C programming.

EEE 5216 Introduction to Biophotonics 3 Credits
Grading Scheme: Letter Grade
Introduction to the principles of optics, lasers and biology, the interaction of light with cells and tissues, and various optical imaging, sensing and activation techniques and their applications in biomedicine.  
Prerequisite: Students may not take this course if they have already taken EEE4210.

EEE 5225 Resonant MEMS 3 Credits
Grading Scheme: Letter Grade
Fundamentals of resonant micro-electro-mechanical systems (Resonant MEMS) and their applications.  
Prerequisite: Familiarity with ordinary differential equations, elementary signals and systems and circuit theory.

EEE 5283 Neural Signals, Systems and Technology 3 Credits
Grading Scheme: Letter Grade
Biophysical principles of neural signaling, characterization of neural circuits and systems, technology design principles for interfacing with biological neural systems, overview of clinical applications and industrial opportunities for neurotechnology.  
Prerequisite: Graduate standing in engineering and/or neuroscience or undergraduate senior standing with consent of instructor.

EEE 5317C Introduction to Power Electronics 3 Credits
Grading Scheme: Letter Grade
Components and circuits for power applications. Switched-mode power supplies.  
Prerequisite: Solid State Devices, Electronic Circuits and Linear Controls. Students may not take this course if they have already taken EEL4242C.

EEE 5320 Analog IC Design I 3 Credits
Grading Scheme: Letter Grade
Amplifier stages, active loads, output stages, op-amps, feedback, frequency response, compensation.  
Prerequisite: Analog Electronics. Students may not take this course if they have already taken EEE 4306.

EEE 5322 VLSI Circuits and Technology 3 Credits
Grading Scheme: Letter Grade
Introduction to VLSI circuit technology and manufacturing. Fabrication, device models, layout, parasitics, and simple gate circuits.  
Prerequisite: Solid State Devices and Electronic Circuits. Students may not take this course if they have already taken EEE4310.

EEE 5354L Semiconductor Device Fabrication Laboratory 3 Credits
Grading Scheme: Letter Grade
This course will be offering hands-on experience in semiconductor material characterization and device fabrication techniques.

EEE 5364 Fundamentals of Data Converters 3 Credits
Grading Scheme: Letter Grade
Exploring different data conversion techniques with an emphasis on IC implementation. Discussion of circuit building blocks and the effects of their non-idealities in the overall system performance will be analyzed.  
Prerequisite: Basic Electronic Circuits.

EEE 5374 Radio Frequency Electronics 3 Credits
Grading Scheme: Letter Grade
Teaches RF Electronic circuit design for a modern wireless transceiver and the RF circuit theory necessary to guide good design choices. The students learn to use RF IC design tools to design an RF low noise amplifier IC as part of a team final design project.  
Prerequisite: Basic Electronic Circuits. Students may not take this course if they have already taken EEE 4373.

EEE 5400 Future of Microelectronics Technology 3 Credits
Grading Scheme: Letter Grade
Prerequisite: Solid State Devices. Students may not take this course if they have already taken EEE4329.

EEE 5405 Microelectronic Fabrication Technologies 3 Credits
Grading Scheme: Letter Grade
Principles of microelectronic device fabrication. Emphasis on fundamentals of microfabrication processing and microelectronic device process flows. Computerized process simulation.  
Prerequisite: Solid State Devices. Students may not take this course if they have already taken EEE4331.

EEE 5408 Mixed Signal IC Testing I 3 Credits
Grading Scheme: Letter Grade
Fundamentals of Testing IC Devices and systems: test specifications, parametric testing, measurement accuracy, test hardware, sampling theory, digital signal processing based testing, and calibrations. Circuit analysis and design with analog and mixed-signal systems. Labs on testing passive components, LDOs, Op-amps, DACs/ADCs, Mixed-Signal ICs Labview and the National Instruments Savage Tester.  
Prerequisite: Analog and Digital Electronics. Students may not take this course if they have already taken EEE 4404.
EEE 5415 Modern Memory Device Technologies 3 Credits
Grading Scheme: Letter Grade
This course discusses state-of-the-art volatile and nonvolatile memory device technologies and their limitations. It also discusses emerging memory device technologies, including those that could be adopted by industry in the next decades due to their potential performance, density, power and cost advantages.
Prerequisite: Solid State Devices.

EEE 5426 Introduction to Nanodevices 3 Credits
Grading Scheme: Letter Grade
Physical principles of modern solid-state devices and their applications; quantum mechanics; fundamentals of nanoelectronics.
Prerequisite: Students may not take this course if they have already taken EEE4420.

EEE 5467 Micro/Nano Machined Metamaterials 3 Credits
Grading Scheme: Letter Grade
Study course on the micro-/nano machined metamaterials and their applications for radio frequency (RF) and microwave devices including transmission line, waveguides, resonators, filters, and antennas.
Prerequisite: Electromagnetic Fields and Applications

EEE 5502 Foundations of Digital Signal Processing 3 Credits
Grading Scheme: Letter Grade
Analysis and design of digital filters for discrete signal processing, spectral analysis, and fast Fourier transform.
Prerequisite: None. Students may not take this course if they have already taken EEL4750.

EEE 5544 Noise in Linear Systems 3 Credits
Grading Scheme: Letter Grade
Fundamental analytical techniques for modeling, analyzing, and processing electrical signals and computer data in the presence of noise and randomness. Covers from probability to filtering of random processes, with applications to communications, signal and image processing, data compression, and simulation.
Prerequisite: Students may not take this course if they have already taken EEL4516.

EEE 5702 Automated Hardware/Software Verification 3 Credits
Grading Scheme: Letter Grade
Develop modeling, formal specification, and automated verification skills for analyzing complex hardware and/or software systems. Hands-on experience with model checking tools.
Prerequisite: Data Structures, Algorithms and Architecture (Prerequisites allow students to register without departmental intervention. Students are expected to review the syllabus and consult the instructor if they have questions regarding prerequisites).

EEE 5716 Introduction to Hardware Security and Trust 3 Credits
Grading Scheme: Letter Grade
Fundamentals of hardware security and trust for integrated circuits. Cryptographic hardware, invasive and non-invasive attacks, side-channel attacks, physically unclonable functions (PUFs), true random number generation (TRNG), watermarking of Intellectual Property (IP) blocks, FPGA security, counterfeit detection, hardware Trojan detection and prevention in IP cores and integrated circuits.
Prerequisite: Digital Design. Students may not take this course if they have already taken EEE4714.

EEE 5725 Acoustics 3 Credits
Grading Scheme: Letter Grade
Governing equations for wave theory of sound; Character of plane acoustic waves and 3-D acoustic fields; Sound transmission/reflection at an interface between two media; Waves transmission/attenuation inducts; Low frequency approximations (lumped-element modeling) and transducers; sources of sound.
Prerequisite: Permission of instructor. Students may not take this course if they have already taken EEE4720.

EEE 6287 Brain Machine Interface Engineering 3 Credits
Grading Scheme: Letter Grade
Overviewing the recent field of Brain Machine Interfaces and neurotechnology with an emphasis on the engineering aspects of the problem (signal processing, and neurotechnology). The student will have the opportunity to work with brain signals and develop and test algorithms for BMIs.
Prerequisite: EEE 5502

EEE 6321 Analog IC Design I 3 Credits
Grading Scheme: Letter Grade
Design of analog circuits in CMOS IC technology. MOS switches, MOS op amp circuits, circuit simulation using SPICE.
Prerequisite: EEE 5320.

EEE 6323 Advanced VLSI Design 3 Credits
Grading Scheme: Letter Grade
Advanced very large scale integrated circuit design, testability, and performance evaluation. Use of industrial VLSI software. Building an advanced CMOS VLSI circuit.
Prerequisite: EEE 5322.

EEE 6328C Microwave IC Design 3 Credits
Grading Scheme: Letter Grade
Fundamentals of microwave integrated circuit design. Use of computer software to design simple microwave circuits. Microwave circuit testing.

EEE 6374 RF Circuits and Systems 3 Credits
Grading Scheme: Letter Grade
Requirements for RF integrated circuits. Design and implementation. Interdependence of RF circuit performance with devices, parasitics, packages, and process technology.
Prerequisite: EEE 5322.

EEE 6382 Semiconductor Physical Electronics 3 Credits
Grading Scheme: Letter Grade
Crystal structure and symmetry, carrier statistics, lattice dynamics, energy band theory, equilibrium properties of semiconductors, recombination-generation and trapping processes, electronic transport phenomena, scattering mechanisms, and optical properties.
Prerequisite: EEE 5426.

EEE 6390 VLSI Device Design 3 Credits
Grading Scheme: Letter Grade
Criteria and tradeoffs in designing high-performance semiconductor devices in scaled (VLSI) Si-based integrated-circuit technologies.
Prerequisite: EEE 5426 or EEE 5400.

EEE 6397 Semiconductor Device Theory I 3 Credits
Grading Scheme: Letter Grade
Semiconductor device physics, equilibrium and non-equilibrium processes, pn junctions, BJT operation, charge-control modeling, and high-current and heavy-doping effects.
Prerequisite: EEE 5426.
EEE 6428 Nanoscale Devices for VLSI Technology 3 Credits
Grading Scheme: Letter Grade
Using nanotechnology simulation tools to study nanoscale devices in future very large scale integration (VLSI) technologies; band structure, transport, molecular transistors, nanowires, nanotransistors, and quantum dots.

EEE 6431 Carbon Nanotubes 3 Credits
Grading Scheme: Letter Grade
Basic semiconductor and solid-state physics of carbon nanotubes, nanotube geometrical and electronic structure, and current nanotube research.
Prerequisite: EEE 5400.

EEE 6460 Advanced Microsystem Technology 3 Credits
Grading Scheme: Letter Grade
Advanced micro-fabrication technologies, micro-system design, interface circuits, and MEMS packaging. CMOS, Optical, and RF MEMS.
Prerequisite: EEL 5225.

EEE 6465 Design of MEMS Transducers 3 Credits
Grading Scheme: Letter Grade
Design of MEMS transducer systems with physical, technological and economic constraints.
Prerequisite: EEL 5225.

EEE 6503 Digital Filtering 3 Credits
Grading Scheme: Letter Grade
Introduction to number transforms, complexity of algorithms, and finite fields. Development of transforms and digital filter using algebraic operators and finite fields plus the technological consideration of DSP system and system integration.
Prerequisite: analysis and design of digital filters.

EEE 6504 Machine Learning for Time Series 3 Credits
Grading Scheme: Letter Grade
Theory of adaptation with stationary signals; performance measures. LMS, RLS algorithms. Implementation issues and applications.
Prerequisite: EEE 5502 and EEL 5840.

EEE 6512 Image Processing and Computer Vision 3 Credits
Grading Scheme: Letter Grade
Pictorial data representation; feature encoding; spatial filtering; image enhancement; image segmentation; cluster seeking; two-dimensional z-transforms; scene analysis; picture description language; object recognition; pictorial database; interactive graphics; picture understanding machine.
Prerequisite: Digital Signal Processing.

EEE 6561 Fundamentals of Biometric Identification 3 Credits
Grading Scheme: Letter Grade
Methods and principles for the automatic identification/authentication of individuals. Technologies include fingerprint, face, and iris biometrics. Additional topics include biometric system design, performance evaluation, multi-modal biometric systems, and biometric system security.
Prerequisite: EEE 6512 or instructor approval

EEE 6586 Automatic Speech Processing 3 Credits
Grading Scheme: Letter Grade
Prerequisite: EEE 5502.

EEE 6715 Computational Aspects of Cyber-Physical Systems 3 Credits
Grading Scheme: Letter Grade
Fundamental and practical issues in designing and analyzing cyber-physical systems including system design, middleware design, monitoring, scheduling, management and control issues in the full life-cycle of CPS design and implementation. Applications of CPS will be studied, including mobile computing, mobile social networks, smart grid, and cloud of things.
Prerequisite: EEL 5718 and graduate standing

EEE 6742 Advanced Hardware Security and Trust 3 Credits
Grading Scheme: Letter Grade
Expands on the foundation provided by the Introduction to Hardware Security and highlights the challenges arising from the end of Moore's law as well as the rapid evolution of attackers. Hands-on experience with various commercial and open-source CAD tools will be developed via lectures, tutorials, and projects.
Prerequisite: EEE 5716, undergraduate course in digital design, and familiarity with VHDL, Verilog, and CAD/EDA tools.

EEE 6744 Hands-On Hardware Security 3 Credits
Grading Scheme: Letter Grade
Focuses on practical learning of computer hardware security using a hands-on approach. Students will work on a custom-designed hardware platform to understand innards of a computer system and ethically "hack" into it at different levels. They will examine it to understand security vulnerabilities, mount attacks, and implement countermeasures.
Prerequisite: EEE 5716

EEL 5182 State Variable Methods in Linear Systems 3 Credits
Grading Scheme: Letter Grade
Linear algebra and state variable methods for design and analysis of discrete and continuous linear systems.
Prerequisite: Linear Controls. Students may not take this course if they have already taken EEL 4610.

EEL 5225 Principles of Micro-Electro-Mechanical Transducers 3 Credits
Grading Scheme: Letter Grade
Introduction to principles of micro-electro-mechanical devices and systems.
Prerequisite: Solid State Devices.

EEL 5249 Fundamentals of RF and Power Electronic Devices 3 Credits
Grading Scheme: Letter Grade
The course is designed to introduce important semiconductor device technologies for high speed electronics, power electronics and energy harvesting applications.
Prerequisite: Solid State Devices.

EEL 5250 Power System Analysis 3 Credits
Grading Scheme: Letter Grade
Development of power system equivalents by phase, network analysis, load flow, symmetrical components, sequence networks, and fault analysis.
Prerequisite: Basic Electric Energy Engineering. Students may not take this course if they have already taken EEL 4251.

EEL 5285 Smart Grid for Sustainable Energy 3 Credits
Grading Scheme: Letter Grade
Survey of power grid operations and markets for students with interest in power systems and/or sustainable energy. Characteristics of traditional and new energy resources; how resources impact the grid; control on many time-scales; how the power grid and power markets of tomorrow will differ from those of today.
Prerequisite: Linear Controls and Experience with MATLAB.
EEL 5406 Computational Photography 3 Credits  
Grading Scheme: Letter Grade  
Fundamentals of computational photography, sensing, imaging and illumination.  
Prerequisite: Signals and Systems. Students may not take this course if they have already taken EEL 4403.

EEL 5417 Applied Magnetism & Magnetic Materials 3 Credits  
Grading Scheme: Letter Grade  
Introduction to magnetism, magnetic materials, and magnetic devices. The course offers a balance of theory and application from an applied engineering perspective.  
Prerequisite: None. Students may not take this course if they have already taken EEL 4412.

EEL 5426 RF/Microwave Passive Circuits 3 Credits  
Grading Scheme: Letter Grade  
Radio frequency (RF)/microwave passive components and circuits such as transmission lines, waveguides, couplers, filters, and resonators.  
Prerequisite: Electromagnetic Fields and Applications.

EEL 5441 Fundamentals of Photonics 3 Credits  
Grading Scheme: Letter Grade  
Review of electromagnetic fields and waves, energy bands in semiconductors, p-n junctions and optical properties of semiconductors. Fundamentals of optical modulators and switches, laser theory, laser characteristics, photodetectors, optical waveguides, and photonic applications.  
Prerequisite: Solid State Devices & Electromagnetic Fields and Applications.

EEL 5447 Laser Theory and Design 3 Credits  
Grading Scheme: Letter Grade  
Studies the field of semiconductor optoelectronics and the physics of optoelectronic devices including the interaction of photons with electrons and holes in a semiconductor leading to the realization of optoelectronic devices such as photon amplifiers, LEDs, diode lasers, and electro-absorption modulators, and detectors, including their design and application-specific characteristics.  
Prerequisite: Physics of Electrical Engineering.

EEL 5462 Advanced Antenna Systems 3 Credits  
Grading Scheme: Letter Grade  
Electromagnetic field theory and its application to antenna design.  
Prerequisite: Electromagnetic Fields. Students may not take this course if they have already taken EEL 4461.

EEL 5486 Electromagnetic Fields and Applications 3 Credits  
Grading Scheme: Letter Grade  
Rigorous development of fundamental electrostatic, magnetostatic, and electromagnetic behavior, with special attention toward practical applications. Electrodynamics: Gauss’ law, electric fields, scalar potential, and energy in simple media. Magnetostatics: Ampère’s law, Faraday’s law, magnetic fields, vector potential, and energy in simple media. Electromagnetics: Maxwell’s equations, time-varying fields, and Poynting’s theorem.  
Prerequisite: Undergraduate course in fields and waves. Students may not take this course if they have already taken EEL 4473.

EEL 5490 Lightning 3 Credits  
Grading Scheme: Letter Grade  
Introduction to lightning discharge processes. Electromagnetics relevant to lightning measurements. Applications for determining lightning charge, current, location, and characteristics. Lightning protection.  
Prerequisite: Electromagnetic Fields. Students may not take this course if they have already taken EEL 4495.

EEL 5547 Introduction to Radar 3 Credits  
Grading Scheme: Letter Grade  
Basic principles of cw and pulsed radar; angle, range, and doppler tracking; accuracy and resolution; signal design.  
Prerequisite: Wave propagation, noise in communications systems, and Fourier Transforms. Students may not take this course if they have already taken EEL 4540.

EEL 5666C Intelligent Machines Design Laboratory 4 Credits  
Grading Scheme: Letter Grade  
Design simulation, fabrication, assembly, and testing of intelligent robotic machines.  
Prerequisite: EEL 4744C.

EEL 5704 Digital Design 3 Credits  
Grading Scheme: Letter Grade  
Develop a deep understanding of operating system concepts and systems programming fundamentals and gain hands-on experience in systems programming by using Pthreads as well as implementing Linux device drivers and testing/verifying systems code for deadlock and race-freedom.  
Prerequisite: Operating Systems and Architecture (Prerequisites allow students to register for course without departmental intervention. Students are expected to review the syllabus and consult the instructor if they have questions regarding prerequisites.)

EEL 5718 Computer Communications 3 Credits  
Grading Scheme: Letter Grade  
Design of data communication networks: modems, terminals, error control, multiplexing, message switching, and data concentration.  
Prerequisite: Communication Systems and Components. Students may not take this course if they have already taken EEL 4598.

EEL 6117D Digital Logic Design 3 Credits  
Grading Scheme: Letter Grade  
Fundamental concepts at introductory graduate level in reconfigurable computing based upon advanced technologies in field-programmable logic devices. Topics include general concepts, device architectures, design tools, metrics and kernels, system architectures, and application case studies.  
Prerequisite: Digital Design. Students may not take this course if they have already taken EEL 4720.

EEL 5733 Advanced Systems Programming 3 Credits  
Grading Scheme: Letter Grade  
Develop a deep understanding of operating system concepts and systems programming fundamentals and gain hands-on experience in systems programming by using Pthreads as well as implementing Linux device drivers and testing/verifying systems code for deadlock and race-freedom.  
Prerequisite: Operating Systems and Architecture (Prerequisites allow students to register for course without departmental intervention. Students are expected to review the syllabus and consult the instructor if they have questions regarding prerequisites.)

EEL 5737 Principles of Computer System Design 3 Credits  
Grading Scheme: Letter Grade  
This class will be providing a broad introduction to the main principles and abstractions for engineering hardware and software systems, and in-depth studies of their use on computer systems across a variety of designs, be it in operating system, a client/server application, a database server, or a fault-tolerant disk cluster.  
Prerequisite: Dig. Des. and Comp. Prog.. The project?s programming component uses a scripting language (Python) and requires basic understanding of data structures, algorithms, and Unix. Students may not take this course if they have taken EEL 4736.

EEL 5764 Computer Architecture 3 Credits  
Grading Scheme: Letter Grade  
Fundamentals in design and quantitative analysis of modern computer architecture and systems, including instruction set architecture, basic and advanced pipelining, superscalar and VLIW instruction-level parallelism, memory hierarchy, storage, and interconnects.  
Prerequisite: Digital Design.
EEL 5840 Fundamentals of Machine Learning 3 Credits
Grading Scheme: Letter Grade
Engineering and hardware concepts pertaining to design of intelligent computer systems.

EEL 5855 Cross Layered Systems Security 3 Credits
Grading Scheme: Letter Grade
Develop an understanding of the principles of computer security, as it crosses layers of abstraction (application, operating system, hardware and network). Students will learn challenges of building secure computer systems with examples and hands-on assignments. Current research on these challenges will be discussed. Students will review and present conference papers.
Prerequisite: Programming knowledge & Principles of computer systems design knowledge

EEL 5905 Individual Work 1-4 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Selected problems or projects.
Prerequisite: consent of adviser.

EEL 5934 Special Topics in Electrical Engineering 1-3 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Special Topics in Electrical Engineering

EEL 6065 Electrical & Computer Engineering Technical Writing 3 Credits
Grading Scheme: Letter Grade
A specialized technical writing course for Electrical and Computer Engineering graduate students.

EEL 6246 Power Electronics II 3 Credits
Grading Scheme: Letter Grade
Advanced topics including the modeling of single and three-phase power electronics systems, control design for single and three-phase power electronics systems, reduction and modeling of EMI for power electronics systems and resonant power converters.
Prerequisite: EEE 5317C or equivalent.

EEL 6275 Power System Protection 3 Credits
Grading Scheme: Letter Grade
Unbalanced Load Flow; Fault Analysis on Distribution Systems; Multimachine Stability; Balanced/Unbalanced State Estimation; Principles of Protection, Transducers and Relay Classification; Circuit Breakers; Protection of Distribution and Transmission Lines, Transformers, Generators, Motors/Buses, Reactors/Capacitors, Distributed Generation; Power System Phenomena and Relaying Considerations System Performance; Fault Location.
Prerequisite: EEL 5250

EEL 6487 Electromagnetic Field Theory and Applications II 3 Credits
Grading Scheme: Letter Grade
Electromagnetic radiation, antennas, wave propagation in anisotropic media.
Prerequisite: EEL 5486.

EEL 6507 Queuing Theory and Data Communications 3 Credits
Grading Scheme: Letter Grade
Introduction to basic queuing models; performance analysis of multiple access protocols; error control strategies.
Prerequisite: EEE 5544.

EEL 6509 Wireless Communication 3 Credits
Grading Scheme: Letter Grade
Introduction. Satellite and cellular systems, propagation, modulation techniques, multiple access techniques, channel coding, speech and video coding, and wireless computer networks.
Prerequisite: Graduate level course in noise in linear systems.

EEL 6528 Digital Communications with Software-defined Radios 3 Credits
Grading Scheme: Letter Grade
Basics of software-defined radios; Introduction to USRP radios and GNU Radio software platform; Practical communication algorithms and designs; Implementation of communication systems in USRP radios.
Prerequisite: EEL 6535 or EEL 6509.

EEL 6532 Information Theory 3 Credits
Grading Scheme: Letter Grade
Applications of information theory to communications and other related areas.
Prerequisite: EEE 5544 or equivalent.

EEL 6533 Data Analytics and Decision Sciences 3 Credits
Grading Scheme: Letter Grade
Hypothesis testing of signals in the presence of noise by Bayes, Neyman-Pearson, minimax criteria; estimation of signal parameters.
Prerequisite: EEE 5544.

EEL 6535 Digital Communications 3 Credits
Grading Scheme: Letter Grade
Digital modulation techniques; analysis of digital communication systems in presence of noise; optimum principles; synchronization; equalization.
Prerequisite: EEE 5544.

EEL 6537 Spectral Sensing and Sparse Signal Recovery 3 Credits
Grading Scheme: Letter Grade
Measurement and analysis of signals and noise. Digital filtering and spectral analysis; fast Fourier transform.
Prerequisite: EEE 5544, EEE 5502.

EEL 6550 Error Correction Coding 3 Credits
Grading Scheme: Letter Grade
Introduction to abstract algebra, block coding and decoding, convolutional coding and decoding, trellis coded modulation, and run-length-limited codes.
Prerequisite: EEE 5544 or equivalent.
Corequisite: EEE 5544 or 4516.

EEL 6555 Signal Processing for Active Sensing 3 Credits
Grading Scheme: Letter Grade
Theoretically developing an active sensing system by taking into account the probing waveform synthesis considerations under various spectrum restrictions, as well as the sophisticated receiver statistical and array signal processing methodologies to combat diverse adverse effects such as interference and jamming.
Prerequisite: EEL 6537 or equivalent.

EEL 6588 Wireless Ad Hoc Networks 3 Credits
Grading Scheme: Letter Grade
Advanced research-oriented course covering various topics relevant to a cutting-edge technology, namely wireless ad hoc networks, mobile ad hoc networks, wireless sensor networks, and/or wireless mesh networks.
Prerequisite: EEL 5718, Graduate student standing.
EEL 6591 Wireless Networks 3 Credits
Grading Scheme: Letter Grade
Design and analysis of wireless networks including channel characteristics, physical layer, cellular concepts, multiple access control protocols, FEC and ARQ protocols, resource allocation, and wireless standards.
Prerequisite: EEL 5718 and knowledge of probability and statistics.

EEL 6614 Modern Control Theory 3 Credits
Grading Scheme: Letter Grade
Optimization of systems using the calculus of variations, dynamic programming, and the maximum principle. Extensive study of the linear plant with a quadratic performance index. Observers and dynamic compensators.
Prerequisite: EEL 5182.

EEL 6617 Linear Multivariable Control 3 Credits
Grading Scheme: Letter Grade
Transfer matrix theory of systems, emphasis on feedback, internal stability, model matching, and assignment of invariant factors.
Prerequisite: EEL 5182.

EEL 6686 Embedded Systems Seminar 3 Credits
Grading Scheme: Letter Grade
An embedded system is any computing system other than traditional computer systems. Examples include set-top boxes, digital cameras, alarm systems, automotive systems, aerospace systems, and cell phones. Structured as a seminar course and will review cutting-edge publications with student presentations.
Prerequisite: CDA 5636.

EEL 6706 Fault-Tolerant Computer Architecture 3 Credits
Grading Scheme: Letter Grade
Design and quantitative analysis of fault-tolerant architectures and dependable systems including fundamental issues, redundancy techniques, evaluation methods, design methodology, and applications.
Prerequisite: EEL 5764 or CDA 5155.

EEL 6761 Cloud Computing and Storage 3 Credits
Grading Scheme: Letter Grade
Provides a broad introduction to the fundamentals in cloud computing and storage, and an in-depth investigation on system architecture, programming models, algorithmic design, and application development.
Prerequisite: Graduate level course in computer architecture.

EEL 6763 Parallel Computer Architecture 3 Credits
Grading Scheme: Letter Grade
Advanced architecture emphasizing design and quantitative analysis of parallel architecture and systems, including theory, hardware technologies, parallel and scalable architectures, and software constructs.
Prerequisite: EEL 5764.

EEL 6814 Neural Networks and Deep Learning 3 Credits
Grading Scheme: Letter Grade
Prerequisite: EEL 5840

EEL 6825 Pattern Recognition and Intelligent Systems 3 Credits
Grading Scheme: Letter Grade
Decision functions; optimum decision criteria; training algorithms; unsupervised learning; feature extraction, data reduction; potential functions; syntactic pattern description; recognition grammars; machine intelligence.
Prerequisite: Machine Learning.

EEL 6841 Machine Intelligence and Synthesis 3 Credits
Grading Scheme: Letter Grade
Theory of machine intelligence applied to general problem of engineering intelligent computer systems and architecture. Applications emphasized.
Prerequisite: EEL 5840.

EEL 6871 Software Defined Systems 3 Credits
Grading Scheme: Letter Grade
Exploring ECE research through presentations by faculty members, graduate students, and invited speakers.

EEL 6873 Electrical and Computer Engineering Graduate Seminar 1 Credit, Max 5 Credits
Grading Scheme: S/U
Graduate seminar in current topics and trends in ECE.

EEL 6892 Virtual Computers 3 Credits
Grading Scheme: Letter Grade
Techniques for virtualization of networked computer systems. Virtual machines (classic VMs, application binary interface VMs, para-virtualization), virtual distributed file systems (file system proxies, call-forwarding), and virtual networks (tunneling, virtual private networks).
Prerequisite: EEL 5737 or instructor approval.

EEL 6905 Individual Work 1-4 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Selected problems or projects.
Prerequisite: consent of adviser.

EEL 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

EEL 6933 Electrical and Computer Engineering Graduate Seminar 1 Credit, Max 3 Credits
Grading Scheme: S/U
Exploring ECE research through presentations by faculty members, graduate students, and invited speakers.
Prerequisite: Graduate student status

EEL 6955 Special Topics in Electrical Engineering 1-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Special Topics in Electrical Engineering

EEL 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

EEL 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.
EEL 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

EGN 5949 Practicum/Internship/Cooperative Work Experience 1-6 Credits, Max 6 Credits
Grading Scheme: S/U
Practical cooperative engineering work under approved industrial and faculty supervision.
Prerequisite: graduate student.

EGN 6640 Entrepreneurship for Engineers 3 Credits
Grading Scheme: Letter Grade
Introduction to entrepreneurship, idea generating and feasibility analysis, and business planning. Lectures, case studies, student-led discussions, team business plans, and investor presentations.

EGN 6913 Engineering Graduate Research 0-3 Credits
Grading Scheme: S/U
Course will provide the student with supervised research in a laboratory setting.

EGN 6933 Special Topics 1-3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Special Topics in Engineering, not specific to a major.

EGN 6937 Engineering Fellowship Preparation 0-1 Credits
Grading Scheme: Letter Grade
Engineering Fellowship Preparation will instill in students an understanding of the fellowship and grant process.

EGN 6913 Engineering Graduate Research 0-3 Credits
Grading Scheme: S/U
Course will provide the student with supervised research in a laboratory setting.

EGN 6937 Engineering Fellowship Preparation 0-1 Credits
Grading Scheme: Letter Grade
Engineering Fellowship Preparation will instill in students an understanding of the fellowship and grant process.

EGS 6039 Engineering Leadership 3 Credits
Grading Scheme: Letter Grade
Concepts, theory and practice of engineering leadership; effective written and oral communications and presentations; engineering leadership characteristics, individual differences and self-awareness; developing and building teams; managing change, conflicts, and crises; and understanding real-world ethics and core values.

EGS 6050 Foundations in Engineering Education 2 Credits
Grading Scheme: Letter Grade
An introduction to fundamental issues, questions, and approaches to engineering education.

EGS 6056 Learning and Teaching in Engineering 1 Credit
Grading Scheme: Letter Grade
Learn and apply evidence-based teaching and assessment techniques. Understand how to create course content based on the student-centered learning approach to teaching. Be introduced to methods to foster an inclusive classroom environment to support diverse learners in your classroom. Develop teaching philosophy based on the principles provided through this course.
Prerequisite: Enrolled in a graduate-level engineering program.

EGS 6101 Divergent Thinking 3 Credits
Grading Scheme: Letter Grade
Focuses on student acquisition of divergent thinking skills to support the engineering design process. It emphasizes the importance of student practices such as observing, questioning, learning and experimenting, and stresses cultivating an openness to new experiences, in order to generate ideas and devise solutions to complex design problems.

EGS 6626 Fundamentals of Engineering Project Management 3 Credits
Grading Scheme: Letter Grade
Provides engineering students with a comprehensive understanding of how to plan, optimize and efficiently manage projects (or tasks) to implement products, services or developments. This includes building the structure, processes, components and linkages with a team for successful project delivery within schedule, budget and quality requirements.

EGS 6628 Applied Engineering Project Management 3 Credits
Grading Scheme: Letter Grade
Applied Engineering Project Management expands on foundational project management practices to include complex as well as new project delivery concepts. Topics include project acquisition; negotiation skills; advanced risk planning and management; program management; project.
Prerequisite: EGS 4625/6626, Fundamentals of Engineering Project Management, or equivalent (with permission of the instructor).

EGS 6681 Advanced Engineering Leadership 3 Credits
Grading Scheme: Letter Grade
Designed to further develop the leadership framework and capabilities of graduate engineering students. It involves a case study-based instructional approach that reviews and applies strategic leadership concepts and knowledge critical to the success of engineering-based companies that now operate in a highly-uncertain and volatile business environment.
Prerequisite: EGS 6039 or instructor approval.

ESI 6900 Principles of Engineering Practice 1-4 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Course work in specialized topics for graduate students.
Prerequisite: consent of instructor.
English

AML 6017 Studies in American Literature Before 1900 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Studies in American Literature Before 1900

AML 6027 Studies in 20th-Century American Literature 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Studies in 20th-Century American Literature

CRW 6130 Fiction Writing 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Fiction Writing

CRW 6166 Studies in Literary Form 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Formal aspects of literature.
Prerequisite: consent of instructor.

CRW 6331 Verse Writing 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Verse Writing

CRW 6906 Individual Work 1-3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Individual study in reading literature and criticism, required for MFA specialization in creative writing.

ENC 5236 Advanced Business Writing for Accounting 4 Credits
Grading Scheme: Letter Grade
Practice in and examination of theories of professional writing.

ENC 6428 Digital English 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Digital technologies, media, and programs related to the discipline of English. Scholarship and theory about (and production of work in) such media (web, MOO).

ENC 7760 From Paper to Publication: The Peer-Reviewed Journal Article in English Studies and Related Fields 3 Credits
Grading Scheme: Letter Grade
Publishing peer-reviewed articles is essential to job placement and promotion in the humanities; this course teaches strategies for success in academic writing, the review process, and assessing journals. By the end of the semester, students revise a paper and submit it to a peerreviewed journal in their area of specialization.

ENG 6016 Psychological Approaches to Literature 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Psychological Approaches to Literature

ENG 6075 Literary Theory: Issues 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Literary Theory: Issues

ENG 6077 Literary Theory: Forms 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Forms of theory studies (e.g., "schools," writing practices, assemblages of theoretical issues).

ENG 6137 The Language of Film 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
The Language of Film

ENG 6138 Studies in the Movies 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Studies in the Movies

ENG 6824 Proseminar in Graduate Studies in English: Research, Writing, and the Profession 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
The proseminar has a two-fold objective: to introduce students to research methods, scholarly writing, and professionalization and to examine of a specific topic in English, Writing, or Media Studies. Students have the opportunity to work in their areas of research. Assignments include bibliographies, academic genres, presentations, and peer reviews.

ENG 6906 Individual Work 1-3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Individual Work

ENG 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

ENG 6932 Film and Video Production 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
A variable-topics film and video production seminar.
Prerequisite: None.

ENG 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

ENG 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ENG 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

ENL 6246 Studies in Romantic Literature 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Studies in Romantic Literature

ENL 6256 Studies in Victorian Literature 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Studies in Victorian Literature

ENL 6276 Studies in 20th-Century British Literature 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Studies in 20th-Century British Literature

LAE 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

LAE 6947 Writing Theories & Practices 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Writing Theories Practices
Prerequisite: English major.

LIT 6047 Studies in Drama 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Studies in Drama
LIT 6236 Postcolonial Studies 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Postcolonial literature and theory, including theories of colonialism and globalization, as well as the literature of Africa, Asia, the Caribbean, Australia, New Zealand, and Canada as they pertain to colonialism and its legacies.

LIT 6357 African-Amer. or African Diaspora Lit./Cultures 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
African-American or African Diaspora literature

LIT 6358 Theoretical Approaches to Black Cultural Studies 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Explorations of theory and black writing and the variety of theoretical approaches.

LIT 6855 Issues in Cultural Studies 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Issues in Cultural Studies

LIT 6856 Cultural Studies: Interventions 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Praxes, perspectives, and limitations of cultural and theoretical studies within the multiple contexts of their production.

LIT 6934 Variable Topics 1-5 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Studies in topics not normally offered in the regular curriculum, including intensive study of topics within a literary period, extensive study of motifs crossing several periods, and studies in various national or ethnic literatures (African, Afro-American, Jewish, Scots).

Entomology and Nematology

ALS 5156 Agricultural Ecology Principles and Applications 3 Credits
Grading Scheme: Letter Grade
Introduction to agroecosystems. Ecological principles with examples and applications from agriculture.

ALS 6046 Grant Writing 2 Credits
Grading Scheme: Letter Grade
Preparation, submission, and management of competitive grants, including operations of national review panels and finding sources of extramural funding.
Prerequisite: admitted to doctoral program.

ALS 6166 Exotic Species and Biosecurity Issues 3 Credits
Grading Scheme: Letter Grade
U.S. policies and programs affecting agricultural biosecurity. Attention is devoted to current agricultural and extension and regulatory programs. Emphasizes policies and procedures in detecting and reporting non-indigenous species. Students will develop the analytical capabilities to assess the consequences of agricultural biosecurity threats.
Prerequisite: BSC2010, BSC2010L, BSC2011, BSC2011L, or equivalent.

ALS 6935 Topics in Biological Invasions 3 Credits
Grading Scheme: Letter Grade
Non-native species invasions and environmental effects of these invaders. Students will develop analytical capabilities to assess the consequences of biological invasions.
Prerequisite: BSC2010/BSC2010L and BSC2011/BSC2011L or equivalent.

ENY 5006 Graduate Survey of Entomology 2 Credits
Grading Scheme: Letter Grade
Insect structure, function, development, classification, ecological niches, and control of those harmful to plants and animals.
Corequisite: ENY 5006L.

ENY 5006L Graduate Survey of Entomology Laboratory 1 Credit
Grading Scheme: Letter Grade
Practical experience working with insects, using laboratory equipment, dissecting insects, and preparing laboratory reports. Collection required.
Corequisite: ENY 5006.

ENY 5031C Insect Field Biology 3 Credits
Grading Scheme: Letter Grade
For nonmajors. Role of insects in nature. Field exercises and experiments.

ENY 5160C Survey of Science with Insects 3 Credits
Grading Scheme: Letter Grade
Interactions of insects with man and environment.

ENY 5164 Graduate Survey of Invertebrate Field Biology 3 Credits
Grading Scheme: Letter Grade
Field-oriented survey of invertebrate biodiversity and conservation.

ENY 5212 Insects and Wildlife 3 Credits
Grading Scheme: Letter Grade
Insects and other arthropods and their relationships with wild vertebrate animals.
Prerequisite: ENY 5006L or equivalent

ENY 5223C Biology and Identification of Urban Pests 3 Credits
Grading Scheme: Letter Grade
Biology, behavior, identification. Damage recognition of species that infest houses, damage structures, and affect pets and humans.

ENY 526C Principles of Urban Pest Management 3 Credits
Grading Scheme: Letter Grade
Methods of controlling household, structural, and occasional pests. Chemical and nonchemical control of cockroaches, termites, and fleas.

ENY 5231 Pests Structures 2 Credits
Grading Scheme: Letter Grade
Knowledge base to solve pest-management problems in real-life situations.
Corequisite: ENL 5231L.

ENY 5236 Insect Pest and Vector Management 3 Credits
Grading Scheme: Letter Grade
Principles and practices used in pest management, emphasizing arthropod pests affecting crop and ornamental plants, humans, and livestock.

ENY 5241 Biological Control 4 Credits
Grading Scheme: Letter Grade
Principles involved in the natural and biological control of insects.

ENY 5245 Agricultural Acarology 2 Credits
Grading Scheme: Letter Grade
Introduction to mites of agricultural importance, their biology, behavior, and control.

ENY 5332 Graduate Survey of Urban Vertebrate Pest Management 2 Credits
Grading Scheme: Letter Grade
Biology, ecology, health risks, exclusion, and control of vertebrate pests in urban environment.
ENY 5405 Insects as Vectors of Plant Pathogens 3 Credits
Grading Scheme: Letter Grade
This course will be presenting information on insect, other arthropod and nematode vectors of plant pathogens, and the role and management of these vectors in agricultural and environmental areas. Including material on identification and morphology of important vectors and how these features affect transmission of plant pathogens.
Prerequisite: ENY3005, ENY5006, or equivalent

ENY 5516 Turf and Ornamental Entomology 3 Credits
Grading Scheme: Letter Grade
Identification, biology, and integrated management of common arthropod families and species inhabiting turfgrasses and popular ornamental plants in the urban environment with emphasis on the Southeastern U.S.

ENY 5566 Tropical Entomology 3 Credits
Grading Scheme: Letter Grade
Natural history, ecology, behavior, natural ecosystems, and agroecosystems of tropics.

ENY 5567 Tropical Entomology Field Laboratory 2 Credits
Grading Scheme: Letter Grade
Field experience observing the natural history, ecology, and behavior of insects in natural ecosystems and agroecosystems in the tropics.
Prerequisite: ENY 5566.

ENY 5572 Advanced Apiculture 3 Credits
Grading Scheme: Letter Grade
The biology of honey bees and the craft of apiculture will be examined by exploring the natural history, biogeography and ecology of honey bees. Honey bee anatomy, physiology, colony social structure, pests/diseases, pollination ecology, management, and current topics in beekeeping will be discussed.
Prerequisite: None.

ENY 5611 Immature Insects 4 Credits
Grading Scheme: Letter Grade
Structure and identification of immature forms of insects, especially the Holometabola.

ENY 5820 Insect Molecular Genetics 3 Credits
Grading Scheme: Letter Grade
Basics of DNA, RNA, gene transcription and translation, and tools used in molecular genetics of insects.

ENY 6166 Insect Classification 3 Credits
Grading Scheme: Letter Grade
Classification of adult insects to family and of some to species level. Habitat, niche, and relationship to environment.

ENY 6203 Insect Ecology 3 Credits
Grading Scheme: Letter Grade
Advanced course on concepts in ecology with emphasis in insects; relationships with their biotic and physical environments and basics of ecological research.
Corequisite: ENY 6203L

ENY 6203L Insect Ecology Laboratory 1 Credit
Grading Scheme: Letter Grade
Methodology and instrumentation used in ecological research with insects.
Corequisite: ENY 6203

ENY 6206 Ecology of Vector-Borne Disease 2 Credits
Grading Scheme: Letter Grade
Introduces the critical components of vector-borne disease systems and the basic concepts inherent to disease ecology. The course also focuses on various vector-borne diseases of humans and wildlife and how aspects of the environment and host/vector biology influence disease transmission. Other topics include epidemiology, transmission models and emerging diseases.
Prerequisite: General Biology or equivalent

ENY 6207 Ecology and Conservation of Pollinators 3 Credits
Grading Scheme: Letter Grade
Examines interactions between animals and the plants that they pollinate, current threats to pollinator populations, and the conservation of pollinators worldwide. In this course, we will explore these topics through readings, discussion, and a field research project.
Prerequisite: BSC 2010 and BSC 2010L or equivalents with minimum grades of C, and graduate standing.

ENY 6248 Termite Biology and Control 2 Credits
Grading Scheme: Letter Grade
Taxonomy, identification, behavior, ecology, and methods of control for the economically important termites of the New World.

ENY 6401 Insect Physiology 3 Credits
Grading Scheme: Letter Grade
Physiology and biochemistry of insect development and adaptation for survival.

ENY 6401L Insect Physiology Laboratory 1 Credit
Grading Scheme: Letter Grade
This graduate-level laboratory course complements the lecture course in Insect Physiology (ENY 6401). Students will learn internal and external anatomy of insects and gain proficiency in physiological, biochemical, and molecular biology techniques such as estimating respiratory gas exchange, protein purification and quantification, and estimating enzyme activity.
Prerequisite: ENY 3005 & BSC 2010 & BSC 2011

ENY 6406 Molecular Biology of Insects and Nematodes 3 Credits
Grading Scheme: Letter Grade
Provides foundation knowledge of molecular biology, with emphasis on scientific discoveries from insects and nematodes. Presents information on the current innovations and trends of molecular technologies (e.g. high throughput sequencing, different types of omics, genome editing by CRISPR).
Prerequisite: BSC 2005, BSC 2010, ABE 2062, AGR 3303, ANS 3006, BCH 4024, ENY 2040, ENY 3005, or equivalent; or instructor permission.

ENY 6454 Behavioral Ecology and Systematics of Insects 3 Credits
Grading Scheme: Letter Grade
A theoretical and practical treatment of behavioral ecology and how phylogenetic methods can be employed to both develop and test hypotheses of how insect behavior has evolved.

ENY 6572 Apiculture I 3 Credits
Grading Scheme: Letter Grade
The biology of honey bees and the craft of apiculture will be examined by exploring the life cycle of honey bees, biogeography and evolution of beekeeping. Equipment, techniques, management practices, pollination ecology, economic practices and current issues within beekeeping will be discussed.
ENY 6575 Apiculture II 3 Credits
Grading Scheme: Letter Grade
This course will provide more depth on topics introduced in Apiculture I including beekeeping styles, colony stressors and yearly management. This course will also explore issues affecting the beekeeping industry including integrated pest management, pests/diseases, African bees, commercial pollination, queen production, bee removals and pesticides will be discussed.

ENY 6591C Advanced Mosquito Identification 3 Credits
Grading Scheme: Letter Grade
Intensive, hands-on training on morphological features and the identification of adult and larval mosquitoes species that occur in North America, and discussions on historical and current issues in mosquito taxonomy.
Prerequisite: ENY 3005 or ENY 4161

ENY 6593 Advanced Mosquito Biology 3 Credits
Grading Scheme: Letter Grade
This course will be covering six critical areas of mosquito biology; classification, natural history and ecology, physiology, population dynamics, mosquito-borne diseases, and control of mosquitoes. Students will understand the fundamental processes governing mosquitoes and mosquito-borne diseases.

ENY 6651C Insect Toxicology 3 Credits
Grading Scheme: Letter Grade
Chemistry, toxicity, mode of action, metabolism, and environmental considerations of insecticides and related compounds. Mechanisms of resistance to insecticides.

ENY 6665 Advanced Medical and Veterinary Entomology I 3 Credits
Grading Scheme: Letter Grade
Taxonomy, morphology, and biology of arthropods of medical and veterinary importance. A collection and project proposal will be required.
Corequisite: ENY 6665L.

ENY 6665L Advanced Medical and Veterinary Entomology Laboratory 1 Credit
Grading Scheme: Letter Grade
Identification of mosquitoes, ticks, lice, fleas, and other disease vectors. Collection required.
Corequisite: ENY 6665: Advanced Medical and Veterinary Entomology I.

ENY 6706 Forensic Entomology 3 Credits
Grading Scheme: Letter Grade
The role of arthropods in decomposition, in criminal and civil investigations and the increasing importance of science on society. The material discussed in this course deals with death and some may consider images and concepts disturbing.

ENY 6821 Insect Microbiology 3 Credits
Grading Scheme: Letter Grade
Associations existing between insects and microorganisms including mutualistic relationships, commensalism, vector biology, and insect-pathogen interactions.
Prerequisite: consent of instructor.

ENY 6822C Molecular Biology Techniques with Invertebrates and Their Pathogens 4 Credits
Grading Scheme: Letter Grade
Insects, nematodes, bacteria, viruses. Cloning of DNA, DNA blots, PCR, sequencing and analysis.
Prerequisite: basic course in genetics, biochemistry, or molecular biology.

ENY 6905 Problems in Entomology 1-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Individual study under faculty guidance. Student and instructor to agree on problem and credits prior to registration.

ENY 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Research for nonthesis M.S. students.

ENY 6931 Entomology Seminar 1 Credit, Max 8 Credits
Grading Scheme: Letter Grade
Presentation and discussion of current research topics.

ENY 6932 Special Topics in Entomology 1-2 Credits, Max 4 Credits
Grading Scheme: S/U
Reports and discussions on selected topics announced in advance.

ENY 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

ENY 6942 Insect Diagnostics 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Identifying insects and diagnosing plant damage caused by insects.

ENY 6943 Entomology Internship 1-3 Credits, Max 6 Credits
Grading Scheme: S/U
Diagnosing plant disorders caused by complex of insects and other factors.

ENY 6944 Entomology Extension Internship 1-3 Credits, Max 6 Credits
Grading Scheme: S/U
Diagnosing insect damage to plants in field and greenhouse. Learning to make control recommendations.

ENY 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master’s Thesis

ENY 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ENY 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Dissertation

IPM 6021 Insect Pest and Vector Management 3 Credits
Grading Scheme: Letter Grade
Covers the principles and practices used in pest and vector management, and also emphasizes the arthropod pests affecting crop and ornamental plants, humans and livestock.

NEM 5004C Graduate Survey of Nematology 3 Credits
Grading Scheme: Letter Grade
Morphology, anatomy, development, feeding habits, life cycles, disease cycles, and control of nematodes that parasitize plants and animals. Role of plant parasitic nematodes in disease complexes and as vectors of plant viruses. "Free-living" nematodes that inhabit oceans, fresh water, and soil.
NEM 5707C Plant Nematology 3 Credits
Grading Scheme: Letter Grade
Identification of plant parasitic nematodes, diseases they cause, interactions with other plant parasites, and management schemes to control population densities.

NEM 6101C Nematode Morphology and Anatomy 2 Credits
Grading Scheme: Letter Grade
Morphology, anatomy, and function of structures, organs, and systems.

NEM 6102 Nematode Systematics and Molecular Phylogeny 2 Credits
Grading Scheme: Letter Grade
Theory and practice of using molecular evidence, particularly DNA sequence data, for addressing diverse systematic and evolutionary questions will be explored. Morphological, molecular, and basic bioinformatics tools will be addressed.
Prerequisite: NEM 6942 (Nematode Diagnosis)

NEM 6102L Nematode Systematics and Molecular Phylogeny Laboratory 2 Credits
Grading Scheme: Letter Grade
Morphological, molecular, and basic bioinformatics tools used in nematode species identification will be explored. Emphasising basic molecular techniques, such as DNA extraction and quantification, restriction enzyme digestion, polymerase chain reaction and agarose gel electrophoresis.
Corequisite: NEM6102 (Nematode Systematics and Molecular Phylogeny)

NEM 6103 Insect Parasitic Nematodes 2 Credits
Grading Scheme: Letter Grade
Insect-parasitic nematodes in all taxons, including their pathogenicity, life cycles, etc. Steinerenematidae and Heterohibditidae emphasized.

NEM 6103L Entomopathogenic Nematodes Laboratory 1 Credit
Grading Scheme: Letter Grade
Intensive lab that focuses on entomopathogenic nematodes. Students will learn the morphological, molecular, and basic bioinformatics tools used to identify entomopathogenic nematodes to species. In addition, soil sampling techniques, nematode isolation and baiting methods will be covered.

NEM 6201 Nematode Ecology 3 Credits
Grading Scheme: Letter Grade
Population and community ecology of plant-parasitic and other soil-inhabiting nematodes. Mathematical descriptions and relationships will be emphasized where appropriate.

NEM 6708 Field Plant Nematology 2 Credits, Max 4 Credits
Grading Scheme: Letter Grade
Field trips to various agricultural research stations and production areas in Florida to learn plant symptoms and current research methods.

NEM 6905 Problems in Nematology 1-4 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Problems in Nematology

NEM 6931 Nematology Seminar 1 Credit, Max 6 Credits
Grading Scheme: Letter Grade
Presentation and discussion of current research, research topics.

NEM 6932 Special Topics in Nematology 1-4 Credits, Max 4 Credits
Grading Scheme: S/U
Reports and discussions.

NEM 6934 Selected Studies in Nematology 1-4 Credits
Grading Scheme: Letter Grade
Current issues with subject matter variable.

NEM 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

NEM 6942 Nematode Diagnostics 2 Credits
Grading Scheme: Letter Grade
Diagnosing nematode problems from soil and plant samples.

NEM 6943 Nematode Internship 1-3 Credits, Max 6 Credits
Grading Scheme: S/U
Diagnosing complex plant disorders caused by nematodes and other factors.

NEM 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

NEM 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

NEM 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

PMA 5205 Citrus Pest Management 3 Credits
Grading Scheme: Letter Grade
Arthropod and nematode pests of citrus. Ecological principles of host and pest community relationships. Pest identification, biology, and interactions with citrus. Pest monitoring, diagnosis, and management.

PMA 6228 Field Techniques in Integrated Pest Management 2 Credits
Grading Scheme: Letter Grade
Practical aspects of pest management, emphasizing sampling, diagnostics, decision making processes, and informational resources available to IPM practitioner.

Environmental Engineering Sciences

CWR 6116 Advanced Surface Hydrology 3 Credits
Grading Scheme: Letter Grade
Physical and quantitative concepts and principles of hydrologic processes and their engineering applications. Reynolds Transport Theorem, the Continuity and Momentum Equations applied to phenomena and processes. Hydrologic analyses, including unit hydrograph theory, lumped flow routing, and distributed flow routing. Engineering concepts of hydrologic design, design storms and hydrologic chemistry.
Prerequisite: ENV3040C or equivalent numerical methods, STA 3032 or equivalent statistics, CWR3201 or equivalent hydrodynamics

CWR 6252 Environmental Biochemistry of Trace Metals 3 Credits
Grading Scheme: Letter Grade
Environmental impact and fate of trace metals and metalloids as they cycle through geological and biological environmental compartments. Emphasizes anthropogenic activities of metals with growing environmental concerns, including arsenic, mercury, chromium, and lead.
Prerequisite: consent of instructor.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisite</th>
<th>Grading Scheme</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CWR 6536</td>
<td>Stochastic Subsurface Hydrology</td>
<td>3</td>
<td></td>
<td>Letter Grade</td>
<td>Stochastic modeling of subsurface flow and transport including geostatistics, time series analysis, Kalman filtering, and physically based stochastic models.</td>
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<td><strong>Grading Scheme:</strong> Letter Grade</td>
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<tr>
<td></td>
<td><strong>Prerequisite:</strong> senior-level course in probability and statistics, calculus through differential equations, soil physics, and/or subsurface hydrology.</td>
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<tr>
<td>CWR 6537</td>
<td>Contaminant Subsurface Hydrology</td>
<td>3</td>
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<td>Letter Grade</td>
<td>Physical-chemical-biological concepts and modeling of retention and transport of water and solutes in unsaturated and saturated media. Applications of environmental aspects of soil and groundwater contamination.</td>
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<td><strong>Grading Scheme:</strong> Letter Grade</td>
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<tr>
<td></td>
<td><strong>Prerequisite:</strong> None.</td>
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<tr>
<td>EES 5105</td>
<td>Advanced Wastewater Microbiology</td>
<td>3</td>
<td></td>
<td>Letter Grade</td>
<td>The role of microorganisms and other biota in major environmental problems, wastewater processes, and natural bodies of water.</td>
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<td><strong>Grading Scheme:</strong> Letter Grade</td>
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<tr>
<td>EES 5207</td>
<td>Environment Chemistry</td>
<td>3</td>
<td></td>
<td>Letter Grade</td>
<td>Survey of principles of chemistry with applications to water, emphasizing properties, composition, redox equilibria, and complexation; environmental organic chemistry; earth's atmosphere with emphasis on chemical composition, gaseous inorganic pollutants and oxides, and photochemical smog.</td>
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<td><strong>Grading Scheme:</strong> Letter Grade</td>
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<tr>
<td></td>
<td><strong>Prerequisite:</strong> Undergraduate coursework in general and organic chemistry.</td>
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<tr>
<td>EES 5245</td>
<td>Water Quality Analysis</td>
<td>3</td>
<td></td>
<td>Letter Grade</td>
<td>Applying the principles of analytical chemistry to determine the chemical composition of natural waters and wastewaters. Emphasizes methods used routinely to determine water and wastewater quality and to interpret data.</td>
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<td><strong>Grading Scheme:</strong> Letter Grade</td>
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<td></td>
<td><strong>Prerequisite:</strong> Undergraduate courses in general chemistry and water chemistry.</td>
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<tr>
<td>EES 5305C</td>
<td>Ecological and General Systems</td>
<td>3</td>
<td></td>
<td>Letter Grade</td>
<td>Systems ecology, including examples, languages, theoretical formulations, and models for designing, synthesizing, and predicting systems of man and nature.</td>
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<td><strong>Grading Scheme:</strong> Letter Grade</td>
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<td></td>
<td><strong>Prerequisite:</strong> Undergraduate coursework including Differential Equations, Chemistry, and Biology.</td>
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<tr>
<td>EES 5306</td>
<td>Energy Analysis</td>
<td>3</td>
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<td>Letter Grade</td>
<td>Energetics of systems of environment and economics; energy analysis of environmental systems, agroecosystems, regional and national economies; energy evaluation of public policy.</td>
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<td><strong>Grading Scheme:</strong> Letter Grade</td>
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<tr>
<td>EES 5415</td>
<td>Environmental Health</td>
<td>3</td>
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<td>Letter Grade</td>
<td>Effects of environment pollution on health. Methods of evaluating, treating, and preventing pollutants of health significance.</td>
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<td><strong>Grading Scheme:</strong> Letter Grade</td>
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<td>EES 6007</td>
<td>Advanced Energy and Environment</td>
<td>3</td>
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<td>Letter Grade</td>
<td>Energy basis for a system of humanity and nature, including principles of systems ecology, ecological economics, and public policy.</td>
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<td><strong>Grading Scheme:</strong> Letter Grade</td>
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<tr>
<td>EES 6051</td>
<td>Advanced Environmental Planning and Design</td>
<td>3</td>
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<td>Letter Grade</td>
<td>Sustainable communities and regions. Quantitative methods for evaluating environmental impacts and carrying capacity. Theories of spatial and temporal organization of systems of humanity and nature.</td>
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<td><strong>Grading Scheme:</strong> Letter Grade</td>
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<tr>
<td>EES 6107C</td>
<td>Advanced Ecological Engineering</td>
<td>3</td>
<td></td>
<td>Letter Grade</td>
<td>A unified course in fundamental principles of ecology and engineering methods that enables students to use their engineering training to quantitatively evaluate and design interface ecosystems and the restoration of drastically altered lands. Course content is organized using a systems framework.</td>
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<td><strong>Grading Scheme:</strong> Letter Grade</td>
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<tr>
<td>EES 6140</td>
<td>Biology of Exotic Species</td>
<td>3</td>
<td></td>
<td>Letter Grade</td>
<td>Examines case histories of species’ introduction worldwide and the mechanisms responsible for establishment and dominance of native communities by exotic taxa.</td>
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<td><strong>Grading Scheme:</strong> Letter Grade</td>
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<td></td>
<td><strong>Prerequisite:</strong> Undergraduate coursework in biology.</td>
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<td>EES 6208</td>
<td>Principles of Water Chemistry I</td>
<td>3</td>
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<td>Letter Grade</td>
<td>Applying chemical principles to aqueous reactions. Emphasizes thermodynamics, kinetics, and aqueous equilibria including acid-base, solubility, complexation, precipitation, and redox.</td>
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<td><strong>Grading Scheme:</strong> Letter Grade</td>
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<td></td>
<td><strong>Prerequisite:</strong> Undergraduate coursework in both chemistry and calculus.</td>
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<td><strong>Grading Scheme:</strong> Letter Grade</td>
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<td></td>
<td><strong>Prerequisite:</strong> Undergraduate coursework including foundations of air pollution.</td>
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<td>EES 6246</td>
<td>Advanced Water Analysis</td>
<td>3</td>
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<td>Letter Grade</td>
<td>Advanced chemical procedures used in water chemistry research. Applying instrumental methods for determining trace inorganic and organic natural water constituents.</td>
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<td><strong>Grading Scheme:</strong> Letter Grade</td>
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<td></td>
<td><strong>Prerequisite:</strong> Undergraduate coursework in organic chemistry or EES 5245.</td>
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<tr>
<td>EES 6307</td>
<td>Advanced Ecological Engineering</td>
<td>3</td>
<td></td>
<td>Letter Grade</td>
<td>An advanced course in the fundamental principles of ecology and engineering methods that enables students to use their engineering training to design and quantitatively evaluate interface ecosystems and restoration of drastically altered lands to create symbiotic relationships between humans and the environment.</td>
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<td><strong>Grading Scheme:</strong> Letter Grade</td>
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<tr>
<td>EES 6308C</td>
<td>Wetland Ecology</td>
<td>3</td>
<td></td>
<td>Letter Grade</td>
<td>Defining and classifying major wetland ecosystems, formation of wetlands, wetland functions and values; wetlands ecological engineering and management; and integrating wetlands into developing landscape. Emphasizes everal field trips to natural and altered wetlands.</td>
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<td><strong>Grading Scheme:</strong> Letter Grade</td>
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<tr>
<td></td>
<td><strong>Prerequisite:</strong> Undergraduate coursework including Biology and Chemistry.</td>
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</tbody>
</table>
EES 6309 Wetland Design and Restoration 3 Credits
Grading Scheme: Letter Grade
Applied and theoretical aspects of wetlands use for water quality management; natural and constructed treatment wetlands; engineering and ecology of wetland systems; design for sustainability and ancillary benefits. Theoretical and applied aspects of the restoration and management of wetland ecosystems.
Prerequisite: EEN 6308C, SWS 5242 or WIS 6934

EES 6318 Principles of Industrial Ecology 3 Credits
Grading Scheme: Letter Grade

EES 6335 Springs Ecosystems 3 Credits
Grading Scheme: Letter Grade
Applied and theoretical aspects of the ecology and management of Florida’s artesian springs.

EES 6405 Environmental Toxicology 3 Credits
Grading Scheme: Letter Grade
Effects of environmental toxicants on humans, animals, and the environment.
Prerequisite: Undergraduate coursework in biology, general chemistry and organic chemistry.

EES 6425 Environmental Nanotechnology 3 Credits
Grading Scheme: Letter Grade
Life cycle, environmental applications and health implications of engineered nanomaterials.
Prerequisite: Undergraduate coursework in biology, general chemistry and organic chemistry.

EES 6932 Modeling the Fate of Air Pollutants 3 Credits
Grading Scheme: Letter Grade
Provides the concept/skill that integrate atmospheric kinetic and thermodynamic data obtained from photochemical reactors into gas/aerosol models using a kinetic solver. This course provides flexibility in modeling topics that allow students to study emerging issues in atmospheric chemistry and to individualize topics based on their backgrounds/research.
Prerequisite: Undergraduate coursework including general chemistry and foundations of air pollution.

EGN 5949 Practicum/Internship/Cooperative Work Experience 1-6 Credits, Max 6 Credits
Grading Scheme: S/U
Practical cooperative engineering work under approved industrial and faculty supervision.
Prerequisite: graduate student.

EGN 6640 Entrepreneurship for Engineers 3 Credits
Grading Scheme: Letter Grade
Introduction to entrepreneurship, idea generating and feasibility analysis, and business planning. Lectures, case studies, student-led discussions, team business plans, and investor presentations.

EGN 6913 Engineering Graduate Research 0-3 Credits
Grading Scheme: S/U
Course will provide the student with supervised research in a laboratory setting.

ENV 5075 Environmental Policy 3 Credits
Grading Scheme: Letter Grade
Policy analysis, making, and implementation. Analytical methods for evaluating alternative policies. Legal, social, political, and economic patterns and processes that shape the climate in which environmental policy is made.

ENV 5105 Foundations of Air Pollution 3 Credits
Grading Scheme: Letter Grade
Principal types, sources, dispersion, effects, and physical, economic and legal aspects of control of atmospheric pollutants.

ENV 5306 Municipal Refuse Disposal 3 Credits
Grading Scheme: Letter Grade
Quantities and characteristics of municipal refuse and hazardous materials. Collection methods, transfer stations, equipment and costs. Refuse disposal practices, regional planning and equipment.

ENV 5518 Field Methods in Environmental Hydrology 3 Credits
Grading Scheme: Letter Grade
Field methods for characterizing sites for environmental and hydrologic evaluation. Focuses on subsurface systems and ground water interactions.
Prerequisite: Coursework including introductory concepts of fluid flow.

ENV 5565 Hydraulic Systems Design 3 Credits
Grading Scheme: Letter Grade
Hydraulic design of water distribution systems, wastewater collection and disposal systems, and water and wastewater treatment plants.
Prerequisite: Undergraduate coursework in hydrodynamics.

ENV 5619 Principles of Sustainable Engineering Design 3 Credits
Grading Scheme: Letter Grade
Principles of Sustainable Engineering Design is a 3-credit hour course for civil and environmental engineering seniors and graduate students. Students will learn the meaning of sustainability and sustainable development and how those concepts apply to the planning, design and operation of civil infrastructure.

ENV 5626 Air Pollution Control Design 3 Credits
Grading Scheme: Letter Grade
Design, analysis, operational limitations, cost and performance evaluation of control processes and equipment. Field visits to and inspection of industrial installations.
Prerequisite: Undergraduate coursework including Differential Equations, Physics and Chemistry.

ENV 6126 Air Pollution Control Design 3 Credits
Grading Scheme: Letter Grade
Design, analysis, operational limitations, cost and performance evaluation of control processes and equipment. Field visits to and inspection of industrial installations.
Prerequisite: Undergraduate coursework including Differential Equations, Physics and Chemistry.

ENV 6130 Aerosol Mechanics 3 Credits
Grading Scheme: Letter Grade
Generating, collecting, and measuring aerosols. Theory of fluid dynamic, optical, electrical, inertial, and thermal behavior of gas-borne particles.
Prerequisite: Undergraduate coursework including Differential Equations, Physics and Fluid Mechanics.
ENV 6301 Advanced Solid Waste Containment Design 3 Credits
Grading Scheme: Letter Grade
Current practice in designing solid and hazardous waste landfills, waste piles, monofills, and surface impoundments. Regulations, siting, sizing, liners, leachate and gas management, operations, closure, and post-closure.

ENV 6416 Advanced Stormwater Control Systems 3 Credits
Grading Scheme: Letter Grade
Chemical, physical, biological and hydrologic aspects of rainfall-runoff; and control through unit operations and processes (UOP); interactions between hydrologic processes; water chemistry, sediment transport, infrastructure materials and UOPs; constituent physical properties, chemistry and loads related to design of UOPs for control, treatment and/or reuse.
Prerequisite: Undergraduate coursework in water chemistry and water & wastewater treatment.

ENV 6435 Advanced Water Treatment Process Design 3 Credits
Grading Scheme: Letter Grade
Design of selected water treatment processes including disinfection, air stripping, adsorption, ion exchange and membrane processes.
Prerequisite: Undergraduate course work in water and/or wastewater treatment process design, calculus, and chemistry.

ENV 6435L Water Treatment Process Design Laboratory 1 Credit
Grading Scheme: Letter Grade
Development of water treatment design parameters by performing bench scale and pilot scale experiments on selected treatment processes.
Corequisite: ENV 6435

ENV 6437 Advanced Wastewater System Design 3 Credits
Grading Scheme: Letter Grade
Layout and design of sanitary sewage systems, pumping stations, force mains, wastewater treatment plants, and methods of effluent disposal. Emphasizes preparing design drawings and estimating costs.
Prerequisite: Undergraduate course work including water and wastewater treatment;
Corequisite: Undergraduate coursework including hydraulic system design.

ENV 6438 Advanced Potable Water Systems Design 3 Credits
Grading Scheme: Letter Grade
Design of water treatment operations, including coagulation, flocculation, mixing, sedimentation, filtration, softening, corrosion control, and sludge management. Design costs.
Prerequisite: Undergraduate course work in water and/or wastewater treatment process design, hydraulics, and chemistry.

ENV 6439 Activated Carbon: Environmental Design and Application 3 Credits
Grading Scheme: Letter Grade
Theory and application of manufacturing activated carbon, its use in water treatment/remediation (i.e., design of activated carbon systems), and thermal reactivation.

ENV 6441 Water Resources Planning and Management 3 Credits
Grading Scheme: Letter Grade

ENV 6455 Microbiology of Environmental Engineering Systems 3 Credits
Grading Scheme: Letter Grade
Divided into three sections that will introduce the morphological and metabolic characteristics of microbial groups and discuss the role of microorganisms in natural (water, soil, and air) and environmental engineered systems.

ENV 6508 Wetland Hydrology 3 Credits
Grading Scheme: Letter Grade
Prerequisite: Undergraduate coursework in Hydrology, Hydrodynamics, or Fluid Mechanics.

ENV 6511 Biological Wastewater Treatment 3 Credits
Grading Scheme: Letter Grade
Theory and current research associated with biological treatment processes.

ENV 6556 Advanced Waste Treatment Operations 3 Credits
Grading Scheme: Letter Grade
Biological, physical, and chemical processes used in the advanced treatment of domestic and industrial wastewater. Reuse application and guidelines.
Prerequisite: course or professional experience in unit operations and processes of water and wastewater treatment.

ENV 6516 Biological Wastewater Treatment 3 Credits
Grading Scheme: Letter Grade

ENV 6617 Principles of Green Engineering Design and Sustainability 3 Credits
Grading Scheme: Letter Grade
Principles of sustainability and methods to incorporate them into engineering design practices. Demonstration of tools such as sustainability metrics, life cycle assessment, sustainability auditing and carbon footprinting.

ENV 6905 Individual Work 1-4 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Faculty-supervised individual research or study of material not covered in formal courses.

ENV 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

ENV 6916 Nonthesis Project 1-3 Credits, Max 3 Credits
Grading Scheme: Letter Grade
Nonthesis Project

ENV 6930 Special Problems in Environmental Engineering 1-4 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Special Problems in Environmental Engineering

ENV 6932 Special Problems in Environmental Engineering Seminar 1 Credit, Max 6 Credits
Grading Scheme: S/U
Graduate Environmental Engineering Seminar

ENV 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

ENV 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.
Environmental Horticulture

ALS 5934 Graduate Professional Development Seminar 2 Credits
Grading Scheme: S/U
Presentations and group discussion of topics essential to enhance awareness, personal satisfaction, and professional success of graduate students.

BCH 5045 Graduate Survey of Biochemistry 4 Credits
Grading Scheme: Letter Grade
Introduction to plant, animal, and microbial biochemistry for graduate students who have not had biochemistry. Integration and regulation of biochemical processes stressed; limited discussion of some biochemical techniques.
Prerequisite: inorganic chemistry, organic chemistry, biology.

HOS 5117C Horticultural Plant Morphology and Identification 3 Credits
Grading Scheme: Letter Grade
Principles and practices of horticultural plant identification using vegetative and floral morphology.
Prerequisite: for graduate students who have not taken ORH 3513C.

HOS 5432 Advanced Nutritional Management of Ornamental Crops 3 Credits
Grading Scheme: Letter Grade
Techniques for determining, interpreting, and managing the nutritional status of ornamental plants in the greenhouse, nursery or landscape. Topics include: meter selection and calibration, water analysis, substrate/soil analysis, report interpretation and writing, diagnosis and recommendations.
Prerequisite: SWS 3022/3022L, ORH 3253C, or consent of instructor.

HOS 5515C Greenhouse and Nursery Operations 3 Credits
Grading Scheme: Letter Grade
Principles involved in managing nurseries. Interaction among media components, irrigation, and nutrition. Weekend field trips may be required.
Prerequisite: for graduate students needing introduction to the principles of planning, organizing, and managing production operations. Not open to students who have taken ORH 3254.

HOS 6070 Plant Materials for Conservation and Restoration 3 Credits
Grading Scheme: Letter Grade
Understand how to protect, select, produce, and establish native plants for ecological restoration. Learn the scientific basis for guidelines on planning revegetation, selecting plant material, and formulating successful conservation and restoration plans for rare, threatened and endangered species.

HOS 6523 Research and Development in Turfgrass Science 3 Credits
Grading Scheme: Letter Grade
Principles and practices of turfgrass improvement and management, including propagation, nutrition, physiology, soil management, and experimental methods applied to turf research.

HOS 6905 Problems in Horticultural Science 1-4 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Independent study.

HOS 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research.

HOS 6931 Horticultural Science Seminar 1 Credit, Max 3 Credits
Grading Scheme: S/U
Oral presentation of material in one of the following areas: literature review, related to student's research; research results; or published paper, of relevance to horticulture. Subject matter determined by instructor. Offered in spring.

HOS 6932 Special Topics 1-4 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Study of contemporary research in horticultural science.

HOS 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching.

HOS 6941 Practicum in Horticultural Science 2-4 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Supervised and individual work in professional areas of horticulture.
Prerequisite: admission is limited to graduate students majoring in horticultural science.

HOS 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis.

HOS 6991 Evolution, Eco-physiology and Global Importance of Seeds 4 Credits
Grading Scheme: Letter Grade
Critical analysis of literature related to seed evolution; how seeds interact with biotic and abiotic environments to maintain viability and complete germination; and multiple roles of seeds in geo-political systems, economics and humanity. Students lead discussions throughout the semester and present a final synthesis project on a topic of interest.
Prerequisite: Basic knowledge in plant sciences, botany, and biology or equivalent courses in related fields.

HOS 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

HOS 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation.

ORH 5026C Advanced Annual and Perennial Gardening 3 Credits
Grading Scheme: Letter Grade
Identification, selection, use, and management of annuals, perennials, herbs, and ornamental grasses in the landscape.
Prerequisite: for graduate students who have not taken ORH 4280; or

ORH 5086 Advanced Golf and Sports Turf Management 2 Credits
Grading Scheme: Letter Grade
Golf course and sports turf management.
Prerequisite: for graduate students who have not taken ORH 4223.

ORH 5282 Orchid Biology and Culture 3 Credits
Grading Scheme: Letter Grade
Orchid plants and flowers, including nomenclature, breeding, seed culture, harvesting, and handling.
Prerequisite: for graduate students who have not taken ORH 4280; or

consent of instructor.
ORH 5817C Advanced Florida Native Landscaping 3 Credits
Grading Scheme: Letter Grade
Introduction to nomenclature, effective use, and design elements of plants native to Florida.
Prerequisite: ORH 1520 or 3513.

PLS 5222C Propagation of Horticultural Crops 3 Credits
Grading Scheme: Letter Grade
Theoretical and practical applications of macro- and micropropagation techniques for higher plants.
Prerequisite: for students who have not taken PLS 3221.

PLS 5241C Advanced Plant Micropropagation 4 Credits
Grading Scheme: Letter Grade
Practical application of plant tissue for clonal propagation of horticultural crops.
Prerequisite: PLS 3221 or consent of instructor.

PLS 5405 Advanced Composting Technology 3 Credits
Grading Scheme: Letter Grade
Humification of organic matter under controlled conditions.
Prerequisite: for graduate students who have not taken PLS 4404C; or consent of instructor.

European Studies

EUS 6005 Intro Euro Studies 1 Credit
Grading Scheme: Letter Grade
Intro Euro Studies

EUS 6905 Individual Work 1-3 Credits
Grading Scheme: Letter Grade
Individual Work

EUS 6930 Special Topics 3 Credits
Grading Scheme: Letter Grade
Special Topics

EUS 6932 Seminar: the Eu Today 1-3 Credits
Grading Scheme: Letter Grade
Seminar: the Eu Today

Family, Youth and Community Sciences

FYC 5008 Personal and Family Tax Planning 3 Credits
Grading Scheme: Letter Grade
Principles, current law and practice of income taxation and its impact on financial planning for individuals, couples and families in their roles as investors, employees and business owners.
Prerequisite: Graduate standing.

FYC 5009 Personal and Family Insurance Planning 3 Credits
Grading Scheme: Letter Grade
Introduces students to risk management and insurance decisions in personal and family financial planning. Topics include insurance for life, health, disability, property and liability risks, as well as annuities, group insurance and long term care.
Prerequisite: Graduate standing.

FYC 5106 Personal and Family Retirement and Estate Planning 3 Credits
Grading Scheme: Letter Grade
Provides individuals with knowledge of both public and private retirement plans including Social Security, Medicare, Medicaid, defined benefit, defined contribution plans and their regulatory provisions. Estate planning aspects focus on the efficient conservation and transfer of wealth through trusts, wills, probate and charitable giving consistent with the client's goals.
Prerequisite: Graduate standing.

FYC 5935 Personal and Family Financial Planning Capstone 3 Credits
Grading Scheme: Letter Grade
Critical thinking and decision making about personal and family financial management topics in the context of the financial planning process. Students analyze and prioritize goals and make recommendations for a client in areas of household accounting, taxes, investments, risk management, retirement planning and estate planning.
Prerequisite: FYC 5008, FYC 5009 and FYC 5106.

FYC 6111 Families and Violence 3 Credits
Grading Scheme: Letter Grade
Examines the major types of family violence across the life span, including all forms of child maltreatment, intimate partner violence, and elder abuse.

FYC 6117 Military Families in Community Context 3 Credits
Grading Scheme: Letter Grade
Military culture and procedures, issues related to service in the military, the impact that military service can have on the individual and family, and strategies for providing services to military personnel and their families.
Prerequisite: None.

FYC 6131 Ethics for FYCS Practitioners 3 Credits
Grading Scheme: Letter Grade
Basic elements of ethics, professional ethics, and professionals as ethical "agents."

FYC 6207 Adolescent Problematic Behavior 3 Credits
Grading Scheme: Letter Grade
Ecological model to examine common themes of adolescent development with challenges that lead to problematic behavior.
Prerequisite: core major courses.

FYC 6221 Grant Proposals for Community-Based Organizations 3 Credits
Grading Scheme: Letter Grade
Skills needed to develop funding proposals to support community-based projects and organizations.

FYC 6222 Parenting and Child Relationships 3 Credits
Grading Scheme: Letter Grade
Relationships affecting child development outcomes.
Prerequisite: core courses.

FYC 6223 Promoting Positive Youth Development 3 Credits
Grading Scheme: Letter Grade
Examines risk and protective factors for promoting youth development.
Prerequisite: FYC 6207.

FYC 6224 Resilience and Positive Youth Development 3 Credits
Grading Scheme: Letter Grade
Conceptual and applied examination of resilience as a shaping force in youth development from infancy through the emerging adult years.
Prerequisite: FYC 6230 Theories of Youth and Family Development.
FYC 6230 Theories of Family Development, Systems and Change 3 Credits
Grading Scheme: Letter Grade
Provides an overview of the major theoretical perspectives on families, including family development and family systems; and emerging theories relevant to diverse and changing families. Special attention is given to the application of these perspectives for research and practice.
Prerequisite: SYG 2430 or FYC 3101 and 3201.

FYC 6234 Theoretical Approaches to Youth Development 3 Credits
Grading Scheme: Letter Grade
An in-depth examination and synthesis of historical (macro) and contextual contemporary (micro) theories of youth development, spanning from childhood through emerging adulthood, as they are used to inform research, including applying principles and theories of youth development to community-based settings.

FYC 6235 Prevention Science in Youth Development and Family Science 3 Credits
Grading Scheme: Letter Grade
Explores the theoretical and empirical foundations for the science of prevention and its application to youth development and family science. Taking an ecological approach, this course will explore methods and processes for designing, delivering, and evaluating YDFS prevention programs and the implications for families, schools, and communities.

FYC 6302 Sustainable Community Development 3 Credits
Grading Scheme: Letter Grade
Relationships among economic, social, and environmental aspects of sustainability. Analytic and professional skills to build sustainable communities. Community study and in-depth analysis.

FYC 6320 Community Development and Civic Engagement 3 Credits
Grading Scheme: Letter Grade
Examining the process and methods for community development with an emphasis on research related to civic engagement and public participation. Students will develop skills for managing change in communities.

FYC 6330 Theories of Community Development 3 Credits
Grading Scheme: Letter Grade
Sociological concept of community and its application in public development policies.

FYC 6421 Nonprofit Organizations 3 Credits
Grading Scheme: Letter Grade
Community nonprofit organizations. Governance, policy and decision making, and planning.

FYC 6422 Policy Issues and Case Studies in Nonprofit Organizations 3 Credits
Grading Scheme: Letter Grade
Study and analysis of policy and cases related to development and operation of nonprofit organizations.
Prerequisite: FYC 6421.

FYC 6423 Non-Governmental Organizations 3 Credits
Grading Scheme: Letter Grade
Non-governmental organizations and their political and economic impacts.
Prerequisite: FYC 6421.

FYC 6424 Fund Raising for Community Nonprofit Organizations 3 Credits
Grading Scheme: Letter Grade
Critical evaluation of fund raising theory, research on the profession, and best contemporary fund raising practices in the nonprofit sector.
Prerequisite: FYC 6421.

FYC 6425 Risk Management in Nonprofit Organizations 3 Credits
Grading Scheme: Letter Grade
A foundation in the concepts, principles and strategies associated with risk management in nonprofit organizations. Topics include the nature and purpose of risk management; the general risk management exposures facing nonprofit organizations; and risk mitigation strategies for nonprofits.
Prerequisite: FYC 6421 Nonprofit Organizations.

FYC 6620 Program Planning and Evaluation for Human Service Delivery 3 Credits
Grading Scheme: Letter Grade
Contemporary theories and process for planning and evaluating human service education and delivery programs.
Prerequisite: core FYCS courses.

FYC 6662 Public Policy and Human Resource Development 3 Credits
Grading Scheme: Letter Grade
Current policies and laws impacting youths, families, and communities. Strategies to change these policies and laws.

FYC 6800 Scientific Reasoning and Research Design 3 Credits
Grading Scheme: Letter Grade
Scientific reasoning, scientific method, and quantitative and qualitative research design.

FYC 6802 Advanced Research Methods for Family, Youth, and Community Sciences 3 Credits
Grading Scheme: Letter Grade
Research tools and techniques appropriate for an ecological model, emphasizing a multi-method approach.
Prerequisite: FYC 6800 or equivalent.

FYC 6901 Problems in Family, Youth, and Community Sciences 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Advanced students select and study problem related to family, youth, and community sciences.

FYC 6912 Nonthesis Project in Family, Youth, and Community Sciences 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Developing an original applied project such as program evaluation, policy analysis, or in-depth review of current issue in human resource development.

FYC 6932 Topics, in Family, Youth, and Community Sciences 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Critical review of selected topics.

FYC 6933 Seminar in Human Resource Development 1 Credit, Max 2 Credits
Grading Scheme: S/U
Explores current topics, trends, and research findings.

FYC 6934 Professional Internship/Practicum in Family, Youth, and Community Sciences 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Directed work experience or internship in professional capacity.

FYC 6971 Research for Master's Thesis 1-6 Credits
Grading Scheme: S/U
Research for Master's Thesis
FIN 7979 Advanced Research 1-12 Credits, Max 12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

FIN 7980 Research for Doctoral Dissertation 1-15 Credits, Max 15 Credits
Grading Scheme: S/U
N/A.

Finance

FIN 5405 Business Financial Management 3 Credits
Grading Scheme: Letter Grade
Analysis of business financing and investing decisions.
Prerequisite: ACG 5065. Required of all MBA degree candidates who have had no basic business finance course.

FIN 5437 Finance I: Asset Valuation, Risk, and Return 2 Credits
Grading Scheme: Letter Grade
Analysis of business financing and investing decisions. Selected financial tools and concepts. Risk analysis and capital budgeting.
Prerequisite: must be M.B.A. student. Required of all M.B.A. students who lack basic business finance course.

FIN 5439 Finance II: Capital Structure and Risk Management 2 Credits
Grading Scheme: Letter Grade
Continuation of FIN 5437. Focus on corporate financial decision making.
Prerequisite: FIN 5437 or admission to the Master of Accounting program. Required of all M.B.A. students.

FIN 6108 Personal Financial Management 1 Credit, Max 2 Credits
Grading Scheme: Letter Grade
Personal financial planning, how to accumulate and preserve personal wealth, creating an integrated financial plan, financial modeling, tax planning, portfolio construction and the fundamentals of risk and insurance.
Prerequisite: designed for students admitted in MBA program.

FIN 6246 Money and Capital Markets 3 Credits
Grading Scheme: Letter Grade
Financial markets, with emphasis on flow of funds, interest rate determination, and allocation of resources.
Prerequisite: FIN 5405, college-level mathematics, and statistics.

FIN 6296 Capitalism 2 Credits
Grading Scheme: Letter Grade
This course introduces the concept of capitalism including the evolution of capitalism and its role in a modern free market economy. The course places particular emphasis on securities markets covering the sources and users of capital. Each of these topics considers the interaction of government, financial markets and society.
Prerequisite: FIN 5439 or Master of Science-Finance students.

FIN 6306 Investment Banking 2 Credits
Grading Scheme: Letter Grade
Hands-on approach to various aspects of investment banking industry. Lectures and guest speakers from investment banking firms.
Prerequisite: FIN 5439. Designed for M.B.A. students.

FIN 6425 Corporation Finance 3 Credits
Grading Scheme: Letter Grade
Applying business finance problems. Students prepare written solutions to case problems.
Prerequisite: FIN 5405 or consent of instructor. Designed for MBA students.

FIN 6427 Measuring and Managing Value 2 Credits
Grading Scheme: Letter Grade
Applying basic financial theory to valuing companies and creating value through sound financial decision making.
Prerequisite: FIN 5439 or Master of Science-Finance students.

FIN 6429 Financial Decision Making 2 Credits
Grading Scheme: Letter Grade
Applying basic financial theory to help managers determine how to finance their businesses. Optimal debt policy, distribution of firm cash flow policies, equity issuance strategies, risk management, and using hybrid securities in financing business.
Prerequisite: FIN 5439 or Master of Science-Finance students.

FIN 6432 Asset Valuation and Corporate Finance 2 Credits
Grading Scheme: Letter Grade
Financial concepts and tools that are essential to managing a business. Financial information to succeed as general managers. Provide foundation for students planning to take further elective courses in finance.
Prerequisite: Master of Business Administration students

FIN 6438 Study in Valuation 2 Credits
Grading Scheme: Letter Grade
Independent analysis of firms in industry. Assessment of relative investment attractiveness of these firms and industry. Projects presented and critiqued by investment professionals.
Prerequisite: FIN 5439 or Master of Science-Finance students.

FIN 6465 Financial Statement Analysis 2 Credits
Grading Scheme: Letter Grade
Examination of fundamental analysis of corporate financial statements. Identification of reliable estimates of fundamental corporate earning power and earning risks.
Prerequisite: FIN 5439 or Master of Science-Finance students, or Master of Accounting students.

FIN 6477 Entrepreneurial Finance 2 Credits
Grading Scheme: Letter Grade
Investigate conventional principles of corporate finance that can be used to analyze the financing needs of new ventures.

FIN 6489 Financial Risk Management 2 Credits
Grading Scheme: Letter Grade
This course is a practical introduction to the main concepts of managing risk, namely market, credit, liquidity, operational, legal and regulatory, business, strategic, and reputation risk. However, the bulk of the course will focus on financial market and credit risk. The course will make little use of mathematical formalism and will emphasize intuitive quantitative arguments. Students are expected to be comfortable with basic probability and statistics and be able to program either in a formal language such as MATLAB or in Excel.
Prerequisite: FIN 5437 and FIN 5439 or enrolled in Master of Science-Finance Program.
FIN 6496 Mergers & Acquisitions 2 Credits
Grading Scheme: Letter Grade
The primary objective of this course is to survey the process of mergers and acquisitions ("MA"), develop your skills in the design and evaluation of these transactions, and expose students to the key tactical issues typically confronted in MA transactions.
Prerequisite: FIN 5439 OR Enrolled in Master of Science-Finance Program.

FIN 6518 Investment Concepts 2 Credits
Grading Scheme: Letter Grade
Prerequisite: FIN 5439 or Master of Science-Finance students.

FIN 6525 Asset Management Project 1 Credit, Max 2 Credits
Grading Scheme: Letter Grade
Training in optimal portfolio allocation, measuring tracking error/value at risk and performance attribution. Group experience to manage and evaluate portfolios.

FIN 6526 Portfolio Theory 2 Credits
Grading Scheme: Letter Grade
Survey of modern approaches in security portfolio management. Two levels of examination: (1) management of owner's aggregate portfolio and (2) security selection strategies, such as mutual funds, followed by managers.
Prerequisite: FIN 5439 or Master of Science-Finance students.

FIN 6528 Asset Allocation and Investment Strategy 2 Credits
Grading Scheme: Letter Grade
Providing an introduction to investment strategy as practiced by fund managers. Course content will include a review of the analytical tools and models typically used in asset allocation, but will also provide an appraisal of the successes and failures of the most common investment strategies. While there will be some treatment of stock selection, the main focus will be on strategies involving allocation across broad asset classes.
Prerequisite: FIN 5437 and FIN 5439 OR Enrolled in Master of Science-Finance students.

FIN 6537 Derivative Securities 2 Credits
Grading Scheme: Letter Grade
Prerequisite: FIN 5439 or Master of Science-Finance students.

FIN 6545 Fixed Income Security Valuation 2 Credits
Grading Scheme: Letter Grade
Basics of interest rate determination, forward rates, and effects of interest rate uncertainty on holding period returns. Also pricing of fixed income securities with attached options.
Prerequisite: FIN 5439 or admission to the Master of Accounting program. Designed for M.B.A. students.

FIN 6547 Interest Rate Risk Management 2 Credits
Grading Scheme: Letter Grade
Basic tools. Concepts of duration, immunization, and hedging with financial futures.
Prerequisite: FIN 6545.

FIN 6549 Special Topics in Fixed Income Securities 2 Credits
Grading Scheme: Letter Grade
Municipal bond markets and timing strategies; performance attribution and tracking error; and asset allocation for pensions and endowments.
Prerequisite: FIN 6545.

FIN 6575 Emerging Markets Finance I 2 Credits
Grading Scheme: Letter Grade
This course provides an introduction to the economic and institutional context in which investing and finance occurs in developing countries. The objective is to equip students with the analytical tools and institutional knowledge that will be helpful in understanding emerging financial markets.
Prerequisite: FIN 5439 or students enrolled in the MSF program

FIN 6576 Emerging Markets Finance II 2 Credits
Grading Scheme: Letter Grade
Introduction to the essential elements of investing and raising capital in the emerging markets. The main perspective is that of an investment manager. Focuses on valuation, investment strategies, and corporate finance in the emerging markets.
Prerequisite: FIN 5439 or Master of Science-Finance students.

FIN 6585 Securities Trading 2 Credits
Grading Scheme: Letter Grade
This course focuses on the operations of securities markets and broker/dealer intermediaries. We will evaluate a spectrum of issues regarding the formulation of trading decisions, the design of market structures, and the regulation of securities trading. Trading simulation will be used to provide in-class demonstrations of relevant concepts and hands-on experience in making trading decisions in different market structures.
Prerequisite: FIN 5439 or students enrolled in the MSF program

FIN 6596 Introduction to Computational Methods & Derivative Pricing 2 Credits
Grading Scheme: Letter Grade
Providing practical applications of MATLAB functions and programming to fundamental financial instruments, such as bonds and stocks, and their derivatives. Though this is an introductory course, where mathematical and programming tools will be kept at a basic level, students must be familiar with undergraduate calculus and be comfortable with elementary programming.

FIN 6608 Financial Management of the Multinational Corporation 2 Credits
Grading Scheme: Letter Grade
Issues unique to global operating environment or significantly different from their purely domestic counterparts. Use of different national as well as global capital markets to manage the finance function.
Prerequisite: FIN 6638, FIN 5439 or M.S.-finance student or M.A.- international business students.

FIN 6626 International Finance 3 Credits
Grading Scheme: Letter Grade
Financial markets and institutions, and problems by corporations operating in the international environment.

FIN 6638 International Finance 2 Credits
Grading Scheme: Letter Grade
Introduction to markets. Focus on foreign exchange markets, international bond markets, and international equity markets.
Prerequisite: FIN 5439 or Master of Science-Finance or Master of Arts-International Business students.
FIN 6728 Capitalism and Regulation 2 Credits
Grading Scheme: Letter Grade
Analyzes the role of capital markets in creating economic welfare. Examines the impact of regulations of capital markets. Students consider the rationality of certain financial market regulations in the context of traditional arguments for market regulation. Explores regulations across countries and over time impact financial market development and economic growth. Examines the political economy of the regulation of financial and product markets is examined.
Prerequisite: FIN 5439 or finance students pursuing a Master of Science.

FIN 6729 Economics Organizations and Markets 3 Credits
Grading Scheme: Letter Grade
Economics-based approach to organizational issues including compensation, assignment of decision rights, and assessment of performance. Examination of corporate governance issues, i.e., conflicts between stockholders and managers.

FIN 6785 Investment Banking and Corporate Financial Modeling I 2 Credits
Grading Scheme: Letter Grade
Giving the analytical foundations to assess financial transactions, with the emphasis on constructing integrated spreadsheets to model firm financial statements and cash flows. The course has students develop models from scratch using source data to determine hypothetical valuations in an acquisition using discounted cash flows and multiples techniques.
Prerequisite: Enrolled in Master of Science-Finance Program.

FIN 6786 Investment Banking and Corporate Financial Modeling II 2 Credits
Grading Scheme: Letter Grade
Extending the use of basic models developed in Investment Banking and Corporate Modeling I to mergers, IPOs, private equity placements, and LBOs. Modeling techniques go beyond traditional valuation techniques to also consider viability of the financial structures of these transactions and puts greater emphasis on assessing the impact of uncertainty.
Prerequisite: FIN 6785 and Enrolled in Master of Science-Finance Program.

FIN 6905 Individual Work in Finance 1-4 Credits, Max 7 Credits
Grading Scheme: Letter Grade
Reading and/or research in finance as needed by graduate students. 
Prerequisite: permission of department and Director of Graduate Studies.

FIN 6930 Special Topics in Finance 1-4 Credits, Max 16 Credits
Grading Scheme: Letter Grade
Selected topics in financial research, theory, or of special current significance.

FIN 6935 Finance Professional Speaker Series 1 Credit, Max 2 Credits
Grading Scheme: Letter Grade
Rotating presentations by prominent finance professionals, providing informed perspective on career strategies, opportunities, and real-life applications.

FIN 6936 Special Topics In Investment Finance 2 Credits
Grading Scheme: Letter Grade
Examining special investment topics pertaining to certain asset classes such as commodities, inflation protected bonds, and currencies and to provide a link between economic theory and live applications using the Bloomberg Professional Terminal. For each topic we will be covering the basic theoretical underpinnings and examine market/security structure, portfolio implications, and how Bloomberg data can be used to understand these implications.
Prerequisite: (FIN 5437 & FIN 5439) or be enrolled in Master of Science-Finance program, or Master of Accounting program.

FIN 6957 International Studies in Finance 1-4 Credits, Max 12 Credits
Grading Scheme: S/U
International Studies in Finance
Prerequisite: admission to approved study abroad program and permission of department.

FIN 6958 International Finance Study Tour 2 Credits
Grading Scheme: Letter Grade
Academic and practical exposure to international financial markets and international business practices.

FIN 7446 Financial Theory I 4 Credits
Grading Scheme: Letter Grade
The first in a two-course sequence. Emphasis on the theory of the firm’s investment and financing decisions.

FIN 7447 Financial Theory II 4 Credits
Grading Scheme: Letter Grade
Emphasis on the theory of the financial intermediary system asset pricing theory.

FIN 7808 Corporate Finance 4 Credits
Grading Scheme: Letter Grade
Theory and empirical analyses of corporate financial decisions in a world of risk with both perfect and imperfect markets.

FIN 7809 Investments 4 Credits
Grading Scheme: Letter Grade
Theory and empirical analyses of security investment decisions in a world of risk with both perfect and imperfect markets.

FIN 7938 Finance Research Workshop 1-4 Credits, Max 7 Credits
Grading Scheme: Letter Grade
Analysis of current research topics. Paper presentation and critiques by doctoral students, faculty, and visiting scholars.

FIN 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

FIN 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

GEB 5114 Entrepreneurship and Venture Finance 3 Credits
Grading Scheme: Letter Grade
GEB 6366 Fundamentals of International Business 2 Credits
Grading Scheme: Letter Grade
Complexities of extending the market to more than a single nation/state. Impact on multinational corporation of different cultures and languages, multiple legal systems, national and global capital markets, foreign exchange, and political issues.
Prerequisite: designed for M.B.A. students.
REE 6007 Fundamentals of Real Estate Development 2 Credits
Grading Scheme: Letter Grade
Introduces students to the commercial real estate development process. Variables as to the type of development project sought (office, retail, multi-family, etc.), the end user (owner-occupied or lease-up), and the desired holding period (develop-stabilize-sell or long-term asset), design, construction methods, materials, cost estimating and budgeting (to name just a few of the variables) are examined. Return requirements, development financing, and the timing and type of cash flows during different phases of development are examined, relative to the impact on the project’s overall IRR.
Prerequisite: Grade of "C" or better in REE 6045 Introduction to Real Estate.

REE 6045 Introduction to Real Estate 2 Credits
Grading Scheme: Letter Grade
Real estate finance, appraisal, and law.
Prerequisite: graduate standing.
REE 6058 Real Estate Research and Technology 1 Credit
Grading Scheme: Letter Grade
A critical element of real estate valuation, development, and investment decision making is the utilization of research data, technologies, and software applications to provide support for assumptions and strategic decisions. This course provides hands-on exposure to widely used commercial real estate data sources, software applications, and research methodologies.
Prerequisite: (Master of Science-Real Estate or MBA students) and REE 6045.
REE 6105 Real Estate Appraisal 2 Credits
Grading Scheme: Letter Grade
Tools and techniques used in the fee appraisal business to estimate market value of real property. Emphasis on commercial appraisal using actual case studies.
Prerequisite: REE 6045 or REE 6395.
REE 6206 Primary Mortgage Markets and Institutions 2 Credits
Grading Scheme: Letter Grade
Introduces firms, institutions, practices, and legal issues involved in housing finance. Also potential variation in home mortgage product design and issues that dictate mortgage choice.
Prerequisite: Master of Science-Finance students or FIN 5437 and FIN 5439 (REE 6045 is highly recommended).
REE 6208 Secondary Mortgage Markets and Securitization 2 Credits
Grading Scheme: Letter Grade
High-level overview of secondary markets for mortgage debt and mortgage-backed securities in U.S. Considers instruments, decisions, problems, and current issues.
Prerequisite: REE 6045 or REE 6206 or Master of Science-Finance students or FIN 5437 and FIN 5439.
REE 6315 Real Estate Market and Transaction Analysis 2 Credits
Grading Scheme: Letter Grade
Application of analytical process for analyzing market potential of both developed and undeveloped real estate. Broadened historic perspective on modern city and understanding of how to apply analytical framework to real estate market analysis. Process and documents associated with acquiring and disposing of commercial real estate areas discussed.
Prerequisite: Master of Science-Real Estate or MBA students; REE 6045.
REE 6395 Investment Property Analysis 2 Credits
Grading Scheme: Letter Grade
Introduction to major concepts, principles, analytical methods, and tools useful for investment and finance decisions regarding commercial real estate assets. Property acquisition analysis, leasing, effects of debt financing and taxes, risk and return considerations.
Prerequisite: REE 6045 or Master of Science-Finance students or FIN 5437 and FIN 5439 (REE 6045 is highly recommended).
REE 6397 Real Estate Securities and Portfolios 2 Credits
Grading Scheme: Letter Grade
Securitized equity real estate investment topics, including real estate investment trusts. Emphasis on multiple property valuation and decision making.
Prerequisite: REE 6045 or REE 6395 or Master of Science-Finance students or FIN 5437 and FIN 5439.
REE 6705 Geographic Information Systems and Location Analysis 2 Credits
Grading Scheme: Letter Grade
Examines many traditional ways of analyzing and evaluating location. Introduces relevant data sources, GIS software and numerical and statistical techniques for computer-based study of spatial relationships.
Prerequisite: Graduate standing.
REE 6948 Capstone Seminar and Applied Project 2 Credits
Grading Scheme: Letter Grade
Establishes direct link between concepts developed in prior courses and current industrial practices. Presentations by professionals on current issues and industry practices. Students develop an applied project case.
Prerequisite: REE 6208.
Fisheries and Aquatic Sciences

FAS 5015 Aquaculture I 3 Credits
Grading Scheme: Letter Grade
Provides an overview of the field of aquaculture, including water quality, production systems, nutrition, spawning, and the common fish and invertebrate groups cultured in the United States.

FAS 5203C Biology of Fishes 4 Credits
Grading Scheme: Letter Grade
Emphasizes trends in evolution, integrative and sensory biology, physiology, feeding ecology, reproduction, growth, and population dynamics as they relate to fisheries. Offered fall term in odd-numbered years.
Prerequisite: BSC 2011/2011L or consent of instructor.

FAS 5255C Diseases of Warmwater Fish 3 Credits
Grading Scheme: Letter Grade
Intensive, 2-week course (80 contact hours) in methodology for diagnosing and treating parasitic, bacterial, viral, nutritional, and environmental diseases of warmwater food fish and aquarium species. Offered summer term in even-numbered years.
Prerequisite: consent of instructor.

FAS 5276C Field Ecology of Aquatic Organisms 4 Credits
Grading Scheme: Letter Grade
Understanding principles of fish and shellfish ecology through field studies. Intensive study in lakes, rivers, and coastal marshes to gain understanding of how fish and shellfish interact with their environment. Requires extensive field trips. Offered summer term.
Prerequisite: FAS 4305C or consent of instructor.

FAS 5335C Applied Fisheries Statistics 4 Credits
Grading Scheme: Letter Grade
Population sampling and estimation, statistical assumptions and robustness, mark-recapture, growth, and empirical modeling of populations. Offered fall term in even-numbered years.
Prerequisite: FAS 5276C or consent of instructor.

FAS 5407 Biology of Fishery and Aquaculture Invertebrates 3 Credits
Grading Scheme: Letter Grade
Examines the biology of marine and freshwater invertebrates that are important as fisheries or in aquaculture. Topics will include taxonomy, morphology, distribution, habitat requirements, nutrition, major predators and parasites, significant ecological interactions, and life cycles. Non-food fisheries, such as commercial sponges and pearl oysters, will be included.

FAS 5901 Scientific Thinking in Ecology 2 Credits
Grading Scheme: Letter Grade
General philosophical foundations of science and specific critiques and perspectives found in ecology and aquatic sciences. Offered fall term.

FAS 6154 Marine Adaptations: Environmental Physiology 3 Credits
Grading Scheme: Letter Grade
Examines and compares the physiological adaptations of marine, estuarine, and freshwater organisms to environmental conditions at various organizational levels. Habitats discussed include freshwater, rocky intertidal, salt marsh, coral reef, and deep sea.
Prerequisite: undergraduate course in animal physiology.

FAS 6165 Fish and Crustacean Nutrition 3 Credits
Grading Scheme: Letter Grade
Aquaints students with basic principles of nutrition and formulation of diets for fish and crustaceans in aquaculture. Lectures will cover digestive physiology, nutrients, feed formulation, and specific nutritional requirements for numerous aquatic organisms.

FAS 6176 Algae Biology and Ecology 3 Credits
Grading Scheme: Letter Grade
Covers the biology and ecology of aquatic algae, including evolution, classification, structure, photosynthesis, growth, and reproduction. Emphasis on the ecological role of algae in different aquatic ecosystems (e.g. open ocean, estuaries, coral reefs, rocky intertidal), their impacts (e.g. harmful algae blooms, food webs), and their applications (e.g. food, biochemical).

FAS 6256 Fish and Aquatic Invertebrate Histology 3 Credits
Grading Scheme: Letter Grade
Covering interpretations of the fixed tissue microanatomy and physiology of fish, bivalves, and corals, and introduces common histopathologic (disease) findings.
Prerequisite: Previous coursework in animal biology, or permission of the instructor.

FAS 6272 Marine Ecological Processes 3 Credits
Grading Scheme: Letter Grade
The ecological, biological, and environmental processes that drive patterns in productivity, behavior, population dynamics, and community structure in marine and estuarine ecosystems.
Prerequisite: Graduate student status

FAS 6273 Trophic Ecology of Fishes 3 Credits
Grading Scheme: Letter Grade
Trophic ecology of fishes, including: food habit analyses, diet breadth, diet overlap, prey selectivity, gut evacuation, consumption, food-web linkages, foraging connections through stable isotope ratios, trophic cascades, feeding bioenergetics, and interactions among feeding, growth reproduction.
Prerequisite: STA 6166 & FAS 5203C or equivalent.

FAS 6337C Fish Population Dynamics 4 Credits
Grading Scheme: Letter Grade
Analyzing fish populations for management purposes. Methods for estimating population parameters such as growth, recruitment, and mortality. Using population parameters and computer models to predict yield and catch composition, and bioenergetics approaches for fisheries management problems. Offered spring term in odd-numbered years.
Prerequisite: STA 6166.

FAS 6339C Advanced Quantitative Fisheries Assessment 4 Credits
Grading Scheme: Letter Grade
Covering topics related to fisheries stock assessment and management. Focusing on modern assessment techniques and their associated challenges.
Prerequisite: FAS 6337C Fish Population Dynamics

FAS 6355C Fisheries Management 4 Credits
Grading Scheme: Letter Grade
Integrating scientific, social, political, and legal factors in fisheries management. Offered fall term in odd-numbered years.
Prerequisite: FAS 5276C or consent of instructor.
FAS 6356 Fisheries Enhancement 2 Credits
Grading Scheme: Letter Grade
Provides participants with knowledge and skills required for assessing where and when enhancements can contribute to fisheries management goals, and for developing and managing such initiatives effectively. Emphasizes integrative systems approaches and the key elements of population dynamics, aquaculture production, release strategies, genetic management, governance, and social/economic costs and benefits.

FAS 6408 Aquaculture II 3 Credits
Grading Scheme: Letter Grade
Aquaculture engineering and system design; broodstock management; live feeds and algae production; economics and marketing; biosecurity. Application of principles and concepts will be emphasized. At the conclusion of this course students should have a firm grasp of critical concepts in aquaculture.
Prerequisite: FAS 6932 Introduction to Aquaculture (Aquaculture I).

FAS 6416 Spatial Ecology and Modeling of Fish Populations 2 Credits
Grading Scheme: Letter Grade
Theoretical models, GIS-based methods, spatially explicit matrix population models, movement models, statistical approaches, and stock assessment models to trace the effects of habitat quality, environmental restoration and spatial behavior of fish populations.
Prerequisite: FAS or WEC.

FAS 6905 Individual Study 1-6 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Contemporary problem or topic.

FAS 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

FAS 6932 Special Topics in Fisheries and Aquatic Sciences 1-4 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Fisheries biology, aquaculture, and associated aquatic sciences.

FAS 6933 Graduate Symposium 1 Credit, Max 3 Credits
Grading Scheme: S/U
Graduate Symposium

FAS 6935 Contemporary Problems in Fisheries and Aquatic Sciences 2 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Library research, oral reports, and discussions of scientific problems or topics announced in advance. Offered fall and spring terms.
Prerequisite: graduate student standing.

FAS 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

FAS 6971 Research for Master’s Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master’s Thesis

FAS 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been admitted to a doctoral program. Not appropriate for students who have been admitted to candidacy.

FAS 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

Food and Resource Economics

AEB 5167 Economic Analysis in Small Farm Livelihood Systems 3 Credits
Grading Scheme: Letter Grade
General analysis techniques used to enhance economic analysis of small-scale, limited-resource family farm livelihood systems to evaluate impact of proposed technology, infrastructure, and policy changes on family welfare. Linear programming and regression. Emphasis on tropical agriculture.

AEB 5188 Economics of Agribusiness Decisions 3 Credits
Grading Scheme: Letter Grade
Comprehensive treatment of microeconomic theory and its use in managerial decision making.
Prerequisite: AEB 3103 or ECO 2023.

AEB 5326 Agribusiness Financial Management 3 Credits
Grading Scheme: Letter Grade
Integration of finance and management decision-making tools to solve advanced financial and other management problems faced by agricultural firms and agribusinesses.
Prerequisite: AEB 5326

AEB 5516 Quantitative Methods in Agribusiness Decisions 3 Credits
Grading Scheme: Letter Grade
Introduction to variety of quantitative methods with application to business decision-making contexts.
Prerequisite: STA 2023.

AEB 5757 Strategic Agribusiness Human Resource Management 3 Credits
Grading Scheme: Letter Grade
Issues involved in strategic and effective leadership and management in agribusiness sector of economy. Emphasis on human resource ideas and techniques that managers utilize to improve organizational teamwork, productivity, and performance.

AEB 6103 Microeconomic Principles and Analysis 3 Credits
Grading Scheme: Letter Grade
Economics as a behavioral science describing actions of consumers and producers interacting in the market process; welfare economics; property rights; competition and equilibrium. Institutional backdrop for market process. Problem solving using economic principles.
Prerequisite: ECO 3101 and MAC 2311 or equivalents.

AEB 6145 Agricultural Finance 3 Credits
Grading Scheme: Letter Grade
Prerequisite: AEB 3144 or FIN 3403.

AEB 6183 Agribusiness Risk Management 3 Credits
Grading Scheme: Letter Grade
Examine and develop the applied risk analysis skills useful for risk management decision-making by agricultural producers, agribusinesses, and researchers.

AEB 6225 Public Policy and the Agribusiness Firm 3 Credits
Grading Scheme: Letter Grade
Economic policy process at national and international levels. Issues include structure of food system, food safety, and environmental impacts.
AEB 6301 Food Wholesale and Retail Marketing 3 Credits
Grading Scheme: Letter Grade
Wholesale and retail issues that exist both in U.S. and world markets, such as brand management, supermarket management, and market research.

AEB 6385 Management Strategies for Agribusiness Firms 3 Credits
Grading Scheme: Letter Grade
Planning, organizing, implementing, and evaluating the agribusiness management functions of strategic planning, finance, marketing, and personnel.
Prerequisite: ECO 3101.

AEB 6553 Elements of Econometrics 3 Credits
Grading Scheme: Letter Grade
Econometric problem solving and determining quantitative relationships among economic variables in agriculture and related industries.
Prerequisite: AEB 3103, 4511; STA 3023.

AEB 6674 Intnl Agr Pol and Trade 3 Credits
Grading Scheme: Letter Grade
Intl Agr Pol and Trade

AEB 6675 International Agribusiness Marketing 3 Credits
Grading Scheme: Letter Grade
Principles, issues, barriers, policies, strategies, and decisions involved in global marketing and trade of perishable and storable agricultural commodities and food products.
Prerequisite: AEB 5188.

AEB 6817 Survey Research Methods for Economists 3 Credits
Grading Scheme: Letter Grade
Process of creating, validating, implementing, coding, and interpreting results from economic surveys.

AEB 6905 Problems in Food and Resource Economics 1-3 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Individual study. Problems of interest to the student and agreeable to the instructor.
Prerequisite: consent of instructor.

AEB 6921 Workshop in Food and Resource Economics I 1 Credit
Grading Scheme: Letter Grade
Empirical applications of concepts developed in the microeconomic core.
Prerequisite: AEB 6533.

AEB 6933 Special Topics 1-6 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Special Topics

AEB 6934 Workshop in Food and Resource Economics II 1 Credit
Grading Scheme: Letter Grade
Developing and understanding how to apply food and resource economic concepts to agricultural and resource related problems.

AEB 6942 Advanced Applications in Agribusiness Experience 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Applications of marketing, management, and finance principles to workplace station. Applications developed from approved internship.

AEB 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

AEB 7108 Microeconomic Theory II 3 Credits
Grading Scheme: Letter Grade
Continuation of Microeconomic Theory I. Theory of the firm, market theory, market failure (externality, market power, and asymmetric information). Game theory and applications. General equilibrium theory, welfare trade theory, and agricultural trade policy.
Prerequisite: ECO 7115.

AEB 7174 Economic Coordination and Organizational Behavior in Agribusiness 3 Credits
Grading Scheme: Letter Grade
Analysis of the organization of economic activities across firms and markets, internal governance structures and the separation of ownership and control.

AEB 7182 Agricultural Risk Analysis and Decision Making 3 Credits
Grading Scheme: Letter Grade
Producer decisions including theoretical and empirical problems of multi-factor, multi-product, and poly-period cases. Input demand and product supply functions at the commodity and industry levels.
Prerequisite: AEB 7182.

AEB 7240 Macroeconomic Theory in Open Economies II 3 Credits
Grading Scheme: Letter Grade
Essential elements of macroeconomic theory and policy in world of interdependent nations.

AEB 7373 Consumer Demand and Applied Analysis 3 Credits
Grading Scheme: Letter Grade
Theories of Consumer Behavior in Static and Dynamic Contexts; analysis of household expenditure and demand.

AEB 7453 Natural Resource and Environmental Economics 3 Credits
Grading Scheme: Letter Grade
Resource use, management, development, and conservation. Institutional and market performance in providing socially desired outcomes.
Prerequisite: ECO 3101 and 3203, or consent of instructor.

AEB 7483 Seminar in Natural Resource and Environmental Economics 3 Credits
Grading Scheme: Letter Grade
Application of economic methods to problems of environmental and regional development; input-output models, cost-benefit analysis, economic valuation, and development planning.
Prerequisite: AEB 7453.

AEB 7571 Econometric Methods I 3 Credits
Grading Scheme: Letter Grade
Linear and nonlinear econometric models, serial correlation, heteroscedasticity, errors in variables, qualitative variables, specification errors, and simultaneous equation models.
Prerequisite: MAS 2103, STA 4322.

AEB 7572 Econometric Methods II 3 Credits
Grading Scheme: Letter Grade
Topics in econometrics including single equation and multiple equation linear and nonlinear models.
Prerequisite: AEB 7571.
AEB 7645 Economic Development and Agriculture 3 Credits  
Grading Scheme: Letter Grade  
Relation of human, capital, and natural resources, technology, and institutions to income growth and distribution. Development strategies in low-income countries.  
Prerequisite: ECO 3101 or AEB 3103.  

AEB 7979 Advanced Research 1-12 Credits  
Grading Scheme: S/U  
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.  

AEB 7980 Research for Doctoral Dissertation 1-15 Credits  
Grading Scheme: S/U  
Research for Doctoral Dissertation  

Food Science and Human Nutrition  

DIE 6241 Advanced Medical Nutrition Therapy 3 Credits  
Grading Scheme: Letter Grade  
Opportunity to integrate theories and principles of medical nutrition therapy into clinical practice.  
Prerequisite: admission to Master of Science-Dietetic Internship.  

DIE 6242 Advanced Medical Nutrition Therapy II 4 Credits  
Grading Scheme: Letter Grade  
Opportunity to integrate principles of medical nutrition therapy into clinical practice.  
Prerequisite: admission to Master of Science-Dietetic Internship and DIE 6241.  

DIE 6516 Professional Development in Dietetics 2 Credits  
Grading Scheme: Letter Grade  
Professional development assessment, planning, and evaluation for future dietetics professionals.  
Prerequisite: DIE 6938.  
Corequisite: DIE 6944.  

DIE 6905 Problems in Dietetics 1-3 Credits, Max 4 Credits  
Grading Scheme: Letter Grade  
Individual study and research carried out in community, hospital, or laboratory settings.  
Prerequisite: consent of instructor. Not open to students on probation or conditional admission.  

DIE 6938 Advanced Dietetic Seminar 1 Credit  
Grading Scheme: Letter Grade  
Problem-solving, leadership, and analytical skills.  
Prerequisite: admission to Master of Science-Dietetic Internship.  
Corequisite: DIE 6942.  

DIE 6942 Dietetic Internship I 8-12 Credits, Max 12 Credits  
Grading Scheme: S/U  
Internship in dietetics in affiliated institutions offering core rotations in community nutrition, food systems management, and clinical dietetics. Emphasizes applying theory to practice.  
Prerequisite: DIE 6242.  
Corequisite: DIE 6938.  

DIE 6944 Dietetic Internship II 4-8 Credits, Max 12 Credits  
Grading Scheme: S/U  
Internship in affiliated institutions offering elective and/or specialty rotations (e.g., nutrition support, diabetes, pediatrics, sports nutrition, wellness, advanced food systems, and staff experience). Emphasizes skill development for entry-level practice.  
Prerequisite: DIE 6942.  

FOS 5126C Psychophysical Aspects of Foods 3 Credits  
Grading Scheme: Letter Grade  
Physical and chemical stimuli controlling human sensory perception of texture, color, and flavor of foods.  
Prerequisite: FOS 4311C and 4722C.  

FOS 5205 Current Issues in Food Safety and Sanitation 3 Credits  
Grading Scheme: Letter Grade  
Microbial, chemical, and biological safety of food; principles of sanitation for food processing and retail food industries.  

FOS 5225C Principles in Food Microbiology 4 Credits  
Grading Scheme: Letter Grade  
Fundamental aspects of biological contamination and its control during harvesting, processing, and storage of foods. Analysis of microbial food fermentation, microbial ecology of foods, selection of methods to examine foods for microbial content.  
Prerequisite: MCB 3020 or consent of instructor.  

FOS 5437C Food Product Development 3 Credits  
Grading Scheme: Letter Grade  
Value-added food products. Technology, safety, health/nutrition, legal, quality, and economic/marketing considerations.  
Prerequisite: 4000-level food science course, or consent of instructor.  

FOS 5561C Citrus Processing Technology 3 Credits  
Grading Scheme: Letter Grade  
Value-added food products. Technology, safety, health/nutrition, legal, quality, and economic/marketing considerations. Taught partly at Lake Alfred Citrus Research and Education Center.  
Prerequisite: undergraduate course in food processing.  

FOS 5645 Functional Foods and Nutraceuticals 3 Credits  
Grading Scheme: Letter Grade  
Analysis, chemistry, processing, bioavailability, and health benefits of bioactive food components. Content will include both basic knowledge and the latest research trends.  
Prerequisite: Graduate status  

FOS 5732 Current Issues in Food Regulations 3 Credits  
Grading Scheme: Letter Grade  
Governmental laws and regulations affecting the food industry.  
Prerequisite: consent of instructor.  

FOS 6125C Sensory Evaluation of Food 3 Credits  
Grading Scheme: Letter Grade  
Principles and techniques of sensory evaluation of foods. Emphasizes basics of taste and olfactory perception; the basic psychology of common sensory tests; the proper use of discrimination testing, consumer acceptability and preference testing, and descriptive analysis; and statistical analysis of sensory data.  
Prerequisite: STA 166.
FOS 6215 Principles of Food Safety 3 Credits  
Grading Scheme: Letter Grade  
A multidisciplinary approach to food safety that includes aspects of food chemistry, food toxicology, food biotechnology, food microbiology, food defense, and food processing. Enrollment restricted to students in the Food Safety Graduate Certificate Program.  
Prerequisite: Bachelor's Degree  
FOS 6216 Food Safety Systems 2 Credits  
Grading Scheme: Letter Grade  
Analyzing the seven steps of Hazard Analysis Critical Control Point (HACCP) and prerequisite programs associated with food processing environments in seafood, meat, poultry, vegetable, grain, and beverage processing facilities. Enrollment restricted to students in the Food Safety Graduate Certificate Program.  
Prerequisite: FOS 6215

FOS 6217 Food Safety, Sanitation, and Microbiology 2 Credits  
Grading Scheme: Letter Grade  
Microbial, chemical, and biological safety of food and principles of sanitation for the food processing and retail food industries. Enrollment restricted to students in the Food Safety Graduate Certificate Program.  
Prerequisite: FOS 6215

FOS 6224 Food and Environmental Virology 2 Credits  
Grading Scheme: Letter Grade  
Food virology is an emerging topic in the field of microbial food safety. This course explores the role of viruses as human pathogens; their interactions with bacteria; transmission to food, water, and contact surfaces; detection; and prevention strategies. Through this course, students can develop a competency framework within their discipline.  
Prerequisite: Basic familiarity with microbiology or biochemistry.

FOS 6226C Advanced Food Microbiology 4 Credits  
Grading Scheme: Letter Grade  
Selection of laboratory methods, characterization of food-borne pathogens and spoilage organisms.  
Prerequisite: FOS 4222/4222L, MCB 4303/4303L and BCH 6415.

FOS 6315C Advanced Food Chemistry 4 Credits  
Grading Scheme: Letter Grade  
Functions of lipids, carbohydrates, proteins, enzymes and other components in foods and their interactions and interactions during food processing and storage.  
Prerequisite: BCH 4024 or 3025 and FOS 4311C.

FOS 6317C Flavor Chemistry and Technology 3 Credits  
Grading Scheme: Letter Grade  
Psychophysics of taste and aroma, sensory analysis, flavor extraction, measurement techniques, flavor precursors, off-flavors, Maillard flavors, bioflavors, flavoring materials, flavor safety and authenticity.  
Prerequisite: basic and organic chemistry.

FOS 6355C Instrumental Analysis and Separations 5 Credits  
Grading Scheme: Letter Grade  
Separation of food chemicals: gas, high performance liquid, thin-layer, ion-exchange and molecular size chromatography; characterization via UV-visible, IR, NMR, and mass spectrometry.  
Prerequisite: CHM 3120, FOS 4311C.

FOS 6428C Advanced Food Processing 4 Credits  
Grading Scheme: Letter Grade  
Reaction kinetics, heat transfer mechanics, and process design, optimization and economics.  
Prerequisite: FOS 4427C.

FOS 6455C Industrial Food Fermentations 3 Credits  
Grading Scheme: Letter Grade  
Microbiological, chemical, and physical principles and practices in fermentation of foods and constituents.  
Prerequisite: FOS 4222/4222L.

FOS 6736 Food Regulations 2 Credits  
Grading Scheme: Letter Grade  
Federal laws and regulations associated with the food industry related to food safety, adulteration, misbranding, standards of identity, ingredients, and additives. Structure and function of U.S. government agencies involved in food regulation. Enrollment restricted to students in the Food Safety Graduate Certificate Program.  
Prerequisite: FOS 6215

FOS 6905 Problems in Food Science 1-3 Credits, Max 4 Credits  
Grading Scheme: Letter Grade  
Individual study carried out in laboratory, library, pilot plant, or the food industry.  
Prerequisite: consent of instructor. Not open to students on probation or conditional admission.  
FOS 6910 Supervised Research 1-5 Credits, Max 5 Credits  
Grading Scheme: S/U  
Supervised Research  
Prerequisite: consent of instructor.

FOS 6915 Research Planning 2 Credits  
Grading Scheme: Letter Grade  
Required of first-year graduate students. Planning and initiating research, experimental techniques, analyzing data, reporting results.  
Prerequisite: consent of instructor.

FOS 6936 Topics in Food Science 1-4 Credits, Max 8 Credits  
Grading Scheme: Letter Grade  
Special aspects or current developments in food science.  
Prerequisite: consent of instructor.

FOS 6938 Food Science Seminar 1 Credit, Max 4 Credits  
Grading Scheme: Letter Grade  
Preparing and presenting reports on specialized aspects of research and technology in food science.  
Prerequisite: consent of instructor.

FOS 6940 Supervised Teaching 1-5 Credits, Max 5 Credits  
Grading Scheme: S/U  
Supervised Teaching  
Prerequisite: consent of instructor.

FOS 6971 Research for Master's Thesis 1-15 Credits  
Grading Scheme: S/U  
Research for Master’s Thesis

FOS 7979 Advanced Research 1-12 Credits  
Grading Scheme: S/U  
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.  
FOS 7980 Research for Doctoral Dissertation 1-15 Credits  
Grading Scheme: S/U  
Research for Doctoral Dissertation
HUN 5441 Metabolic Response to Enteral and Parenteral Nutrition 2 Credits  
**Grading Scheme:** Letter Grade  
Response of the body's organ systems to enteral and parenteral nutritional support, emphasizing physiological and biochemical adaptations.  
**Prerequisite:** BCH 3025, HUN 2201, and PET 2350 or equivalents.

HUN 5447 Nutrition and Immunity 3 Credits  
**Grading Scheme:** Letter Grade  
Role of nutrition in immunity. Effect of nutrients, foods, and dietary supplements on regulation of the immune system.  
**Prerequisite:** PCB 4713C.

HUN 6245 Advanced Human Nutrition 3 Credits  
**Grading Scheme:** Letter Grade  
Molecular and cellular aspects of nutrients and discussion of research techniques in genomics and proteomics.  
**Prerequisite:** BCH 4024 or 3025, and a nutrition principles course.

HUN 6255 Clinical Nutrition 2-12 Credits, Max 12 Credits  
**Grading Scheme:** Letter Grade  
Nutritional requirements and metabolism of nutrients in normal individual, altered nutritional requirements and metabolism of nutrients in different disease states, and practical aspects of nutritional and metabolic support of different types of patients.

HUN 6301 Nutritional Aspects of Lipid Metabolism 3 Credits  
**Grading Scheme:** Letter Grade  
Role of lipids in nutrition, with emphasis on energy metabolism and derangements in chronic diseases.

HUN 6305 Nutritional Aspects of Carbohydrates 3 Credits  
**Grading Scheme:** Letter Grade  
Characteristics, absorption, and metabolism of common carbohydrates in the food chain; carbohydrate metabolism and its regulation; carbohydrate metabolism in disease.

HUN 6321 Proteins and Amino Acids in Nutrition 3 Credits, Max 3 Credits  
**Grading Scheme:** Letter Grade  
Digestion, absorption, and degradation; emphasis on turnover, requirements, assessment of quality, and effects of deficiencies, toxicities, and physiological stresses.  
**Prerequisite:** BCH 3025.

HUN 6331 Vitamins in Human Nutrition 3 Credits  
**Grading Scheme:** Letter Grade  
Biochemical and physiological functions; nutrient requirements and interactions; response to deficiencies and excesses.  
**Prerequisite:** BCH 4024 or 3025.

HUN 6356 Minerals in Nutrition 3 Credits  
**Grading Scheme:** Letter Grade  
Biochemical and physiological aspects of mineral absorption, metabolism, and function.  
**Prerequisite:** BCH 4024 or equivalent.

HUN 6812C Analytical Techniques in Nutritional Biochemistry 1 Credit  
**Grading Scheme:** Letter Grade  
Biochemical analyses of tissues and fluids, radio-tracer methodology, metabolic studies, tissue handling, and formulation of experimental animal diets.  
**Prerequisite:** BCH 4024 or 3025 and consent of instructor.

HUN 6905 Problems in Nutritional Sciences 1-3 Credits, Max 4 Credits  
**Grading Scheme:** Letter Grade  
Individual study carried out in laboratory, library, pilot plant, or food industry.  
**Prerequisite:** consent of instructor. Not open to students on probation or conditional admission.

HUN 6936 Topics in Nutritional Sciences 1-4 Credits, Max 8 Credits  
**Grading Scheme:** Letter Grade  
Special aspects or current developments in nutritional sciences.  
**Prerequisite:** consent of instructor.

HUN 6938 Nutritional Sciences Seminar 1 Credit, Max 4 Credits  
**Grading Scheme:** Letter Grade  
Presentation of reports on research in nutrition.  
**Prerequisite:** consent of instructor.

HUN 6939 Advanced Clinical Nutrition 2-12 Credits, Max 12 Credits  
**Grading Scheme:** Letter Grade  
Applying normal and therapeutic nutrition principles to specific clinical topics based on cases from the health center environment.

HUN 6940 Supervised Teaching 1-5 Credits, Max 5 Credits  
**Grading Scheme:** S/U  
Supervised Teaching  
**Prerequisite:** consent of instructor.

HUN 6971 Research for Master's Thesis 1-15 Credits  
**Grading Scheme:** S/U  
Research for Master's Thesis  
**Prerequisite:** for thesis students only.

HUN 7979 Advanced Research 1-12 Credits  
**Grading Scheme:** S/U  
Research for doctoral students before admission to candidacy. Designed for students who have accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

HUN 7980 Research for Doctoral Dissertation 1-15 Credits  
**Grading Scheme:** S/U  
Research for Doctoral Dissertation

**Geography**

GEA 6419 Seminar: South America 3 Credits  
**Grading Scheme:** Letter Grade  
Cultural, economic, political, and resource characteristics and development of representative areas.

GEA 6466 Seminar on Geography of Amazonia 3 Credits  
**Grading Scheme:** Letter Grade  
Exploration of biophysical basis of natural resource management, cultural diversity, and economic development in Amazonia.

GEO 5305 Environmental Biogeography 3 Credits  
**Grading Scheme:** Letter Grade  
Description and explanation of spatial patterns of biodiversity, and underlying biophysical factors of human-environment interactions. Past and present distributions of organisms and how patterns of environmental variation influence the organisms. Biogeography is useful for designing nature reserves, forecasting how climate change may affect organisms, and explaining human adaptations to environmental variability. This class takes a mostly ecological approach to understanding biogeography.  
**Prerequisite:** GEO 2200 or equivalent.
GEO 5920 Geography Colloquium 1 Credit, Max 6 Credits  
Grading Scheme: S/U  
Presentation and discussion of contemporary geographic research.

GEO 6118 Contemporary Geographic Thought and Research 3 Credits  
Grading Scheme: Letter Grade  
Summary of major currents of intellectual thought and research orientations in contemporary geography.  
Prerequisite: admission to graduate program in geography.

GEO 6119 Proposal Writing in Geography 3 Credits  
Grading Scheme: Letter Grade  
Research design, proposal writing and proposal evaluation for geographic studies.  
Prerequisite: Graduate standing in Geography or consent of instructor

GEO 6160 Introduction to Quantitative Methods for Geographers 3 Credits  
Grading Scheme: Letter Grade  
Working knowledge of statistical and quantitative techniques used by geographers. Focuses on spatial analysis.  
Prerequisite: statistics.

GEO 6161 Intermediate Quantitative Methods for Geographers 3 Credits  
Grading Scheme: Letter Grade  
Statistical techniques used in the spatial and social sciences. Regression analysis for cross-sectional, qualitative, time-series, and geocoded data.  
Prerequisite: GEO 6160.

GEO 6166 Advanced Quantitative Methods for Spatial Analysis 3 Credits  
Grading Scheme: Letter Grade  
Critical examination and analysis of spatial data and point patterns, trend-surface modeling and interpolation, count data modeling, cluster and hot-spot detection, process change statistics in space and time, and spatial regression models.  
Prerequisite: GEO 6160 and GEO 6161 or equivalent or permission of instructor

GEO 6168 Spatial Econometrics and Modeling 3 Credits  
Grading Scheme: Letter Grade  
Introduces regression models capable of dealing with spatial autocorrelation. Students develop statistical models and estimate with computer software.  
Prerequisite: GEO 6161 or equivalent.

GEO 6255 Climatology 3 Credits  
Grading Scheme: Letter Grade  
Climatology in a global context. Emphasizes energy budgets, weather systems in the tropics and extratropics, and atmospheric teleconnections such as El Nino.  
Prerequisite: Introductory weather and climate course taken as an undergrad.

GEO 6282 Fluvial Morphology 3 Credits  
Grading Scheme: Letter Grade  
Study of fluvial processes, landforms and deposits and their changes due to environmental factors and human activities.  
Prerequisite: Graduate standing, a basic physical geography or geology course and an introductory statistics course. Other interested individuals should consult instructor.

GEO 6348 Floods Seminar 3 Credits  
Grading Scheme: Letter Grade  
Analysis of the world's most extreme floods from the Pleistocene through present due to various causes. Emphasizes physical and human aspects of flood warning, preparedness, response and recovery throughout the world.

GEO 6375 Land Change Science Seminar 3 Credits  
Grading Scheme: Letter Grade  
Interdisciplinary study of land use and land cover change dynamics and their relationship with global environmental change.

GEO 6408 Parks and People 3 Credits  
Grading Scheme: Letter Grade  
Introduces students to the multiple dimensions of protected areas and people; discusses the history of parks on several continents, and their more well-known biodiversity dimensions; emphasizes the economic attributes of parks and their governance, and moves beyond public conservation to consider private and community approaches.

GEO 6451 Medical Geography 3 Credits  
Grading Scheme: Letter Grade  
Studying human-environment interactions and the influence of these interactions on public health. This course provides a broad-based, comprehensive survey of geographic approaches in medical studies.  
Prerequisite: None.

GEO 6455 Advanced Study Design in Medical Geography 3 Credits  
Grading Scheme: Letter Grade  
Examines problem solving with a focus on the assumptions that underlie methods and strategies to analyze health outcomes. Integrates health with environmental conditions in a spatially explicit manner. Evaluates alternative methods of detection, analyses, data and study design. Examines the implicit and explicit limitations.  
Prerequisite: (GIS 3420C or 6425C) and (GEO 3452 or 6421) or consent of instructor

GEO 6905 Individual Work 1-5 Credits, Max 12 Credits  
Grading Scheme: Letter Grade  
Individual Work

GEO 6921 How to Survive and Thrive in Academia 1 Credit  
Grading Scheme: Letter Grade  
Strategies and approaches, from preparation in graduate school, to success on the academic job market, to getting tenure.

GEO 6931 Seminar in Cultural and Political Ecology 3 Credits  
Grading Scheme: Letter Grade  
Human-environment relationships from the perspective of cultural and political ecology.

GEO 6938 Selected Topics in Geography 1-5 Credits, Max 15 Credits  
Grading Scheme: Letter Grade  
Selected Topics in Geography  
Prerequisite: graduate standing in geography or a related field.

GEO 6971 Research for Master's Thesis 1-15 Credits  
Grading Scheme: S/U  
Research for Master's Thesis

GEO 7979 Advanced Research 1-12 Credits  
Grading Scheme: S/U  
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

GEO 7980 Research for Doctoral Dissertation 1-15 Credits  
Grading Scheme: S/U  
Research for Doctoral Dissertation
NY 6341 Shelter and Care Options for U.S. Elderly 3 Credits
Grading Scheme: Letter Grade
Examining how the housing and long-term care arrangements of older adults in the United States influence their ability to age successfully, that is, to be fully engaged in life and to effectively cope with their chronic health conditions and disabilities.

GIS 5008C Maps and Graphs 4 Credits
Grading Scheme: Letter Grade
General introduction to principles and techniques of thematic cartography and cartographic applications.
Prerequisite: graduate standing.

GIS 5028C Advanced Aerial Photo Interpretation 3 Credits
Grading Scheme: Letter Grade
Uses of aerial photographs in geographical research.
Prerequisite: GEO 2200 or consent of instructor.

GIS 5038C Remote Sensing 4 Credits
Grading Scheme: Letter Grade
Uses of remote sensing imagery in geographical research.
Prerequisite: GEO 4120C.

GIS 5107C Geographic Information Systems in Research 4 Credits
Grading Scheme: Letter Grade
Geographic technology for creating, modifying, displaying, and analyzing spatial information. Geographic analysis and reasoning, computer software and hardware technology, and research applications of GIS.
Geographic databases.
Prerequisite: GEO 3162C or equivalent.

GIS 6104 Spatial Networks 3 Credits
Grading Scheme: Letter Grade
Many phenomena of interest in physical, social, and cyber environments can be thought of as networks within geographic context. This course teaches methods for analyzing these spatial networks, and introduces their applications in geography, urban studies, transportation, hydrology, epidemiology, social science, etc.
Prerequisite: Entry level knowledge of statistics (GEO6160, or equivalent) or the consent of the instructor. Prior experiences with ArcGIS is preferred, but not required.

GIS 6117 Applied Geostats 3 Credits
Grading Scheme: Letter Grade
Introduces fundamentals and GIS practices of geostatistical analysis (or the kriging), which addresses optimal spatial interpolation. Geostatistics are currently applied in diverse disciplines such as geography, geology, engineering, hydrology, urban studies, and epidemiology.
Prerequisite: Entry level knowledge of both statistics (STA2023, GEO3162C/6160, or equivalent) and GIS (GIS3043/5107C or equivalent), or the consent of the instructor.

GIS 6325 GIS Analysis of Hazard Vulnerability 3 Credits
Grading Scheme: Letter Grade
Instruction on geographic and cartographic techniques for geospatial analysis of risk, vulnerability, and resilience using ArcGIS. Students learn to utilize physical and human geographic datasets for multiple hazard contexts including hydrometeorological, climatological, and geophysical hazards.
Prerequisite: GIS 3043 with minimum grade of C or URP 4273 with minimum grade of C.

GIS 6425C GIS Models for Public Health 3 Credits
Grading Scheme: Letter Grade
Focusing on the design of GIS-based models to address health and health care issues. Major topics include: a conceptual framework, landscape epidemiology models, disease diffusion models, health accessibility, human health behavior, and location-allocation of health services. Lab section helps students gain hands-on experience applying these models with GIS tools.
Prerequisite: (GEO4167C/GEO 6160, or equivalent) and GIS (GIS3043/ GIS 5107C, or equivalent), or the consent of the instructor

GIS 6456C Applications in GIS for Zoonoses and Disease Ecology 3 Credits
Grading Scheme: Letter Grade
An advanced-level course for medical geography, and sister disciplines (epidemiology, public health, ecology). It can serve as an undergraduate level major or minor requirement. Focus is on GIS applications in spatial analysis and ecology to address common research issues related to zoonotic diseases (those affecting animals and humans).
Prerequisite: GIS 3043 and Geography 6161C or equivalents or consent of instructor. Students from public health backgrounds may inquire about course equivalents.

MET 5504 Weather and Forecasting 3 Credits
Grading Scheme: Letter Grade
Skill development in predicting and discussing daily weather patterns using meteorological instruments to collect data and analyze weather events.
Prerequisite: familiarity with basic meteorology.

MET 6530 Hurricanes 3 Credits
Grading Scheme: Letter Grade
Meteorological and climatological concepts related to hurricanes. Forecasting current activity; researching past storms; and analyzing storm structure, damage, and future trends.
Prerequisite: familiarity with basic meteorology.

MET 6555 Seminar in Atmospheric Teleconnections 3 Credits
Grading Scheme: Letter Grade
Atmospheric teleconnections are recurring large-scale patterns of pressure and circulation anomalies. They can influence temperature, rainfall, storm tracks, and jet stream location/ intensity. We will examine how these patterns were discovered, how the index that characterizes the phase of each teleconnection is calculated, and the weather associated with different phases.

MET 6752 Spatial Analysis of Atmospheric Data using GIS 3 Credits
Grading Scheme: Letter Grade
How atmospheric data are collected and analyzed both for meteorologic and climatologic-scale research. Learn where to obtain various types of data and how to analyze data to answer specific research questions.
Prerequisite: MET 5504 or MET 6530, or consent of instructor.

Geology

BOT 5305 Paleobotany 3 Credits
Grading Scheme: Letter Grade
Comparative study of plants through geologic time with attention to morphology and evolution of major groups of land plants, based on the fossil record. Offered spring term in odd-numbered years.
Prerequisite: upper-level course in botany or geology, or consent of instructor.
GLY 5156 Geologic Evolution of North America 3 Credits
Grading Scheme: Letter Grade
Key geological features of North American plate and important aspects of their geological evolution through time. Current and past plate tectonic setting, major geological and geomorphologic provinces, geophysical aspects of North American lithosphere, and natural resources.
Prerequisite: GLY 2010 or 2026; 4400C recommended.

GLY 5245 Hydrogeochemistry 3 Credits
Grading Scheme: Letter Grade
Geological controls on chemical and isotopic composition of natural waters, including meteoric ground water, brines, and sea water; emphasizing thermodynamic and kinetic aspects of fluid-solid reactions.
Prerequisite: inorganic chemistry, calculus, or consent of instructor.

GLY 5246 Geochemistry 3 Credits
Grading Scheme: Letter Grade
The abundance and distribution of the elements and their behavior during various geological processes.
Prerequisite: CHM 2046, GLY 2010C.

GLY 5247 Surface and Ground Water Interactions 3 Credits
Grading Scheme: Letter Grade
Classic and new literature that deals with interactions between surface and ground water. Emphasizes submarine ground water discharge in estuary and coastal zones, hyporheic zones of streams, and karst aquifers.
Prerequisite: geology/hydroecology and undergraduate chemistry and physics.

GLY 5255 Organic Geochemistry and Geobiology 3 Credits
Grading Scheme: Letter Grade
Theory, practice, and methods of organic geochemistry, organic biogeochemistry, and geomicrobiology.
Prerequisite: one year introductory chemistry, one year introductory geology.

GLY 5328 Advanced Igneous Petrology 3 Credits
Grading Scheme: Letter Grade
Compositional variability, phase relations, and petrogenetic history of igneous rocks, volcanic regions, and mantle. Theories of petrotectonic associations and magmatogenesis.
Prerequisite: GLY 4310C or equivalent.

GLY 5455 Introduction to Geophysics and Tectonics 3 Credits
Grading Scheme: Letter Grade
Physics of the Earth. Study of gravity and magnetic fields, seismic waves, thermal history, orogenic belts, and plate tectonic theory.
Prerequisite: GLY 2010C, 2026C, or 4400C and 1 year of college physics or consent of instructor.

GLY 5466 Seismology and Earth Structure 3 Credits
Grading Scheme: Letter Grade
Introduces basic theory of elastic wave propagation in the Earth. Applies seismology as a tool for determining Earth structure and explains relationships between earthquakes and plate tectonics.
Prerequisite: MAP 2302 or GLY 5455 or PHY 2048 or PHY 2060 or consent of instructor.

GLY 5468 Terrestrial Gravity and Magnetism 3 Credits
Grading Scheme: Letter Grade
Survey of potential field theory with applications to gravity and magnetism of the Earth.
Prerequisite: MAP 2302 or PHY 2060, and GLY 5455, or by consent of instructor.

GLY 5558C Sedimentology 3 Credits
Grading Scheme: Letter Grade
Lecture and discussion of major sedimentary processes active in coastal and continental margin settings, focus on relating processes with sedimentary facies. Class work augmented with frequent field trips.
Prerequisite: GLY 2010 or 2026; 4552.

GLY 5576 Continental Margin Stratigraphy 3 Credits
Grading Scheme: Letter Grade
Basic concepts of sequence stratigraphy and to illustrate their application in the study of tectonics, sediment supply, and sea-level change. Emphasizes exploration tools, such as advanced well logging techniques and seismic stratigraphy, used to relate lithology with stratigraphy.
Prerequisite: GLY4552 or equivalent

GLY 5705 Geomorphology 3 Credits
Grading Scheme: Letter Grade
Application of principles of geomorphology to origin and evolution of landscapes.
Prerequisite: GLY 4400C.

GLY 5736 Marine Geology 3 Credits
Grading Scheme: Letter Grade
Detailed introduction to the origin and evolution of ocean basins, ocean margins, and oceanic sediments and microfossils, including a paleoceanographic history of the marine realm.
Prerequisite: GLY 2010C, or 2026C, or OCE 1001.

GLY 5786L Topics in Field Geology 2 Credits
Grading Scheme: Letter Grade
Visits to selected sites and regions of outstanding geologic value and interest.
Prerequisite: graduate standing and consent of instructor.

GLY 5827 Ground Water Geology 3 Credits
Grading Scheme: Letter Grade
Principles of ground water geology, with special reference to the Coastal Plain and Florida.
Prerequisite: GLY 2010C, or 2026C.

GLY 6075 Global Climate Change: Past, Present, and Future 3 Credits
Grading Scheme: Letter Grade
Evolution of the Earth's climate through geologic time, including discussion of modern climatology and methods of paleoclimate interpretations.
Prerequisite: GLY 4552C.

GLY 6256 Chemical Biomarkers in Aquatic Ecosystems 3 Credits
Grading Scheme: Letter Grade
Examines the origins, fates, and distribution of organic compounds in contemporary aquatic waters as well as in recent and ancient sediments.
Prerequisite: Introduction to Oceanography for undergraduates.

GLY 6297 Topics in Geochemistry 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Applications of geochemical (elemental and isotopic) methods and data to tectonics and petrology).
Prerequisite: GLY 5246.

GLY 6425 Tectonics 3 Credits
Grading Scheme: Letter Grade
Evolution and formation of mid-ocean ridges, seamounts, hot spots, island arcs, back-arc basins, passive margins, and mountain chains.
Prerequisite: GLY 4400C.
GLY 6519 Stratigraphy and Timescales 3 Credits
Grading Scheme: Letter Grade
Methods in stratigraphy including biostratigraphy, chemostratigraphy, manostatigraphy, and cyclostratigraphy and how these tools are integrated to generate geologic timescales in absolute time.
Prerequisite: consent of instructor, or undergraduate degree in geology.

GLY 6738 Estuarine Systems 3 Credits
Grading Scheme: Letter Grade
Examines estuarine ecosystems around the world, with particular emphasis on the impact of global change on these highly productive systems.
Prerequisite: For undergraduates OCE 1001

GLY 6826 Hydrogeologic Modeling 3 Credits
Grading Scheme: Letter Grade
Application of computer modeling to hydrogeologic problems through use of analytical and numerical solutions.

GLY 6862 Quantitative Methods in Earth Sciences 3 Credits
Grading Scheme: Letter Grade
Providing graduate students with a solid introduction to the quantitative methods that are increasingly utilized in the Earth sciences.
Prerequisite: College level Calculus and Physics, or permission of instructor.

GLY 6905 Individual Work 1-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
For work beyond that offered in regular courses.

GLY 6931 Seminar 1 Credit, Max 2 Credits
Grading Scheme: Letter Grade
Reading in special topics.

GLY 6932 Special Topics in Geology 1-3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Lectures, conferences, or laboratory sessions covering selected topics of current interest in modern geology.

GLY 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

GLY 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

GLY 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

GIS 6116 Geographic Information Systems Analysis 3 Credits
Grading Scheme: Letter Grade
Analytical tools such as software grid modules, database query, map algebra, and distance operators; analytical operations such as database query, derivative mapping, and process modeling; sources and nature of uncertainty and error, and project planning management.
Prerequisite: SUR 3393 and SUR 3393L

SUR 5365 Digital Mapping 3 Credits
Grading Scheme: Letter Grade
Methods of digital representation of maps, coordinate development, digitizing, stereocompilation, scanning, remote sensing, hardware and software systems, file conversion, integration into GIS systems, and attribute development.
Prerequisite: consent of instructor.

SUR 5385 Remote Sensing Applications 3 Credits
Grading Scheme: Letter Grade
Review of remote sensing systems, image classification methods, mapping applications, integration of remotely sensed data into GIS systems, application of data for variety of land information systems.
Prerequisite: consent of instructor.

SUR 5386 Image Processing for Remote Sensing 3 Credits
Grading Scheme: Letter Grade
Analyzing remote sensing imagery with natural resource applications: image formation and radiometric/atmospheric correction models; hyperspectral image formation; dimensionality reduction and classification; machine learning classification algorithms; and analysis of Light Detection and Ranging (LiDAR) data.

SUR 5525 Least Squares Adjustment Computations 3 Credits
Grading Scheme: Letter Grade
Implementation of least squares solutions for survey-mapping and GIS applications, time and storage optimization; error analysis; initial approximation generation; robust estimations; and computer programming.
Prerequisite: proficiency in computer language and consent of instructor.

SUR 6377 Geospatial Application of UASs 3 Credits
Grading Scheme: Letter Grade
Covers contemporary issues and common applications associated with small UASs (Unmanned Aerial Systems).
Prerequisite: SUR 6502C Foundations of UAS Mapping.

SUR 6395 Topics in Geographic Information Systems 3 Credits
Grading Scheme: Letter Grade
Database development, economic impact of GIS, development of standards, integration of data sets, hardware and software developments, and advances in GIS technology.
Prerequisite: consent of instructor.

SUR 6427 Land Tenure and Administration 3 Credits
Grading Scheme: Letter Grade
Prerequisite: graduate status.

SUR 6502C Foundations of UAS Mapping 3 Credits
Grading Scheme: Letter Grade
Covers the fundamental components of small unmanned aerial systems (UAS) and how they are used to produce high resolution, spatially accurate, planimetric maps and 3-D models of the terrain.

**Geomatics**

GIS 6103 GIS Programming and Customization 3 Credits
Grading Scheme: Letter Grade
Hands-on introduction to the capabilities of a Geographic Information System (GIS) to be expanded through programming.
Prerequisite: Familiarity with ArcGIS and some exposure to programming (specific language not required), to be determined by instructor (approval of instructor required). Course will be departmentally controlled.
SUR 6535 GPS-INS Integration 3 Credits  
**Grading Scheme:** Letter Grade  
Principles of inertial navigation and its integration with GPS; coordinate frames, modeling linear motion and rotational motion, mechanization of inertial navigation sensor measurements, space state representation of system errors and linear state equations.  
**Prerequisite:** Background in vector calculus and matrix algebra.

SUR 6905 Special Problems in Geomatics 1-6 Credits, Max 10 Credits  
**Grading Scheme:** Letter Grade  
Individual study of a selected topic in Geomatics as contracted with the instructor at the start of the term.

SUR 6934 Topics in Geomatics 1-4 Credits, Max 10 Credits  
**Grading Scheme:** Letter Grade  
Rotating Topic.

SUR 6940C Practicum in UAS Mapping 3 Credits  
**Grading Scheme:** Letter Grade  
Provides students hands-on experience with flight planning and safe deployment of small UASs (Unmanned Aerial Systems), and the subsequent processing of the imagery acquired on these flights.  
**Prerequisite:** SUR6502C Foundations of UAS Mapping.

**Greek Studies**

GRE 6425 Greek Prose Composition 3 Credits  
**Grading Scheme:** Letter Grade  
Construction of advanced sentences and complex prose in Classical Greek.  
**Prerequisite:** GRD 1131.

GRE 6755 Epigraphy 3 Credits, Max 6 Credits  
**Grading Scheme:** Letter Grade  
Reading and interpretation of selected inscriptions in Greek and/or Latin.  
**Prerequisite:** reading knowledge of ancient Greek and Latin at advanced level; basic reading knowledge of French and German.

GRK 6905 Individual Work in Modern Greek 3-5 Credits, Max 10 Credits  
**Grading Scheme:** S/U  
Directed independent study.  
**Prerequisite:** graduate standing or consent of instructor.

GRW 6105 The Greek Tradition 3 Credits  
**Grading Scheme:** Letter Grade  
Synoptic survey of Greek literature.

GRW 6216 Greek Novel 3 Credits, Max 6 Credits  
**Grading Scheme:** Letter Grade  
Selections from ancient Greek novels.

GRW 6316 Greek Tragedy 3 Credits  
**Grading Scheme:** Letter Grade  
Reading and analysis of Greek tragedies by Aeschylus, Sophocles, or Euripides, whose dramas form cornerstone of western theater. Text selection varies over 3-year cycle.  
**Prerequisite:** advanced reading ability in Greek.

GRW 6317 Ancient Greek Comedy 3 Credits  
**Grading Scheme:** Letter Grade  
Reading and study of ancient Greek comedy, with selected plays by Aristophanes and Menander.  
**Prerequisite:** advanced reading ability in Greek.

GRW 6345 Greek Lyric Poetry 3 Credits, Max 6 Credits  
**Grading Scheme:** Letter Grade  
Variety and peculiarities of lyric content, style, grammar, structure, dialect, and meter shown through selected poems.

GRW 6346 Pindar 3 Credits, Max 6 Credits  
**Grading Scheme:** Letter Grade  
Selected poems.

GRW 6347 Homer 3 Credits, Max 6 Credits  
**Grading Scheme:** Letter Grade  
Readings from Iliad and Odyssey.

GRW 6348 Non-Homeric Grk Epic 3 Credits  
**Grading Scheme:** Letter Grade  
Non-Homeric Grk Epic.

GRW 6386 Greek Historians 3 Credits, Max 6 Credits  
**Grading Scheme:** Letter Grade  
Readings and analysis of Herodotus, Thucydides, or other major Greek historians.  
**Prerequisite:** graduate status or consent of instructor.

GRW 6506 Plato 3 Credits, Max 6 Credits  
**Grading Scheme:** Letter Grade  
Reading of Symposium and selected books of the Republic.

GRW 6705 Attic Orators 3 Credits, Max 9 Credits  
**Grading Scheme:** Letter Grade  
Examines Attic oratory, focusing on rhetorical methods of persuasion; social dynamics of the disputing process; and political, social, and cultural impact of law on the Athenian democracy.  
**Prerequisite:** Graduate student status or consent of instructor.

GRW 6905 Individual Work 2-4 Credits, Max 10 Credits  
**Grading Scheme:** Letter Grade  
Readings and reports in Greek language and literature.  
**Prerequisite:** graduate standing or consent of instructor.

GRW 6930 Special Topics in Greek Literature 3 Credits, Max 6 Credits  
**Grading Scheme:** Letter Grade  
Intensive study of a particular author, genre, period, or subject.  
**Prerequisite:** graduate status or consent of instructor.

GRW 6931 Comparative Study of Greek and Latin Literature 3 Credits  
**Grading Scheme:** Letter Grade  
Study of genre types.

GRW 6971 Research for Master’s Thesis 1-15 Credits  
**Grading Scheme:** S/U  
Research for Master’s Thesis  
**Prerequisite:** reading knowledge of ancient Greek at an advanced level.

GRW 7979 Advanced Research 1-15 Credits  
**Grading Scheme:** S/U  
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

GRW 7980 Research for Doctoral Dissertation 1-15 Credits  
**Grading Scheme:** S/U  
Research for Doctoral Dissertation  
**Health Education and Behavior**

APK 6900 Directed Independent Study 1-5 Credits, Max 12 Credits  
**Grading Scheme:** Letter Grade  
Individual research projects under faculty guidance.

APK 6940 Advanced Practicum in Exercise and Sport Science 1-5 Credits, Max 5 Credits  
**Grading Scheme:** Letter Grade  
On-site practical experience in exercise and sport science.
HLP 6515 Evaluation Procedures in Health and Human Performance 3 Credits
Grading Scheme: Letter Grade
Evaluation and interpretation of tests and analysis of research data.

HLP 6535 Research Methods in Health and Human Performance 3 Credits
Grading Scheme: Letter Grade
Introduction to research methodology and design.

HLP 6911 Research Seminar 1 Credit
Grading Scheme: S/U
Research presentations by graduate students and faculty in the College.

HLP 6935 Variable International Topics 1-6 Credits, Max 15 Credits
Grading Scheme: Letter Grade
Opportunity to study in a wide range of cultural settings.
Prerequisite: adviser's approval.

HLP 7939 HHP PhD Professional Development Seminar 3 Credits
Grading Scheme: Letter Grade
Designed to complement the scholarly emphases of the HHP PhD program by providing insight into key considerations for professional development and personal growth. Best practices will be shared for developing professional aptitude and the skills necessary for successful matriculation through graduate studies and future professional careers.

HLP 7979 Advanced Research in Health and Human Performance 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field, or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

HLP 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

HSC 5135 Emotional Health Education 3 Credits
Grading Scheme: Letter Grade
Importance of emotional health in achieving optimal health. Health educator's role in program development, supportive listening, and referral strategies for counseling. Development of communication skills. Common emotional health problems and concerns. Not open to students who have completed HSC 3134.

HSC 5138 Human Sexuality 3 Credits
Grading Scheme: Letter Grade
Theory and practice, including psychosexual development, human reproduction, sexual relationships, dysfunction, therapy, legal and ethical issues, as well as teaching and facilitative techniques. Not open to students who have completed HSC 3133.

HSC 5142 Drug Education 3 Credits
Grading Scheme: Letter Grade
Social, behavioral, environmental, and historical perspectives on substance abuse; content, issues, and instructional strategies appropriate for health education regarding alcohol, tobacco, and other drugs in school and community settings. Not open to students who have completed HSC 3140.

HSC 5315C Teaching Health in Elementary Schools 3 Credits
Grading Scheme: Letter Grade
Examines needed health education areas, lesson and unit planning, methods and innovative approaches to health instruction, and evaluating comprehensive school health education.

HSC 5536C Medical Terminology for the Health Professions 3 Credits
Grading Scheme: Letter Grade
Literal and "actual" meanings of medical and scientific terms. Anatomy, physiology, diagnostic, clinical, therapeutic, and pathology pictures presented with compound medical terms. Writings and pronunciation exercises augment the visual format to provide an interactive working knowledge of medical language.

HSC 5576 Nutrition Education for Special Populations 3 Credits
Grading Scheme: Letter Grade
Assessing nutrition information needs for selected population groups. Planning, implementing, and evaluating nutrition education programs for school and community settings. Not open to students who have completed HSC 3574.

HSC 5606 Spirituality and Health 3 Credits
Grading Scheme: Letter Grade
Exploring current research and theory about the relationship of spirituality and health/disease.

HSC 5618 Advanced Exercise Therapy, Adapted Physical Activity, & Health 3 Credits
Grading Scheme: Letter Grade
Art and science of effectively teaching exercise therapy, adapted physical activities, and healthy living strategies. Medical and health characteristics of common disabilities and methods for prescribing appropriate exercise therapy programs are presented. Multiple adapted equipment ideas will be presented to facilitate teaching in inclusive settings for all ages. Clinical experiences with individuals with disabilities are provided.

HSC 5626 Minority Health Issues 3 Credits
Grading Scheme: Letter Grade
Current health problems confronting socioeconomically disadvantaged groups and ethnic minority groups.

HSC 5657 Health and End-of-Life Issues 3 Credits
Grading Scheme: Letter Grade
Cultural, spiritual, and psychological traditions that affect health decisions, behavior, and medical care. Emphasizes developing professional and personal skills for coping with end-of-life issues for oneself and for assisting others.

HSC 5925 Seminar in Health Education 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Seminar in Health Education

HSC 5956 Writing for Professional Publications 3 Credits
Grading Scheme: Letter Grade
Procedures and practices in scholarly writing for health-related professional publications including topic selection, literature searches, internet applications, documentation, manuscript preparation, reasons for rejection, and legal and ethical considerations.

HSC 6037 Philosophy and Principles of Health Education 3 Credits
Grading Scheme: Letter Grade
History, philosophy, and ethics; theories of health behavior and principles of learning; areas of professional specialization; roles and functions of professional health educators; certification and continuing education; trends.
HSC 6235 Patient Health Education 3 Credits
Grading Scheme: Letter Grade
Health education theory and principles applied to the primary health care setting. Overview of agents and processes of disease, emphasizing program development for teaching protocols for specific diseases. Recent developments in patient education (e.g., outpatient programs and wellness centers).

HSC 6318 Planning Health Education Programs 3 Credits
Grading Scheme: Letter Grade
Basic principles of health education for various community settings, and using communication media in joint planning for comprehensive health education.

HSC 6506 Epidemiology 3 Credits
Grading Scheme: Letter Grade
Procedures used in studying the origin, distribution, and control of chronic and communicable diseases. Emphasizes the role of health education interventions in disease control.

HSC 6567 Health Promotion and Programming in Gerontology 3 Credits
Grading Scheme: Letter Grade
Planning, implementing, and evaluating health maintenance and promotion programs for adult populations, emphasizing the aging process.

HSC 6571 Contemporary Issues in Health Promotion 3 Credits
Grading Scheme: Letter Grade
Emotional health, value systems, stress and depression, aging and death, drug abuse, physical fitness, weight control, consumer health, and chronic and communicable diseases.

HSC 6575 Women's Health Issues 3 Credits
Grading Scheme: Letter Grade
Relevance for health promotion, prevention, education, and counseling.

HSC 6595 HIV/AIDS Education 3 Credits
Grading Scheme: Letter Grade
Examine the medical, social, legal and educational implications of HIV/AIDS on individuals and society.

HSC 6603 Theories of Health Behavior and Practice in Health Education 3 Credits
Grading Scheme: Letter Grade
Selected health behavior theories and applying these theories to the practice of health education and health promotion.

HSC 6605 Scientific Foundations of Holistic Health 3 Credits
Grading Scheme: Letter Grade
Examining and interpreting the holistic principles that influence and modify the health potential of the individual and the community.

HSC 6625 Trends in International Health 3 Credits
Grading Scheme: Letter Grade
Disease patterns and prevalence, contributing factors, organizational and governmental initiatives, and model programs; emphasizes problems amenable to health education interventions. Not open to students who have completed HSC 4650.

HSC 6629 Health Promotion for Priority Populations 3 Credits
Grading Scheme: Letter Grade
Health issues confronting politically and socioeconomically disadvantage groups and ethnic minority groups.
Prerequisite: graduate standing.

HSC 6637 Social Marketing and Health 3 Credits
Grading Scheme: Letter Grade
Current theory and knowledge in field of social marketing. Analysis of components and applications of marketing within context of health behavior.

HSC 6646 Community Health Methods in Injury Prevention & Control 3 Credits
Grading Scheme: Letter Grade
Prerequisite: HSC 3032

HSC 6665 Health Communication 3 Credits
Grading Scheme: Letter Grade
Survey of theory and research relevant to the role of communication processes in health behavior, health care, and health promotion.

HSC 6695 Worksite Health Promotion 3 Credits
Grading Scheme: Letter Grade
Procedures involved in planning, implementing, and evaluating comprehensive health promotion programs; factors in risk assessment and reduction; strategies and resources for employee health education; ethical issues in client relations. Not open to students who have completed HSC 4694.

HSC 6712 Evaluating Health Education Programs 3 Credits
Grading Scheme: Letter Grade
Introduction to methods of health education research.

HSC 6735 Research Methods in Health Education 3 Credits
Grading Scheme: Letter Grade
Current theory and knowledge in field of social marketing. Analysis of components and applications of marketing within context of health behavior.

HSC 6850 Internship in Health Education 1-12 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Internship in Health Education

HSC 6904 Readings in Health Education 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Readings in Health Education

HSC 6905 Independent Study 1-3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Independent Study

HSC 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

HSC 6935 Current Topics in Health Education 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Current Topics in Health Education

HSC 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

HSC 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis
HSC 6973 Project in Lieu of Thesis 1-9 Credits
Grading Scheme: S/U
Planning, implementing, and evaluating a health education program intervention.

HSC 7904 Advanced Readings in Health Education 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Advanced Readings in Health Education

HSC 7905 Advanced Independent Study in Health Education 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Advanced Independent Study in Health Education

HSC 7937 Advanced Seminar in Health Education 1-3 Credits
Grading Scheme: Letter Grade
Advanced Seminar in Health Education

PET 5936 Special Topics/Seminars 1-3 Credits
Grading Scheme: Letter Grade
Special Topics/Seminars

PET 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

PET 6947 Graduate Internship in Exercise and Sport Sciences 3-9 Credits, Max 9 Credits
Grading Scheme: S/U
On-site full-time practical experience in field of study.
Prerequisite: completion of 2 terms of course work applicable to specialization; permission of adviser, written application, and site approval.

PET 6971 Research for Master’s Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master’s Thesis

History

AFH 5348 History of West Africa 3 Credits
Grading Scheme: Letter Grade
Ghana empire to the contemporary period.

AFH 5934 Topics in African History 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Topics in African History

AFH 6259 Seminar in Modern Africa 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
In-depth reading and discussion of aspects of modern African history. Seminar focuses on specific themes, such as ethnicity, colonialism, violence, warfare, gender, religion, and nationalism.

AFH 6805 Theo/Met African Hist 3 Credits
Grading Scheme: Letter Grade
Theories and methods that underlie the study of African history and change as the field has evolved over the last four or more decades. Attention to changing frameworks for viewing the African past, with a focus on the historians’ research methods and techniques.

AFH 6934 Africa 3 Credits
Grading Scheme: Letter Grade
Africa

AFH 6936 Readings in African History 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Readings in African History

AMH 5405 The South to 1860 3 Credits
Grading Scheme: Letter Grade
History of the South from the Civil War to present, emphasizing the South as an integral region and its relationship to the rest of the nation. Not open to students who have taken AMH 4403 or equivalent.
Prerequisite: consent of instructor.

AMH 5930 Topics in United States History 3 Credits, Max 15 Credits
Grading Scheme: Letter Grade
Topics in United States History

AMH 6198 Early American Society 3 Credits
Grading Scheme: Letter Grade
Readings seminar focusing on a selected topic or topics in American history through the War of 1812.

AMH 6199 Nineteenth Century America 3 Credits
Grading Scheme: Letter Grade
Readings seminar focusing on a topic or topics in nineteenth century American history.

AMH 6290 Modern America 3 Credits
Grading Scheme: Letter Grade
Readings seminar focusing on topics in American history in the twentieth century.

AMH 6406 Readings in Southern History, 1607-1865 3 Credits
Grading Scheme: Letter Grade
An analysis of the major scholarly works and interpretations dealing with the development of a bi-racial society in the American South.

AMH 6465 Seminar in U.S. Urban History 3 Credits
Grading Scheme: Letter Grade
Historical development of American cities and ways in which the urbanization process has reshaped social life.

AMH 6516 Seminar in American Foreign Relations and Expansion 3 Credits
Grading Scheme: Letter Grade
American foreign policy since 1945, the United States response to Third World nationalism, the changing historiographical debate over the nature of U.S. diplomacy, and other selected topics.

AMH 6557 Seminar in Constitutional or Legal History of the United States 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Chronological and thematic analysis of the evolution of American law, legal institutions, and constitutionalism from their English origins to present.

ASH 5388 Topics in East Asian History 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Topics in East Asian History

EUH 5195 The Archaeology of the Middle Ages 3 Credits
Grading Scheme: Letter Grade
Examining key issues in the theory and practice of medieval archaeology. Major themes include the relation between history and archaeology, nationalism in archaeology, urban centers, rural settlements, church and monastic archaeology, wetland archaeology, mortuary archaeology, crafts, social relations, power in the Middle Ages, gender, ethnicity, and state formation.

EUH 5934 Topics in European History 3 Credits, Max 15 Credits
Grading Scheme: Letter Grade
Topics in European History
EUH 6126 Readings in Medieval History 3 Credits
Grading Scheme: Letter Grade
Major themes; readings combine classic studies that shaped the field with current work exploring issues like gender, textuality and historical memory, and popular religion.

EUH 6177 Economy and Society in Late Antiquity and the Early Middle Ages 3 Credits
Grading Scheme: Letter Grade
Examines the processes by which land tenure, trade, and aristocratic demand interacted to become powerful forces in shaping political, social, and economic conditions of the transition from Antiquity to the Middle Ages (from Late Antiquity to the early Middle Ages).

EUH 6289 Readings, Modern Europe 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Major themes; readings combine classic studies that shaped the field with current works exploring a wide range of topics.

EUH 6469 Modern German History 3 Credits
Grading Scheme: Letter Grade
Interpretations of and approaches to German history, and introduction to advanced research in the area.

HIS 5485 Special Studies in the History of Science 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Special Studies in the History of Science

HIS 5451 Problems in Comparative Legal History 3 Credits
Grading Scheme: Letter Grade
Seminar begins with the question of what comparative legal history is and considers a series of case studies to explore approaches to comparative legal history.

HIS 6445 Postcolonial Theories 3 Credits
Grading Scheme: Letter Grade

HIS 6446 Readings in the History of Science 1-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Inquiry into the development of western scientific thought and institutions. Specific historical topics having intellectual coherence and substantial historiography.

HIS 6905 Individual Study 1-3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Individual Study

HIS 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

HIS 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

HIS 6943 Internship in Historical Applications 2-4 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Internship in Historical Applications

HIS 6957 Nonthesis Project in History 1-3 Credits, Max 9 Credits
Grading Scheme: S/U
Nonthesis research.

HIS 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

HIS 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

HIS 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

LAH 5438 Modern Mexico 3 Credits
Grading Scheme: Letter Grade
Topics in Mexican history from independence in 1821 to the present. Emphasizes the Diaz dictatorship and the Mexican Revolution. Not open to students who have taken LAH 4433 or equivalent.

LAH 5476 Caribbean History to 1800: Slavery, Colonization, and International Conflict 3 Credits
Grading Scheme: Letter Grade
Social, economic, and political history of the West Indies and the Circumcaribbean region to around 1800. Emphasizes slave societies. Not open to students who have taken LAH 4471.

LAH 5527 Andean Nations 3 Credits
Grading Scheme: Letter Grade
Anthropological and political history of the postcolonial Andean region, including the republics of Venezuela, Colombia, Ecuador, Peru, and Bolivia.

LAH 5607 History of Amazonia 3 Credits
Grading Scheme: Letter Grade
Introduction to the history of the Amazon region. Places the region in the wider context of Latin American history and Atlantic history from the pre-colonial era to the 1980s.

LAH 5637 Brazil Since 1750 3 Credits
Grading Scheme: Letter Grade
History of Brazil from the Portuguese era of reform to the military regime of 1964-85.

Prerequisite: consent of instructor.
Horticultural Sciences

ALS 5932 Special Topics 1-4 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Special Topics

HOS 5085C Principles of Postharvest Horticulture 3 Credits
Grading Scheme: Letter Grade
Biological principles involved in harvesting, grading, packaging, transportation, and marketing horticultural crops, and their effects on quality maintenance. Offered even-numbered years in fall.
Prerequisite: BOT 3503 or equivalent.

HOS 5242 Genetics & Breeding of Vegetable Crops 3 Credits
Grading Scheme: Letter Grade
Traditional and molecular breeding methods for vegetable crops and the influence of scientific research, government policies, and consumer preferences on vegetable crop improvement.
Prerequisite: AGR 3303 or equivalent.

HOS 5306 Molecular Biology of Plant Hormones 3 Credits
Grading Scheme: Letter Grade
Biochemistry, molecular biology, and physiology of plant hormones that control plant growth and development. Offered even-numbered years in fall.
Prerequisite: BCH 6415 and HOS 4304 or equivalent.

HOS 5330 Postharvest Technologies for Horticultural Crops 2 Credits
Grading Scheme: Letter Grade
Intensive study of current technologies and procedures for harvesting and handling fresh fruit, vegetable, and ornamental crops grown in Florida. Requires field trip during spring break. Offered in spring.
Prerequisite: HOS 5085C suggested. Open to graduate students and to upper-division undergraduate students with consent of instructor.

HOS 5555 Tropical Fruit Production and Research in Florida 3 Credits
Grading Scheme: Letter Grade
A comprehensive study at the Tropical Research and Education Center at Homestead and field locations in South Florida. (Students will be in residence for 4 weeks at the Center.) Offered even-numbered years in summer.

HOS 5711 Phytochemicals in Food & Health 3 Credits
Grading Scheme: Letter Grade
This course examines phytochemicals in fruits and vegetables including their distribution, roles in human health promotion, biosynthesis and degradation, enzymes, genes and case studies of crop breeding and engineering.
Prerequisite: BCH 4024 or equivalent or consent of instructor.

HOS 6201 Breeding Perennial Cultivars 3 Credits
Grading Scheme: Letter Grade
Methods of breeding perennial fruit and ornamental cultivars using mutations, cell and tissue culture, polyploidy, recurrent selection, and wide hybridization. Conservation and domestication of wild plants. Offered odd-numbered years in fall.
Prerequisite: AGR 3303.

HOS 6236 Molecular Marker Assisted Plant Breeding 3 Credits
Grading Scheme: Letter Grade
Providing an overview of terminology, methodology, and applied examples of utilizing molecular markers in a plant breeding program.

HOS 6242 Genetics & Breeding of Vegetable Crops 3 Credits
Grading Scheme: Letter Grade
Physiological, biochemical, and molecular aspects of senescence and ripening of harvested fruit, vegetative, and floral organs with attention to the storage and quality maintenance of harvested plant organs.
Prerequisite: BOT 3503 and BOT 5505C or equivalents.

HOS 6311 Advanced Citriculture I 3 Credits
Grading Scheme: Letter Grade
Regulation of citrus vegetative growth including climactic, physiological, and cultural factors. Offered odd-numbered years in the fall at Lake Alfred CREC.
Prerequisite: FRC 3212 and 4223 or equivalent.

HOS 6365 Advanced Citriculture II 3 Credits
Grading Scheme: Letter Grade
Factors regulating flowering, fruit development and alternate bearing of citrus. Offered even-numbered years in spring at Lake Alfred CREC.
Prerequisite: FRC 3212 and 4223 or equivalent.

HOS 6905 Problems in Horticultural Science 1-4 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Independent study.
HOS 6910 Supervised Research 1-5 Credits, Max 5 Credits  
Grading Scheme: S/U  
Supervised Research

HOS 6931 Horticultural Science Seminar 1 Credit, Max 3 Credits  
Grading Scheme: S/U  
Oral presentation of material in one of the following areas: literature review, related to student’s research; research results; or published paper, of relevance to horticulture. Subject matter determined by instructor. Offered in spring.

HOS 6932 Special Topics 1-4 Credits, Max 8 Credits  
Grading Scheme: Letter Grade  
Study of contemporary research in horticultural science.

HOS 6934 Professional Seminar Preparation 1 Credit  
Grading Scheme: Letter Grade  
Preparation and oral presentation of proposal and research seminars emphasizing presentation design and mechanics.

HOS 6940 Supervised Teaching 1-5 Credits, Max 5 Credits  
Grading Scheme: Letter Grade  
Supervised Teaching

HOS 6941 Practicum in Horticultural Science 2-4 Credits, Max 8 Credits  
Grading Scheme: Letter Grade  
Supervised and individual work in professional areas of horticulture. Prerequisite: admission is limited to graduate students majoring in horticultural science.

HOS 6971 Research for Master’s Thesis 1-15 Credits  
Grading Scheme: S/U  
Research for Master’s Thesis

HOS 7979 Advanced Research 1-12 Credits  
Grading Scheme: S/U  
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

HOS 7980 Research for Doctoral Dissertation 1-15 Credits  
Grading Scheme: S/U  
Research for Doctoral Dissertation

PCB 5065 Advanced Genetics 4 Credits  
Grading Scheme: Letter Grade  
Examines genetic principles including gene and gene function; recombination and linkage; molecular markers, multipoint linkage analysis, and positional cloning; and quantitative, population, developmental, and non-Medalian genetics. Offered in fall term. Prerequisite: AGR 3303 or PCB 3063 and BCH 4024 or BCH 5045. For graduate students in any life science discipline.

PCB 5530 Plant Molecular Biology and Genomics 3 Credits  
Grading Scheme: Letter Grade  
Integrated overview of the fundamental mechanisms enabling plant growth, development, and function, and approaches to study these at molecular level. Topics include replication, repair, transcription, translation, cell cycle, transformation, gene tagging, structural genomics, proteomics, and metabolomics. Offered in fall term. Prerequisite: undergraduate molecular biology or biochemistry.

PCB 5528 Plant Cell and Developmental Biology 3 Credits  
Grading Scheme: Letter Grade  
Cellular and developmental biology of plants. Lecture format with frequent discussion of recent papers. Topics include signal transduction, organelles, protein trafficking, and developmental mechanisms. Offered in spring term. Prerequisite: PCB 5530 and PCB 5065 or equivalent.

PCB 6910 Supervised Research 1-5 Credits, Max 5 Credits  
Grading Scheme: S/U  
Supervised Research

PCB 6937 Special Topics in Plant Molecular and Cellular Biology 1-4 Credits, Max 8 Credits  
Grading Scheme: Letter Grade  
Contemporary research. Prerequisite: graduate course work in genetics, biochemistry, or molecular biology areas.

PCB 6971 Research for Master’s Thesis 1-15 Credits  
Grading Scheme: S/U  
Research for Master’s Thesis

PCB 7922 Journal Colloquy in Plant Molecular and Cellular Biology 1 Credit, Max 8 Credits  
Grading Scheme: Letter Grade  
Critical discussion and presentation of recent journal articles in the area of plant molecular and cellular biology. Prerequisite: Required for PCMB majors.

PCB 7979 Advanced Research 1-12 Credits  
Grading Scheme: S/U  
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PCB 7980 Research for Doctoral Dissertation 1-15 Credits  
Grading Scheme: S/U  
Research for Doctoral Dissertation

WDS 6005 Weed Management for Organic and Sustainable Cropping Systems 3 Credits  
Grading Scheme: S/U  
Ecological principles can be applied in agroecosystems to manage weeds sustainably. Alternative weed management approaches that are less dependent on herbicides and utilize ecological processes detrimental to weeds and their propagules will be emphasized. Students will learn actively by critically analyzing pertinent literature and participating in discussions of supplemental reading. Prerequisite: HOS 3020C or ALS 3153.

Industrial and Systems Engineering

EGN 5949 Practicum/Internship/Cooperative Work Experience 1-6 Credits, Max 6 Credits  
Grading Scheme: S/U  
Practical cooperative engineering work under approved industrial and faculty supervision. Prerequisite: graduate student.

EGN 6640 Entrepreneurship for Engineers 3 Credits  
Grading Scheme: Letter Grade  
Introduction to entrepreneurship, idea generating and feasibility analysis, and business planning. Lectures, case studies, student-led discussions, team business plans, and investor presentations.
EGN 6913 Engineering Graduate Research 0-3 Credits
Grading Scheme: S/U
Course will provide the student with supervised research in a laboratory setting.

EIN 5249 Human Factors in System Design 3 Credits
Grading Scheme: Letter Grade
This course will provide an understanding of concepts and methods in human factors and applications to human-machine system design. We will consider the system design implications of human cognitive and physical capabilities and limitations in perception, memory, decision-making and motor-control.

EIN 6176 Advanced Quality Management and Engineering for Business Processes 3 Credits
Grading Scheme: Letter Grade
Philosophy of continuous improvement and methodology for applying team problem solving to manufacturing and service industries. Hands-on application of basic statistical quality tools; introduction to quality function deployment; concurrent engineering; business process reengineering; process analysis; benchmarking. Team project.
Prerequisite: introductory statistics or consent of instructor.

EIN 6212 Loss Assessment and Control 3 Credits
Grading Scheme: Letter Grade
This course will provide advanced coverage of risk assessment and management methods in the context of systems safety engineering. It will cover different types of hazard exposure, (chemical, fire, radiation, asbestos, lead, hazardous waste). Risk measurement and mitigation strategies will be identified for each hazard along with emergency response operations.
Prerequisite: EIN6216 System Safety Engineering (C)

EIN 6216 Occupational Safety Engineering 3 Credits
Grading Scheme: Letter Grade
Topics covered include safety history and litigation, accident causation, safety organizations and agencies, approaches to occupational safety and risk management, product defects and safety program development; product liability; consumer product safety commission, hazard communication standard, workers’ compensation, OSHA safety standards and codes and OSHA record keeping, common occupational hazards.
Prerequisite: Basic probability and Electricity at the undergraduate level.

EIN 6336 Advanced Production and Inventory Control 3 Credits
Grading Scheme: Letter Grade
Production planning and control; problem identification and formulation. Mathematical theory of single- and multicommodity inventory systems; problem solving using dynamic programming and Markov chains.
Prerequisite: ESI 6314 & ESI 6325

EIN 6357 Advanced Engineering Economy 3 Credits
Grading Scheme: Letter Grade
Prerequisite: STA 4321.

EIN 6422 Manufacturing Management 3 Credits
Grading Scheme: Letter Grade
Variety and importance of management decisions. Total quality management, just-in time manufacturing, concurrent engineering, material requirements planning, production scheduling, and inventory control.
Prerequisite: ESI 6314 and undergraduate probability and statistics.

EIN 6510 Principles of Manufacturing Systems Engineering 3 Credits
Grading Scheme: Letter Grade
Introduction to modern manufacturing systems. Components of product and process design, computer-integrated manufacturing and automation. Current areas of development and research.
Prerequisite: calculus through differential equations.

EIN 6905 Special Problems 1-6 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Laboratory, lecture, field work, or conferences.

EIN 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

EIN 6918 Graduate Seminar 1 Credit, Max 15 Credits
Grading Scheme: S/U
Graduate Seminar

EIN 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

EIN 6971 Research for Master’s Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master’s Thesis

EIN 7933 Special Problems 1-6 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Laboratory, lecture, field work, or conferences.

EIN 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

EIN 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

ESI 5236 Reliability Engineering 3 Credits
Grading Scheme: Letter Grade
Mathematical models and methods of reliability engineering. Typical component failure distributions; system reliability as a function of component reliability. Reliability block diagrams and fault trees.
Prerequisite: ESI 4567C, STA 4322.

ESI 6216 System Safety Engineering 3 Credits
Grading Scheme: Letter Grade
This course will focus on identification and recognition of potential safety hazards as well as the concept of risk assessment. Various systems safety methodologies will be explored together with applications to hazard analysis and control. Industrial case studies will be referenced to illustrate the usefulness of system safety techniques.
Prerequisite: EIN 6216, or instructor approval for undergraduate students.

ESI 6314 Deterministic Methods in Operations Research 4 Credits
Grading Scheme: Letter Grade
Introduction to basic models and their solution with modern computer packages. Emphasis on modeling, computer solution, and sensitivity analysis with minimal reference to model theory and development of algorithmic methods.
Prerequisite: calculus through differential equations, knowledge of linear algebra, and experience using mainframes or PCs.
ESI 6323 Models for Supply Chain Management 3 Credits
Grading Scheme: Letter Grade
Essential elements including controlling and coordinating activities such as order processing, purchasing, material storage and handling, production scheduling, packaging, transportation, and setting customer service standards.
Prerequisite: prior course work in linear programming, probability, and stochastic processes.

ESI 6325 Applied Probability Methods in Engineering 3 Credits
Grading Scheme: Letter Grade
Applied probability theory and statistics, reliability engineering, quality control, robust design, forecasting, Markov processes, and queuing theory.
Prerequisite: calculus, differential equations, undergraduate probability, and statistics.

ESI 6341 Intro to Stochastic Optimization 3 Credits
Grading Scheme: Letter Grade
Introduction to Stochastic Optimization is intended as a first introductory course for graduate students in such fields as engineering, operations research, statistics, mathematics, and business administration (in particular, finance or management science). 3 credits.
Prerequisite: Basic knowledge of calculus, statistics and linear programming.

ESI 6346 Decision Making under Uncertainty 3 Credits
Grading Scheme: Letter Grade
Introduction to the use of quantitative models for decision-making in environments where uncertainty is present. Focuses on fundamentals of probability simulation, Markov chains, queuing analysis, decision trees and dynamic programming.
Prerequisite: ESI6314 Deterministic Methods for Operations Research, and Students should have had a course in probability/statistics at the undergraduate level.

ESI 6352 Financial Optimization Case Studies 3 Credits
Grading Scheme: Letter Grade
Prerequisite: There are no formal prerequisites for the course. The course requires knowledge of basic statistical concepts (probability distributions, linear regression). Familiarity with optimization (linear programming). Familiarity with high level programming languages, which can be used for data analysis (e.g., with MATLAB or R).

ESI 6355 Decision Support Systems for Industrial and Systems Engineers 4 Credits
Grading Scheme: Letter Grade
Applications of decision support systems: developing and implementing systems arising in industrial and systems engineering using popular database management and spreadsheet software.
Prerequisite: programming course in C++ or Java and operations research.

ESI 6417 Linear Programming and Network Optimization 3 Credits
Grading Scheme: Letter Grade
Prerequisite: matrix theory.

ESI 6418 Linear Programming Extensions and Applications 3 Credits
Grading Scheme: Letter Grade
Extension of linear programming to large scale linear and nonlinear problems. Integer programming methods. Applications of the methodology to real world models.
Prerequisite: ESI 6417, ESI 6429.

ESI 6420 Fundamentals of Mathematical Programming 3 Credits
Grading Scheme: Letter Grade
Introducing mathematical programming with an emphasis on classical optimization concepts, models and solution techniques. Focus on convex analysis (convex sets, separation theorems, convex functions), optimality conditions (Fritz-John Karush-Kuhn-Tucker), Lagrangian duality and iterative solution methods for gradient, conjugate gradients barrier methods.
Prerequisite: Mathematical background, ability to prove mathematical statements and ability to write simple codes with Matlab or C.

ESI 6429 Introduction to Nonlinear Optimization 3 Credits
Grading Scheme: Letter Grade
Nonlinear optimization models, convex sets and functions, optimality conditions, nonlinear algorithms, dynamic programming methods.
Prerequisite: ESI 6417 and multivariable calculus.

ESI 6448 Discrete Optimization Theory 3 Credits
Grading Scheme: Letter Grade
Modeling with integer variables; enumeration and cutting plane methods; decomposition algorithms; branch and bound methods; computational complexity and software issues; special combinatorial optimization problems; parallel algorithms for integer programming.
Prerequisite: linear programming and nonlinear optimization or equivalent.

ESI 6449 Integer Programming 3 Credits
Grading Scheme: Letter Grade
Advanced topics in the theory, algorithms and applications of integer programming. Focus on polyhedral approaches (cutting planes, integer polyhedra, primal algorithms), theory of lattices and algebraic geometry approaches (Gobner bases, generating functions, sos relaxations).
Prerequisite: ESI 6417 and ESI 6448

ESI 6492 Global Optimization 3 Credits
Grading Scheme: Letter Grade
Prerequisite: linear and nonlinear programming.

ESI 6529 Digital Simulation Techniques 3 Credits
Grading Scheme: Letter Grade
Computer programming aspects of digital simulation. Deterministic simulation; stochastic simulation. Use of simulation languages.
Prerequisite: computer programming and probability theory.

ESI 6533 Advanced Simulation Design and Analysis 3 Credits
Grading Scheme: Letter Grade
Fundamental concepts and techniques for stochastic simulation and applications in communications, transportation and manufacturing systems, and financial engineering. Discrete-event systems and Monte Carlo evaluation.
Prerequisite: ESI 6546, and a graduate-level course in statistical inference.
Information Systems

ISM 5021 Information Systems in Organizations 3 Credits
Grading Scheme: Letter Grade
Introduction for graduate students with minimal microcomputer operation skills. Topics include the range of computer information technology available, language types and procedural languages, applications in organizations, management of resources, and trends. Students use microcomputers in the College's computing laboratories.
Prerequisite: consent of instructor. Designed for MBA students.

ISM 6022 Management Information Systems 2 Credits
Grading Scheme: Letter Grade
Policy and management issues surrounding information systems in today's enterprises. Strategic use, organizational impact, project management, human resource issues, and other topics important to understanding information systems in business.
Prerequisite: ISM 5021

ISM 6123 Systems Analysis and Design 3 Credits
Grading Scheme: Letter Grade
Examines the various activities performed when developing a new information system or upgrading an existing system.

ISM 6128 Advanced Business Systems Design and Development I 2 Credits
Grading Scheme: Letter Grade
Object-oriented analysis and model specification for business software systems. Articulation of key requirements (data, processes, physical components, deployment) using logical modeling methodologies.
Prerequisite: ISM 6123, ISM 6222, and ISM 6553.

ISM 6129 Advanced Business Systems Design and Development II 2 Credits
Grading Scheme: Letter Grade
Continuation of ISM 6128. Focuses on object-oriented design of systems. How to translate business requirements into specific task and component requirements.
Prerequisite: ISM 6128, admission to the Master of Accounting program, or consent of instructor.

ISM 6215 Business Database Systems I 2 Credits
Grading Scheme: Letter Grade
Foundations for developing and evaluating architectures for systems of databases in meeting business information needs.
Prerequisite: ISM 6215.

ISM 6216 Business Database Systems II 2 Credits
Grading Scheme: Letter Grade
Continuation of ISM 6215. Focuses on implementation and programming issues.
Prerequisite: ISM 6215.

ISM 6217 Database Management Systems 3 Credits
Grading Scheme: Letter Grade
Designing and developing databases. Understanding the role of databases in meeting business information needs.
Prerequisite: ISM 6217.

ISM 6222 Business Telecom Strategy and Applications I 2 Credits
Grading Scheme: Letter Grade
Telecommunications analysis and design. Both tactical and strategic issues concerning integration.
Prerequisite: ISM 6222 or consent of instructor.

ISM 6224 Business Telecom Strategy and Applications II 2 Credits
Grading Scheme: Letter Grade
Introduction and overview of the field of business communications. Understanding telecommunications components and terminology applied to business in this age of electronic communication.

ISM 6236 Business Objects I 2 Credits
Grading Scheme: Letter Grade
Overview of main tools for business objects in enterprise programming, with hands-on experience. Distributed object models, component architectures, design methodologies and patterns, languages and development environments, and databases and repositories.
Prerequisite: ISM 6215, ISM 6222, and ISM 6258.
ISM 6239 Business Objects II 2 Credits
Grading Scheme: Letter Grade
Extends concepts and tools of ISM 6236 to include practical aspects of using business objects in enterprise systems. Focus on overview of ERP systems, proxies, proxy repositories, and wrapping legacy systems with objects.
Prerequisite: ISM 6236.

ISM 6251 Programming for Business Analytics 2 Credits
Grading Scheme: Letter Grade
Programming as a tool to create business analytics applications. Covers object-oriented concepts for systems development and language specific libraries to develop business analytics applications.
Prerequisite: ISM 6257

ISM 6257 Intermediate Business Programming 2 Credits
Grading Scheme: Letter Grade
Application in business systems. Classes, inheritance, polymorphism, interfaces, error handling, multi-threading, database connectivity, and their use in business information systems.
Prerequisite: ISM 6129

ISM 6258 Advanced Business Programming 2 Credits
Grading Scheme: Letter Grade
Event-driven, component-based programming. GUI components, and client end system design and implementation in distributed systems, as well as database development, networking, security, and object-oriented concepts.
Prerequisite: ISM 6257.

ISM 6259 Business Programming 2 Credits
Grading Scheme: Letter Grade
An advanced system-implementation course to teach client end system design and implementation. Topics include object-oriented systems development, databases, networking, security, and web application development.
Prerequisite: ISM 6258.

ISM 6405 Business Intelligence 2 Credits
Grading Scheme: Letter Grade
Mastering emerging business intelligence technologies such as data warehousing, online analytic processing (OLAP), data mining and text mining in generating valuable control and decision-support business intelligence for many organizations in adjusting to their competitive business environment.
Prerequisite: ISM 6215 or QMB 6358.

ISM 6423 Data Analysis for Decision Support 2 Credits
Grading Scheme: Letter Grade
Overview of various solution methods for data analysis programs such as clustering, classification, and regression that occur in business decision making. How methods support decision making.
Prerequisite: ISM 6405

ISM 6485 Electronic Commerce and Logistics 2 Credits
Grading Scheme: Letter Grade
Underlying technologies that herald innovations. How to capitalize on new electronic commerce and logistics in business.

ISM 6486 eCommerce Technologies 2 Credits
Grading Scheme: Letter Grade
Database management systems, systems design and Web-page design, human computer interface issues, artificial intelligence methods (such as data mining and expert systems), and intelligent software agents.

ISM 6487 Risks and Controls in eCommerce 2 Credits
Grading Scheme: Letter Grade
Strategic IT planning, policies and control; risk assessment, reliability, benchmarking and monitoring; privacy and security models and technologies; availability, continuity and compliance testing; and threat monitoring.

ISM 6562 Business Data Presentation and Visualization 2 Credits
Grading Scheme: Letter Grade
Business Data Presentation and Visualization
Prerequisite: ISM 6215

ISM 6942 Electronic Commerce Practicum 2 Credits
Grading Scheme: Letter Grade
Projects such as developing e-commerce business plans, constructing e-commerce sites, etc.

ISM 7166 Advanced Business Systems Design and Development III 2 Credits
Grading Scheme: Letter Grade
Continuation of ISM 6129. Focus on software project management and development. Exploration of object-oriented project management approach supported by computer-aided software engineering tool.
Prerequisite: ISM 6129.

MAN 5501 Management 3 Credits
Grading Scheme: Letter Grade
Introduction to the general class of problems associated with managing production facilities.
Prerequisite: QMB 5305. Designed for MBA students.

MAN 5502 Production and Operations Management 2 Credits
Grading Scheme: Letter Grade
Introduction to POM, which focuses on design and control of productive systems within organizations.
Prerequisite: QMB 5305. Core course designed for traditional MBA students.

MAN 6508 Management of Service Operations 2 Credits
Grading Scheme: Letter Grade
Case studies and problems, including systems design, operation, and control. Emphasizes waiting-line systems.

MAN 6511 Production Management Problems 2 Credits
Grading Scheme: Letter Grade

MAN 6528 Principles of Logistics/Transportation Systems 2 Credits
Grading Scheme: Letter Grade
Logistics management in current business environment.
Prerequisite: QMB 6755.

MAN 6573 Purchasing and Materials Management 2 Credits
Grading Scheme: Letter Grade
Industrial/institutional purchasing cycle for operating supplies, raw materials, components, and capital equipment in the context of materials management organizational concepts. Basic principles, policies, and procedures for requirement determination; procurement decision process; purchasing function; and materials management concept, organization, and philosophy.
MAN 6575 Purchasing and Supplier Relationship Management 3 Credits
Grading Scheme: Letter Grade
Basic concepts and tools for purchasing and supply-chain management. Procurement cycle, information flow, supplier selection, and internet procurement.

MAN 6581 Project Management 2 Credits
Grading Scheme: Letter Grade

MAN 6586 Project Management 3 Credits
Grading Scheme: Letter Grade
Principles, techniques, and methods used for effective project management.

MAN 6598 Logistics and Distribution Management 3 Credits
Grading Scheme: Letter Grade
Activities that make products available to consumers at convenient locations, in the required quantities, and at minimum cost to the company.

MAN 6599 Tactical Logistics Planning 3 Credits
Grading Scheme: Letter Grade
Distribution value chain planning, tactical logistics decisions in vehicle routing, inventory management, and value chain contracts.

MAN 6617 International Operations/Logistics 2 Credits
Grading Scheme: Letter Grade
Global delivery/distribution channels, coordinating production/delivery operations in international markets, optimizing use of transportation networks, and designing information/communications systems that span supply chain.

MAN 6619 International Logistics 3 Credits
Grading Scheme: Letter Grade
Strategic issues in managing international supply chains, managing the exchange rate, and the operating risks in global supply chains.

QMB 5303 Managerial Statistics 3 Credits
Grading Scheme: Letter Grade
Basic concepts and methods of probability and statistics, stressing applications in analyzing and solving business problems.
Prerequisite: Basic statistics, calculus. Designed for M.B.A. students.

QMB 5304 Introduction to Managerial Statistics 2 Credits
Grading Scheme: Letter Grade
Basics of modeling and analyzing problems that involve business decision making under uncertainty. Techniques for organizing and formulating decision problems. Probability theory and some basic statistical concepts and procedures.

QMB 5305 Advanced Managerial Statistics 2 Credits
Grading Scheme: Letter Grade
Builds on QMB 5304. Basic concepts in collection, analysis, and interpretation of data, emphasizing the capabilities of different statistical methods and business applications. Focuses on how business decisions can be informed by statistical analysis and how to apply computer software tools to business decisions.
Prerequisite: Designed for M.B.A. students.

QMB 6358 Statistical Analysis for Managerial Decisions I 2 Credits
Grading Scheme: Letter Grade
Data-application techniques for managerial problems; difficulties that can arise in applying the techniques and interpreting results. Experience using computerized procedures; may require substantial amount of case analysis.

QMB 6359 Statistical Analysis for Managerial Decisions II 2 Credits
Grading Scheme: Letter Grade
Data application techniques with emphasis placed on relationships that occur over time. Substantial amount of case analysis, as well as applications programming using industry standard software products.
Prerequisite: QMB 6358 or consent of instructor.

QMB 6607 Decision Processes Under Uncertainty I 2 Credits
Grading Scheme: Letter Grade
Introduction to statistical decision theory, including the vonNeuman-Morgenstern behavioral axioms, forms, techniques for assessing probabilities, and penalty functions, with managerial and economic applications.
Prerequisite: consent of instructor.

QMB 6616 Business Process Analysis 3 Credits
Grading Scheme: Letter Grade
Critical business analytical approaches, including linear programming, project scheduling, waiting-line theory, and time-series analysis.

QMB 6693 Quality Management and Control Systems 2 Credits
Grading Scheme: Letter Grade
Philosophy of total quality management and technical aspects of quality design and measurement systems.
Prerequisite: QMB 5305 or equivalent or consent of instructor.

QMB 6697 Optimization in Simulation Modeling I 2 Credits
Grading Scheme: Letter Grade
Use of simulation techniques in managerial decision problems, including random number generation and search procedures for determining optimal policies.
Prerequisite: consent of instructor.

QMB 6755 Managerial Quantitative Analysis I 2 Credits
Grading Scheme: Letter Grade
Survey of deterministic models for managerial decision making. Emphasizes mathematical programming.

QMB 6756 Managerial Quantitative Analysis II 2 Credits
Grading Scheme: Letter Grade
Using deterministic and stochastic models for decision making. Integer and nonlinear programming, goal programming, multiple-objective linear programming, and decision theory. Applied problem solving and case studies, using appropriate software.
Prerequisite: QMB 6755.

QMB 6845 Supply Chain Analytics: Gaming the Supply Chain 2 Credits
Grading Scheme: Letter Grade
Effective supply chain coordination using analytical tools. The course uses a simulation/gaming format. After a brief description of the analytical tools relevant to a topic, students will be required to use these tools in simulations/games.
Prerequisite: QMB 6755.

QMB 6905 Individual Work in Information Systems and Operations Management 1-5 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Reading and/or research.
Prerequisite: consent of department.

QMB 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research
**QMB 6930 Special Topics in Information Systems and Operations Management** 1-4 Credits, Max 16 Credits  
**Grading Scheme:** Letter Grade  
Variable content. In-depth study of topics not offered in other courses or topics of special current significance.

**QMB 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**  
**Grading Scheme:** S/U  
Supervised Teaching

**QMB 6941 Internship 1-4 Credits, Max 6 Credits**  
**Grading Scheme:** S/U  
Career-related experience that is not attainable in a classroom situation. Participation in such an internship will give employers an opportunity to identify earlier those students they may wish to employ upon graduation.

**QMB 6957 International Studies in Quantitative Methods 1-4 Credits, Max 12 Credits**  
**Grading Scheme:** S/U  
International Studies in Quantitative Methods  
**Prerequisite:** admission to an approved study abroad program and permission of department.

**QMB 6971 Research for Master's Thesis 1-15 Credits**  
**Grading Scheme:** S/U  
Research for Master's Thesis

**QMB 7565 Stat Research Methods 3 Credits**  
**Grading Scheme:** Letter Grade  
Stat Research Methods

**QMB 7931 Special Topics in Information Systems and Operations Management 1-4 Credits, Max 9 Credits**  
**Grading Scheme:** Letter Grade  
Recent literature and state-of-the-art theory and methods in both the decision and the information sciences.  
**Prerequisite:** consent of instructor.

**QMB 7933 Seminar in Information Systems and Operations Management 1-4 Credits, Max 9 Credits**  
**Grading Scheme:** Letter Grade  
Historical foundations and evolutionary development of concepts in decision and information sciences, emerging problems and future trends.  
**Prerequisite:** consent of instructor.

**QMB 7979 Advanced Research 1-12 Credits**  
**Grading Scheme:** S/U  
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

**QMB 7980 Research for Doctoral Dissertation 1-15 Credits**  
**Grading Scheme:** S/U  
Research for Doctoral Dissertation

**Interior Design**

**IND 5106 History of Interior Design I 3 Credits**  
**Grading Scheme:** Letter Grade  
Design philosophy and interior elements in an architectural and sociological context. Record of human achievements expressed in the built environment. Foundation for contemporary design and interior presentation practice. Slides, lecture, and discussion.  
**Prerequisite:** consent of graduate coordinator.

**IND 5136 History of Interior Design II 3 Credits**  
**Grading Scheme:** Letter Grade  
**Prerequisite:** IND 5106 or equivalent.

**IND 5212C Architectural Interiors I 5 Credits**  
**Grading Scheme:** Letter Grade  
Developing interior spaces from conceptual phases to final design resolution, based on the needs of people, interior considerations, and exterior influences. Emphasizes three-dimensional design development, process, and detailed graphic representation of designed spaces.  
**Prerequisite:** consent of graduate coordinator.  
**Corequisite:** IND 5427C and IND 5638.

**IND 5227C Advanced Architectural Interiors I 6 Credits**  
**Grading Scheme:** Letter Grade  
Advanced problems with respect to sophisticated clients in urban settings. Ranges from the infrastructure of large urban spaces to the details of individual spaces, including corporate office planning and design of both public and private spaces.  
**Prerequisite:** consent of instructor or graduate coordinator.  
**Corequisite:** IND 5454C.

**IND 5231C Architectural Interiors II 5 Credits**  
**Grading Scheme:** Letter Grade  
The conceptual design process, design theory, and programmatic concerns included in residential, commercial, and institutional interior design. Emphasizes professional applications and the interior designer as team player, programmer, and problem solver.  
**Prerequisite:** IND 5212C or consent of instructor or graduate coordinator.  
**Corequisite:** IND 5454C and IND 5508.

**IND 5326 Color Theory Planning and Practice 3 Credits**  
**Grading Scheme:** Letter Grade  
Explores color through a review of focused research and experiential learning. Examines the art and science of color theory in the context on interior design and allied fields.

**IND 5427C Interior Design Construction Documents 4 Credits**  
**Grading Scheme:** Letter Grade  
Systematic overview of construction systems, technologies, and materials. Emphasizes the design of interior systems, and detailing of systems, as an extension of the overall design concept.  
**Prerequisite:** consent of graduate coordinator.

**IND 5434C Interior Lighting 3 Credits**  
**Grading Scheme:** Letter Grade  
Introduction to lighting design based on critical awareness of luminous environment and principles and perception of light and color. Graphic exercises in lighting design, documentation, and lighting calculations based on student design project solutions.  
**Prerequisite:** consent of graduate coordinator.

**IND 5454C Advanced Interior Design Detailing and Construction Documents 4 Credits**  
**Grading Scheme:** Letter Grade  
Advanced problems in interior finish systems, such as interior architecture and cabinetry exploration, and production of interior mechanical and millwork drawings and construction documents. Integration of building codes and life safety issues.  
**Prerequisite:** consent of graduate coordinator.
IND 5466 Interior Environmental Technology 3 Credits
Grading Scheme: Letter Grade
Relation to human sensory reactions, psychological factors, health safety, and satisfaction. Vocabulary and concepts of interior environmental technology related to the process of design.
Prerequisite: consent of graduate coordinator.

IND 5508 Business and Professional Practices for Interior Designers 3 Credits
Grading Scheme: Letter Grade
The profession of interior design as practiced today. Considers office practices and design project management. Contract documents, legal concerns, management and marketing strategies, personnel practices, and career planning. Ethics/contracting for design services via case studies.
Prerequisite: consent of instructor or graduate coordinator.

IND 5633 Readings in Design Studies 3 Credits
Grading Scheme: Letter Grade
Students write a systematic literature review that is appropriate for a thesis or dissertation proposal. In order to create a systematic literature review, substantial time will be devoted to critiquing previously written journal articles in the field of interior design.

IND 5638 Design Environments and Human Interaction 3 Credits
Grading Scheme: Letter Grade
Introduction to significant theories concerning the interaction of people with environments at various scales. Also, the corresponding applied environmental design implications of these theories will be explored. This survey of normative theories, philosophies and doctrines of environment and behavior will serve as an evidence base to support research-based design decisions.
Prerequisite: consent of graduate coordinator.

IND 5937 Current Topics in Interior Design 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Framework to support theory, research, and application of interior design processes. Programming and post-occupancy phases through exploration of environment and behavior research and gaming simulation.

IND 6639 Methods of Interior Design Research 3 Credits
Grading Scheme: Letter Grade
Theory and methods related to research in interior design, environment and behavior, and history. Reciprocal interactions between people and the built environment.
Prerequisite: graduate standing.

IND 6906 Independent Studies and Readings 1-3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Independent Studies and Readings

IND 6939 Creativity Applied 3 Credits
Grading Scheme: Letter Grade
Examines creativity theory and research applied to interior design and allied fields by considering what constitutes an innovative organizational culture, product and process breakthroughs including the role of failure in the discovery process.
Prerequisite: IND 5633 Readings in Design Studies, IND 6639 Methods of Research or by instructor approval.

IND 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

IND 6941 Interior Design Internship 2-4 Credits
Grading Scheme: S/U
Opportunities to work in an architectural and interior design office gaining hands-on professional experience working up to 12 weeks.
Prerequisite: IND 5427C, IND 5232C, IND 5508.

IND 6971 Research for Master’s Thesis 1-12 Credits
Grading Scheme: S/U
Research for Master’s Thesis

Japanese Languages and Literatures

MM 5306 International Communication 3 Credits
Grading Scheme: Letter Grade
Analysis and comparison of print and electronic communication systems among nations and cultures; barriers and stimuli to international communications; mass media in national development.

RTV 6973 Project in Lieu of Thesis 1-9 Credits
Grading Scheme: S/U
Development, testing, and evaluation of an original electronic media product, audience research, or management analysis.
Prerequisite: consent of instructor.

Landscape Architecture

LAA 6231 Landscape Architecture Theory 3 Credits
Grading Scheme: Letter Grade
Explores theories pertinent to the practice and study of landscape architecture. Aesthetic and cultural principles and values and related ecological aspects. Designated core course.
Prerequisite: consent of instructor.
Corequisite: LAA 6656C.

LAA 6322 Project Management for Landscape Architects 3 Credits
Grading Scheme: Letter Grade
Two-part exploration of current methods, theories, and approaches to critiquing and evaluating built and proposed environments and their users. Designated core course.

LAA 6342 Landscape Architecture Criticism 3 Credits
Grading Scheme: Letter Grade
Case studies and readings of theories, models, and processes applicable to landscape architectural planning and design. Emphasizes the issues of perception, preference, and other user concerns. Designated core course.

LAA 6382 Ecological and Environmental Policy 3 Credits
Grading Scheme: Letter Grade
Survey of major environmental policy and law with particular reference to Florida case studies. Designated core course.

LAA 6525L Advanced Landscape Construction Design 4 Credits
Grading Scheme: Letter Grade
Development of current communication and production techniques related to professional landscape architectural construction documentation.
LAA 6536 Landscape Management 3 Credits
**Grading Scheme:** Letter Grade
Survey of large and small scale management issues including principles of landscape ecology and site maintenance.

LAA 6656C Advanced Landscape Architectural Design 1-6 Credits
**Grading Scheme:** Letter Grade
Complex project design. Emphasizes user issues, ecological concerns, and regional and cultural issues; and determination of form for sustainable environments.

LAA 6713 Cultural Landscapes 3 Credits
**Grading Scheme:** Letter Grade
Explores the intersection of human and cultural systems as expressed in physical form, with multi-disciplinary explorations of why a landscape looks the way it does, what landscapes "mean", and how they are active agents/indicators in ongoing changes in cultural products, built environments, and society.

LAA 6905 Directed Study 1-3 Credits, Max 9 Credits
**Grading Scheme:** Letter Grade
Directed Study

LAA 6931 Water Conservation through Site Design and Green Roofs 3 Credits
**Grading Scheme:** Letter Grade
Exploration of the impacts of development on the natural systems of a site, particularly water resources. Mitigation of these impacts through sustainable site planning and design methodologies.

LAA 6935 Gardens of the World 3 Credits
**Grading Scheme:** Letter Grade
Explores the garden as a complex expression of human relationships with each other and the larger environment, both physical and cultural.

LAA 6941 Supervised Internship 3 Credits
**Grading Scheme:** S/U
Work is to be supervised by a registered landscape architect. Internship is to be accomplished in summer between first and second years or second and third years. Students, after completion, register in the next fall term for credit.
**Prerequisite:** required for all students who do not document a landscape architectural experience.

LAA 6971 Research for Master's Thesis 2-6 Credits
**Grading Scheme:** S/U
Research for Master’s Thesis

LAA 6979 Terminal Project 1-6 Credits
**Grading Scheme:** S/U
This option, in lieu of thesis, is available for a design project that because of magnitude or design complexity does not adapt to thesis format.

**French**

FOL 6326 Technology in Foreign Language Education 3 Credits
**Grading Scheme:** Letter Grade
Technology in classrooms. The interface between pedagogy and technology.
**Prerequisite:** FOL 6943, FRE 6943, or equivalent.

FRE 6060 Beginning French for Graduate Students I 3 Credits
**Grading Scheme:** S/U
For students with no formal preparation who need a reading knowledge.

FRE 6061 Beginning French for Graduate Students II 3 Credits
**Grading Scheme:** S/U
For students who need proficiency in reading.
**Prerequisite:** FRE 6060 or equivalent.

FRE 6466 Advanced Translation and Stylistics 3 Credits
**Grading Scheme:** Letter Grade
Translation from English to French and French to English. Texts selected from modern authors. Various genres and styles.

FRE 6735 Special Studies in French Linguistics 3 Credits
**Grading Scheme:** Letter Grade
Rotating topics relevant to second language acquisition, sociolinguistics, and/or theoretical linguistics.

FRE 6736 The French language in the Americas 3 Credits
**Grading Scheme:** Letter Grade
Examining of the presence of French in the Americas. Topics we will be covering are origin of French in the Americas, language practices of Francophone communities, linguistic characteristics of the varieties of French, effect of language contact on language behavior and representations, identity issues. Focus varies from year to year.
**Prerequisite:** None, but FRE 6785 or FRE 6855 recommended.

FRE 6785 French Phonetics and Phonology 3 Credits
**Grading Scheme:** Letter Grade

FRE 6827 Sociolinguistics of French 3 Credits
**Grading Scheme:** Letter Grade
Sociolinguistic issues in the French-speaking world: language variation, discourse analysis, attitudes toward varieties of French, and contact with speakers of other languages.

FRE 6845 History of the French Language 3 Credits
**Grading Scheme:** Letter Grade
Phonological, morphological, syntactic, and lexical evolution of French language.

FRE 6855 Structure of French 3 Credits
**Grading Scheme:** Letter Grade
Explores the French language as a system of communication and mental representation. Analyzes morphological, syntactic, and semantic aspects of contemporary French. Emphasizes historical, psychological, and sociological dimensions of linguistic investigation.

FRE 6856 French in the 21st Century 3 Credits
**Grading Scheme:** Letter Grade
Examining of how the French language is changing in the 21st century, from phonological, morphological, syntactic, lexical and semantic points of view. Addressing such topics as phonological assimilation; the negative; interrogative structures; the future tense; and borrowings, calques and semantic shifts, in different varieties of French.
**Prerequisite:** None, but FRE 6785 or FRE 6855 recommended.

FRE 6945 Practicum in Advanced College Teaching 2 Credits, Max 6 Credits
**Grading Scheme:** S/U
Practical training and orientation for advanced doctoral students in teaching upper-division courses. Gain upper-level teaching experience by working closely with a mentor in all areas of the teaching process.
FRW 6956 Overseas Studies in French 1-5 Credits
Grading Scheme: Letter Grade
Course work in French as part of approved study-abroad program.
Prerequisite: permission of graduate coordinator (French).

FRW 6217 Seventeenth-Century French Prose 3 Credits
Grading Scheme: Letter Grade
Major prose works of the classical period. Fermentation in philosophical and moral thought that characterized early modern period France. Cartesian thought, new science, Jansenism, libertines, and moralistes. Also includes texts by La Fayette and Sevigne.

FRW 6276 Readings in Eighteenth-Century Literature 3 Credits
Grading Scheme: Letter Grade
Rotating topics: theater, novel, image of the Orient, Anglo-French connection, women writers of the Old Regime.

FRW 6288 Twentieth-Century French Novel 3 Credits
Grading Scheme: Letter Grade
Analyzes representative novels. Emphasizes literary modernism, surrealism, and the new novel in light of pertinent cultural discourses and literary history.

FRW 6315 Seventeenth-Century French Drama 3 Credits
Grading Scheme: Letter Grade
Theory and practice of dramaturgy in classical period as reflected in plays of Corneille, Molière, and Racine. Close textual analysis to disengage aesthetic and ideological problematics posed by each play.

FRW 6328 Twentieth-Century French Theater 3 Credits
Grading Scheme: Letter Grade
Critical and historical study of representative plays. Theater as a genre and a cultural and political space. Discussion of theoretical writings. Viewing of selected plays on film.

FRW 6346 French Poetry of the Renaissance 3 Credits
Grading Scheme: Letter Grade
French Poetry of the Renaissance

FRW 6355 Modern French Poetry 3 Credits
Grading Scheme: Letter Grade
Historical approach combined with close readings of poetic texts. Introduction to numerous theoretical and critical writings. In addition to poetic texts taken from traditional cannon, less frequently taught poets are presented.

FRW 6396 French Cinema 3 Credits
Grading Scheme: Letter Grade
Critical and historical study of representation of gender and ethnicity in French films.

FRW 6536 The Romantic Period 3 Credits
Grading Scheme: Letter Grade

FRW 6556 French Realism and Naturalism 3 Credits
Grading Scheme: Letter Grade
French Realism and Naturalism

GER 6060 Beginning German for Graduate Students I 3 Credits
Grading Scheme: S/U
For graduate students from other departments who need to acquire a reading knowledge of German. Not open to graduate students in German.

GER 6061 Beginning German for Graduate Students II 3 Credits
Grading Scheme: Letter Grade
For graduate students from other departments who need to acquire a reading knowledge of German. Not open to graduate students in German.
Prerequisite: GER 6060 or its equivalent.
GER 6505 German Culture 3 Credits
Grading Scheme: Letter Grade
Interdisciplinary study of periods and major aspects of German culture from the Middle Ages to the present.

GER 6940 Supervised Teaching 1-5 Credits, Max 3 Credits
Grading Scheme: S/U
Supervised Teaching
Prerequisite: departmental approval.

GET 6526 Weimar Cinema 3 Credits
Grading Scheme: Letter Grade
Weimar cinema, and theory and criticism that surround it. Examination of intersection between formal-aesthetic and ideological-political aspects as manifest in film text.

GET 6529 New German Cinema and its Legacy 3 Credits
Grading Scheme: Letter Grade
New German cinema as response to Hollywood cinema, Germany's Nazi past and problems posed to society, and cinema by other mass media and new imaging technologies. Analytical texts draw from new historicism, cultural studies, psychoanalysis, and postmodernism.

GEW 6205 Foundations of Literary Study 3 Credits
Grading Scheme: Letter Grade
Required of M.A. and Ph.D. candidates in German. Focus on literary criticism and methodology. Different theoretical approaches to literature and research techniques. Recent developments.

GEW 6266 History of the German Novel 3 Credits
Grading Scheme: Letter Grade
Development of novel from its beginning in 17th century to its rise in late 18th, 19th, and 20th centuries as well as history of theories about novels.

GEW 6305 Studies in German Drama and Theater 3 Credits
Grading Scheme: Letter Grade
Main trends in the development of German drama during different literary periods. Analysis of individual plays and theoretical texts.

GEW 6405 Medieval and Renaissance Literature 3 Credits
Grading Scheme: Letter Grade
Courtly and heroic epic, Volksbücher, and major genres and trends from the Medieval and Renaissance period.

GEW 6425 From Luther to Lessing: Early Modern German Literature 3 Credits
Grading Scheme: Letter Grade
Analysis of major trends, authors, and texts from Reformation to Enlightenment.

GEW 6535 German Classical and Romantic Literature 3 Credits
Grading Scheme: Letter Grade
Analysis of major authors and texts. Special attention to developments in culture, aesthetics, and society.

GEW 6558 Young Germany, Biedermeier, Realism, and Naturalism 3 Credits
Grading Scheme: Letter Grade
Writers of the 19th century including Moerike, Heine, Droste-Huelshoff, Stifter, Keller, Raabe, Storm, Fontane, Meyer, Hauptmann.

GEW 6725 Culture and Society in the Weimar Republic 3 Credits
Grading Scheme: Letter Grade
Intellectual and cultural life between 1918 and 1933. Analysis of literary works from theater, cabaret, and cinema within context of social and political life of the Weimar Republic.

GEW 6735 Modern German Literature 3 Credits
Grading Scheme: Letter Grade
Literary trends and major works of early twentieth century. Authors may include Mann, Rilke, Kafka, and Hesse. Relation to contemporary cultural and aesthetic developments.

GEW 6736 Contemporary German Literature 3 Credits
Grading Scheme: Letter Grade
Literary trends from 1945 to present. Relation to contemporary cultural and aesthetic developments. Current developments.

GEW 6745 Literature and Culture in the Third Reich 3 Credits
Grading Scheme: Letter Grade
Analysis of major literary and nonliterary works of Nazi period. Appropriation of German literary tradition. Examination of Nazi theater and film. Literature of the so-called inner emigration.

GEW 6826 German Literary Theory 3 Credits
Grading Scheme: Letter Grade
Major figures in field from nineteenth century to present. Emphasis on question of hermeneutics and different responses developed by literary theoreticians. Special focus on most recent developments in field.

GEW 6900 Seminar in Germanic Languages and Literatures 3 Credits
Grading Scheme: Letter Grade
Seminar in Germanic Languages and Literatures

GEW 6901 Special Study in Germanic Languages and Literatures 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Intensive study of a selected topic.

GEW 6905 Independent Study 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Available by special arrangement. May be taken only once for M.A. credit.

GEW 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

GEW 6971 Research for Master's Thesis 1-9 Credits
Grading Scheme: S/U
Research for Master's Thesis

GEW 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

GEW 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
For students admitted to candidacy.

Romance Languages

FOL 6943 Romance Language Teaching Methods 3 Credits
Grading Scheme: Letter Grade
Required of all graduate students who will be involved in teaching and have not had a similar course elsewhere.
Prerequisite: graduate standing.
Sociology

SYA 6018 Classical Social Theories 3 Credits
Grading Scheme: Letter Grade
Sociological theory from its inception in the early 19th century to about 1930. The ideas of Comte, Spencer, Marx, Weber, Simmel, Durkheim, Pareto, Mead, and others.

SYA 6126 Contemporary Sociological Theory 3 Credits
Grading Scheme: Letter Grade
The study of modern sociological theories, roughly 1930 to the present.

SYA 6315 Qualitative Research Methods 3 Credits
Grading Scheme: Letter Grade
Fieldwork, observation, participant observation, and other qualitative data-collection and analysis techniques.

SYA 6407 Quantitative Research Methods 3 Credits
Grading Scheme: Letter Grade
Applying selected quantitative methods to sociological research problems. Extensive practice applying the methods. Prerequisite: STA 6126.

SYA 6905 Individual Work 1-4 Credits, Max 3 Credits
Grading Scheme: Letter Grade
Work on subjects not available in currently offered courses.

SYA 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

SYA 6942 Applied Social Research Project 3 Credits
Grading Scheme: Letter Grade
Supervised individual or team applied research project.

SYA 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

SYA 7933 Special Study in Sociology 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Special Study in Sociology

SYA 7979 Advanced Research 1-12 Credits, Max 24 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

SYA 7980 Research for Doctoral Dissertation 1-15 Credits, Max 24 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

SYD 6517 Seminar in Environment and Society 3 Credits
Grading Scheme: Letter Grade
Survey of sociological topics important for interdisciplinary environmental science.

SYD 6518 Core Issues in Environmental and Resource Sociology 3 Credits
Grading Scheme: Letter Grade
Addressing the origins and current status of Environmental and Resource Sociology (ERS), central theoretical debates among ER sociologists, and focal topics of concern to ER sociologists, with emphasis on ERS topics current among ER sociologists at the University of Florida.

SYD 6520 Environmental Governance 3 Credits
Grading Scheme: Letter Grade
A social scientific examination of governance policies, rules, and practices that shape environmental outcomes and regulate human-environment relations.

SYD 6706 Racial and Ethnic Relations 3 Credits
Grading Scheme: Letter Grade
Overview of racial-ethnic oppression, stratification, and conflict in the U.S.

SYD 6807 Sociology of Gender 3 Credits
Grading Scheme: Letter Grade
Theoretical and empirical literature about social construction of gender. Overview of key literature.

SYD 6825 Men and Masculinities 3 Credits
Grading Scheme: Letter Grade
How men's life course influences and is affected by the gendered social order. How masculinities are constructed in diverse contexts.

SYD 7801 Reproduction and Gender 3 Credits
Grading Scheme: Letter Grade
Key reproductive issues in a U.S. context. The gendered nature of the reproductive realm. How cultural and social structures shape individuals' feelings, thinking, and actions in terms of specific reproductive choices. Prerequisite: graduate standing.

SYO 6126 Family Theories 3 Credits
Grading Scheme: Letter Grade
Relationships, families, and households (RFH) from a social science (SS) perspective. Aims to synthesize elements of social theory, social research, and social policy.

SYO 6175 Topics in Family Research 3 Credits
Grading Scheme: Letter Grade
Seminar on major empirical approaches to analyzing family relationships.

SYO 6407 Health Disparities 3 Credits
Grading Scheme: Letter Grade
Health needs of vulnerable populations in the United States of America.

SYO 6535 Social Inequality 3 Credits
Grading Scheme: Letter Grade
The unequal distribution among individuals and groups of wealth, power, and prestige. The effect of class systems on society. The effect of class membership on individuals. Social mobility.

SYP 6735 Sociology of Aging and the Life Course 3 Credits
Grading Scheme: Letter Grade
Social and personal conditions of post-retirement years. Family and housing patterns, income, leisure, health, group processes, and evaluation of institutional care of the aged.

Latin

LAT 6425 Latin Prose Composition 3 Credits
Grading Scheme: Letter Grade
Translating English into Latin and imitation of various Latin prose styles.

LNW 5325 Roman Elegiac Poetry 3 Credits
Grading Scheme: Letter Grade
Readings in Latin from one or all of the following: Catullus, Tibullus, Propertius, Ovid, or other Latin elegiac poetry. Prerequisite: graduate student status or consent of instructor.

LNW 5655 Roman Poets: Horace 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Horace's poetry and metrics.
LNW 5665 Roman Poets: Vergil 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
The poetic art of Vergil and its literary, historical, and political background.

LNW 5675 Roman Poets: Ovid 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Ovid’s poetic art against its literary, historical, and political background.

LNW 6105 The Roman Tradition 3 Credits
Grading Scheme: Letter Grade
Synoptic survey of Roman literature.

LNW 6225 The Ancient Roman Novel 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Readings from Petronius and/or Apuleius.

LNW 6315 Plautus and Terence 3 Credits
Grading Scheme: Letter Grade
Reading in Latin selections from the twenty extant plays of Plautus and six extant plays of Terence, with an introduction to the genre of comedy.
Prerequisite: Advanced reading proficiency

LNW 6335 Roman Oratory and Rhetoric 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Theory and practice of Roman oratory and rhetoric through Latin readings in Cicero, Seneca, and Quintilian, and other sources.

LNW 6365 Studies in Roman Satire 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Readings from Horace, Persius, Petronius, Juvenal, Martial.

LNW 6385 Roman Historians 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Readings from major historians: Sallust, Caesar, Livy, Tacitus, Suetonius, and others.

LNW 6495 Late Latin Literature 3 Credits
Grading Scheme: Letter Grade
Readings from one or more of the following: Vulgate, Christian Church Fathers, Historia Apollonii, Peregrinatio Aetheriae, Harrington’s Medieval Latin.

LNW 6905 Individual Work 1-4 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Readings and reports in language and literature.

LNW 6933 Special Topics in Latin Literature 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Intensive study of particular author, genre, period, or subject.
Prerequisite: graduate standing or consent of instructor.

LNW 6935 Proseminar in Classics 3 Credits
Grading Scheme: Letter Grade
Introduction to the study of classical literature, history of scholarship, bibliographies, areas of the discipline.

LNW 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

LNW 6971 Research for Master’s Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master’s Thesis

LNW 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

LNW 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

Linguistics

EAP 5835 Academic Spoken English I 3 Credits
Grading Scheme: S/U
Intensive training in English, particularly English used in formal speaking and pedagogy.
Prerequisite: for international graduate students, especially those who expect to become teaching assistants. No credit toward any graduate degree.

EAP 5836 Academic Spoken English II 2-3 Credits
Grading Scheme: S/U
TAs are videotaped biweekly in their classrooms. Weekly instruction addresses language, cultural, and pedagogical problems encountered in the classroom.

LIN 5741 Applied English Grammar 3 Credits
Grading Scheme: Letter Grade
Survey of English grammar based on the principles of second language acquisition and social interaction, with implications for teachers.

LIN 6084 Introduction to Graduate Research 3 Credits
Grading Scheme: Letter Grade
Scholarly and scientific approaches to study of linguistics. Scientific method, theory development, data processing, scholarly writing, and structure of research proposals.

LIN 6165 Field Methods 3 Credits
Grading Scheme: Letter Grade
Developing the basic linguistic skills of discovering the structure of a language previously unknown to the investigator, starting with paper and pencil. Students learn to listen and interact with a native speaker, to construct questions, to organize and analyze data, to construct and test hypotheses, and to write up discoveries. Emphasizes ethics as a requisite of good science.
Prerequisite: LIN 3201.

LIN 6208 Phonetics for Linguists 3 Credits
Grading Scheme: Letter Grade
Understanding of issues in experimental phonetics and appreciation of research techniques in the acoustic, physiological, and perceptual study in speech.

LIN 6226 Advanced Phonetics 3 Credits
Grading Scheme: Letter Grade
Exposes students to advanced issues in linguistic phonetics, and to experimental phonetic methods and designs.
Prerequisite: LIN 4205 or LIN 6208 or SPA 3011.
LIN 6323 Phonology 1 3 Credits
Grading Scheme: Letter Grade
Phonemics, syllabic and prosodic phenomena, neutralization, distinctive features, morphophonemic alternation, phonological systems and processes. Terminology and notational conventions of generative phonology. Problems from a variety of languages.
Prerequisite: LIN 3201.

LIN 6341 Phonology 2 3 Credits
Grading Scheme: Letter Grade
Theoretical approaches to major problems of phonological theory and/or its relationship to areas such as morphology and SLA. Emphasis on linguistic argumentation and independent research.
Prerequisite: LIN 6323.

LIN 6402 Morphology 1 3 Credits
Grading Scheme: Letter Grade
Theory of word structure, derivation, and inflection. The position of morphology in a grammar, the relationship between morphology and the rest of the grammar, predictions of various theories of morphology. Examples and problems from a wide variety of the world's languages.
Prerequisite: LIN 3460.

LIN 6410 Morphology 2 3 Credits
Grading Scheme: Letter Grade
Technical articles from a variety of twentieth-century schools. Prominent inquiries include the place of morphology in grammar, its relationship with other components, and whether a unified theory of morphology can be constructed.
Prerequisite: LIN 6402.

LIN 6501 Syntax 1 3 Credits
Grading Scheme: Letter Grade
The generative-transformational model of syntax: phrase structure, lexicon, case and agreement, movement, government, and anaphora. Emphasizes problem solving and linguistic argumentation.
Prerequisite: LIN 3460.

LIN 6520 Syntax 2 3 Credits
Grading Scheme: Letter Grade
Further investigation of the generative-transformational model of syntax: advanced clause structure, binding theory, constraints on movement, and logical form.
Prerequisite: LIN 6501.

LIN 6571 Structure of Specific Language 3 Credits
Grading Scheme: Letter Grade
Linguistic examination of Aymara, Cakchiquel, Eskimo, Armenian, Bulgarian, Polish, Turkish, Quechua, Sanskrit, Tamil, or another rarely taught language.
Prerequisite: introductory linguistics course.

LIN 6601 Sociolinguistics 3 Credits
Grading Scheme: Letter Grade
Major approaches to language in context: ethnographic, sociological, linguistic. Applications of sociolinguistics to applied linguistics, social sciences, and education. Collection and analysis of data.
Prerequisite: LIN 6323, LIN 6501.

LIN 6707 Psycholinguistics 3 Credits
Grading Scheme: Letter Grade
Explores basic issues in psycholinguistic research, including language production, comprehension, acquisition, and development.

LIN 6708C Methods in Psycholinguistics 3 Credits
Grading Scheme: Letter Grade
Hands-on experience designing and conducting psycholinguistic experiments and analyzing experimental data.
Prerequisite: LIN 6702; STA 2023 or consent of instructor.

LIN 6720 Second Language Acquisition 3 Credits
Grading Scheme: Letter Grade
Neurolinguistic, psycholinguistic, and sociolinguistic bases of second language acquisition in childhood and adulthood.

LIN 6796 Cognitive Neuroscience of Language 3 Credits
Grading Scheme: Letter Grade
Overview and critical evaluation of brain imaging techniques and issues in language and brain research, covering speech perception, word recognition, reading syntax, discourse processing, production, language acquisition, and bilingualism.

LIN 6804 Semantics I 3 Credits
Grading Scheme: Letter Grade
Truth conditional semantics as opposed to pragmatics. Basic notions in classical logic since logic is assumed in truth conditional semantics.

LIN 6826 Introduction to Formal Pragmatics 3 Credits
Grading Scheme: Letter Grade
Introduces Pragmatics, the study of utterance meanings determined by situated uses of language and linguistic communication as a social activity. Explores the role of linguistic and extra-linguistic contexts in the production and interpretation of utterances. Topics include deictic and anaphoric expressions, sense and reference, presupposition, implicature, speech acts and coherence.
Prerequisite: consent of instructor.

LIN 6856 Semantics II 3 Credits
Grading Scheme: Letter Grade
Introduction to doing formal semantics for linguists, based on the theory of Richard Montague and theories developed within his approach.
Prerequisite: LIN 6804.

LIN 6905 Individual Study 1-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Individual Study

LIN 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

LIN 6932 Special Topics 3 Credits, Max 27 Credits
Grading Scheme: Letter Grade
Special Topics

LIN 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

LIN 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

LIN 7641 Seminar in Language Variation 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Possible topics include variation theory, conversational interaction, language contact, bilingualism, and pidgins and Creoles.

LIN 7725 Topics in Second Language Acquisition 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Focused topic in the area of second language acquisition.
Prerequisite: LIN 6720.
LIN 7885 Discourse Analysis and Pragmatics 3 Credits
Grading Scheme: Letter Grade
Methods of discourse analysis research and face-to-face discourse and pragmatics.
Prerequisite: LIN 6601.

LIN 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

LIN 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

TSL 6171 TESL I: Materials and Techniques 3 Credits
Grading Scheme: Letter Grade
Theories of TESL teaching methods and materials. Instruction in classroom materials. Observation of ESL classroom procedures.

TSL 6172 TESL II: Materials for Special Purposes 3 Credits
Grading Scheme: Letter Grade
Continuation of TSL 6171. Instruction in designing courses and programs in ESL. Each student will be required to develop a sample ESL course.
Prerequisite: TSL 6171.

Management

BUL 5810 Legal Environment of Business 3 Credits
Grading Scheme: Letter Grade
American legal system, sources of law, adjudication, legal nature of corporation, major areas of state and federal corporate law, state and federal regulation of business, legal aspects of ethical and social responsibility of business; intellectual property, employment law, torts and contracts.

BUL 5811 Law, Ethics, and Organizations 2 Credits
Grading Scheme: Letter Grade
Designed for M.B.A. students. Law governing relationships with corporation and between corporation and social, political, and ethical environment. Business and the Constitution, litigation and dispute resolution, agency and forms of business organization, state and federal regulation of corporations and securities.

BUL 5832 Commercial Law for Accountants 2 Credits
Grading Scheme: Letter Grade
Legal ramifications of business transactions. Basic transactional areas to be studied include contracts, sales, and secured transactions. Brief review of accountants’ legal liability.
Prerequisite: level 5–M.Acc.

BUL 6441 Business Ethics and Corporate Social Responsibility 2 Credits
Grading Scheme: Letter Grade
Designed for advanced master’s students in business administration. Ethical issues managers face in business organizations.

BUL 6516 Law of Real Estate Transactions 2 Credits
Grading Scheme: Letter Grade
Introduction to legal aspects, including basic concepts or real estate law, landlord-tenant relations, commercial leasing, multi-unit real estate interests, real estate finance, and sale of real estate. Analysis of legal aspects of real estate development, including impact of zoning and environmental laws, land improvement, and real estate syndication.

BUL 6656 Law for Entrepreneurs 2 Credits
Grading Scheme: Letter Grade
Examining the legal aspects in starting and growing a company (small or medium-sized business or SMEs); strategies for ensuring compliance with law; use of law and the legal system to increase predictability, maximize value, marshal resources, and manage risk in an entrepreneurial enterprise. Since law permeates every act of an entrepreneurship enterprise, the course will consist of a broad survey of legal issues confront a new?small or medium-sized business.

BUL 6841 Employment Law 2 Credits
Grading Scheme: Letter Grade
Designed for master’s students in business. Law related to employment and employees in business organizations.

BUL 6852 International Business Law 2 Credits
Grading Scheme: Letter Grade
Designed for M.B.A. students. Legal aspects of managing the international business environment.

BUL 6905 Individual Work 1-5 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Reading and/or research in business law.
Prerequisite: consent of instructor.

BUL 6930 Special Topics 1-3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Topics not offered in other courses and of special current significance.
Prerequisite: consent of instructor.

ENT 5275 Family Business Management 2 Credits
Grading Scheme: Letter Grade
Crucial aspects of managing small business enterprises. Identifying and analyzing characteristic operating problems of small firms and techniques for solving them. Strategic operating and psychological issues associated with running a privately-held or family firm.

ENT 6006 Entrepreneurship 2 Credits
Grading Scheme: Letter Grade
Practical, hands-on understanding of the stages of the entrepreneurial process. Focuses on the decision-making process in a start-up company.

ENT 6008 Entrepreneurial Opportunity 2 Credits
Grading Scheme: Letter Grade
Introduces non-business graduate students to entrepreneurship and the entrepreneurial process.

ENT 6016 Venture Analysis 2 Credits
Grading Scheme: Letter Grade
Explores and critiques real-world examples of how new business ventures were conceived, started, and run.

ENT 6116 Business Plan Formation 2 Credits
Grading Scheme: Letter Grade
Professional development and preparation of a company business plan. Full analysis of the plan and outside evaluation and ranking.
Prerequisite: None.

ENT 6416 Venture Finance 2 Credits
Grading Scheme: Letter Grade
Capital structure and financing needs of start-up companies. Valuation of nonpublicly traded companies. Intellectual property.

ENT 6506 Social Entrepreneurship 2 Credits
Grading Scheme: Letter Grade
Process of starting, financing, assessing and managing succession of mission-based for-profit and not-for-profit ventures.
MAN 5265 Managing Groups and Teams 1 Credit
Grading Scheme: Letter Grade
Designed for master's students in business. Development of critical team skills and techniques to improve team processes and effectiveness.

MAN 6149 Developing Leadership Skills 2 Credits
Grading Scheme: Letter Grade
Designed for master's students in business administration. Concepts of leadership theory and methods to improve skills.

MAN 6257 Power and Politics in Organizations 1-3 Credits, Max 3 Credits
Grading Scheme: Letter Grade
Links between theory and practice in the use of power and political skills in organizations.
Prerequisite: consent of instructor. Designed for advanced master’s students in business administration.

MAN 6266 Managing Groups and Teams in Organizations 2 Credits
Grading Scheme: Letter Grade
Composing, developing, and motivating teams. Inter- and intra-team processes. Assessing barriers to effectiveness. Interventions to overcome team problems.
Prerequisite: MAN 5246 or equivalent.

MAN 6331 Compensation in Organizations 2 Credits
Grading Scheme: Letter Grade
Designed for M.B.A. students. Relevant practical and theoretical information regarding design of reward systems that support organizational strategies.

MAN 6356 Organizational Staffing 3 Credits
Grading Scheme: Letter Grade
Overview of human resource selection. Recruitment, job analysis, psychometrics, criterion measurement, development and evaluation of selection devices, and practical applications.
Prerequisite: MAN 5245.

MAN 6366 Organizational Staffing 2 Credits
Grading Scheme: Letter Grade

MAN 6446 Negotiations 3 Credits
Grading Scheme: Letter Grade
Theory and skills of negotiation and conflict resolution.
Prerequisite: designed for M.B.A. students.

MAN 6447 Art and Science of Negotiation 2 Credits
Grading Scheme: Letter Grade
Designed for advanced master's students in business administration. Theory and processes of negotiation as practiced in variety of settings. Understanding behavior of individuals, groups, and organizations in competitive situations.

MAN 6635 International Aspects of Human Resource Management 2 Credits
Grading Scheme: Letter Grade
Designed for master's students in business administration. Perspectives of a multinational firm.

MAN 6636 Global Strategic Management 2 Credits
Grading Scheme: Letter Grade
Designed for master's students in business administration. Strategic issues facing global and multinational organizations.
MAN 6637 Global Strategic Management 3 Credits
Grading Scheme: Letter Grade
Analyzes how firms compete in the multinational and global environment.
Prerequisite: designed for master's students in business administration.

MAN 6721 Business Policy 3 Credits
Grading Scheme: Letter Grade
Integrating and applying the various functional and support areas of business administration. Business policy making and administration from the general manager’s perspective.
Prerequisite: all MBA required courses. Designed for M.B.A. students. Taken the last semester before graduation.

MAN 6724 Strategic Management 2 Credits
Grading Scheme: Letter Grade
Designed for M.B.A. students and taken the last semester before graduation. Complex strategic questions that confront general managers. Approaches learned in other courses combined with material particular to strategic management. Approaches used to formulate and implement overall strategies that allow firms to obtain and sustain competitive advantages while creating shareholder wealth.

MAN 6900 Capstone Project 2 Credits
Grading Scheme: Letter Grade
Analyzing a global company using a series of questions in three strategic module assignments. Explicit questions in the assignments are designed to help students define the company, analyze the industry in which it operates, perform an internal analysis of the company/ division, and define the strategies and company organization.
Prerequisite: MIB student

MAN 6905 Individual Work in Management 1-5 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Reading and/or research in management.
Prerequisite: departmental approval.

MAN 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

MAN 6930 Special Topics 1-3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Topics not offered in other courses and of special current significance.
Prerequisite: consent of instructor/department.

MAN 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

MAN 6973 Project in Lieu of Thesis 1-4 Credits, Max 4 Credits
Grading Scheme: Letter Grade
Project in Lieu of Thesis

MAN 7108 Seminar in Research Concepts and Methods in Management 1-3 Credits
Grading Scheme: Letter Grade
Design, execution, and evaluation of research in organizational behavior, human resource management, strategic management, and organization theory.
Prerequisite: consent of instructor.

MAN 7109 Seminar in Motivation and Attitudes 1-3 Credits
Grading Scheme: Letter Grade
Various motivation theories, including expectancy and equity theories. Job satisfaction and other work attitudes, and their effects on individuals and organizations.

MAN 7208 Seminar in Contemporary Approaches to Organizations 1-3 Credits
Grading Scheme: Letter Grade
Recent organizational views such as population ecology, economic approaches to organizational design and control, organizations and technology, and network firms.

MAN 7249 Org Behavior 3 Credits
Grading Scheme: Letter Grade
Org Behavior

MAN 7267 Seminar on Groups and Teams Research 1-3 Credits
Grading Scheme: Letter Grade
Emerging research on groups and teams in organizations. Classic and contemporary theories and research on team composition and team performance.

MAN 7328 Seminar on Staffing and Selection 1-3 Credits
Grading Scheme: Letter Grade
Theories and methods that organizations use to staff their positions.

MAN 7778 Seminar in Strategic Adaptation to Environment 1-3 Credits
Grading Scheme: Letter Grade
How organizations make decisions to cope effectively with their environments. Theory and research on how firms operate in their environments, such as theories of the firm, resource and knowledge-based views of organizations, and various strategic choices.

MAN 7779 Strategic Processes and Structure in Organizations 1-3 Credits
Grading Scheme: Letter Grade

MAN 7935 Strategic Management 3 Credits
Grading Scheme: Letter Grade
Strategic Management

MAN 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

MAN 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

Marketing

MAR 5805 Problems and Methods in Marketing Management 3 Credits
Grading Scheme: Letter Grade
Concepts and techniques for resolving marketing management problems through the case method.
Prerequisite: Designed for MBA students.

MAR 5806 Problems and Methods in Marketing Management 2 Credits
Grading Scheme: Letter Grade
Concepts and techniques for resolving marketing management problems through the case method.
MAR 6157 International Marketing 2 Credits
Grading Scheme: Letter Grade

MAR 6237 The Art and Science of Pricing 2 Credits
Grading Scheme: Letter Grade
Providing students with a good understanding of the strategy and tactics for an effective pricing decision. By the end of the course, students will be able to explain underlying mechanisms for the current pricing practices and apply their knowledge in improving pricing decisions.
Prerequisite: MBA students.

MAR 6256 Strategy and Tactics of Pricing 3 Credits
Grading Scheme: Letter Grade
Providing students with a good understanding of the strategy and tactics for an effective pricing decision. By the end of the course, students will be able to explain underlying mechanisms for the current pricing practices and apply their knowledge in improving pricing decisions.
Prerequisite: MBA students.

MAR 6335 Building and Managing Brand Equity 2 Credits
Grading Scheme: Letter Grade
Product and brand management decisions needed to build, measure, and manage branded equity. Focal objectives are to increase understanding of important issues in planning and evaluating brand strategies and to provide the appropriate theories, models, and other tools to make better branding decisions.
Prerequisite: QMB 5304, QMB 5305, MAR 5805.

MAR 6456 Business-to-Business Marketing 2 Credits
Grading Scheme: Letter Grade
Strategy concepts for marketing products and services to other businesses; institutions such as hospitals and universities, and government. Role of marketing strategy as part of overall business strategy. Developing and launching new products, managing channels of distribution and sales forces, and building and maintaining alliances and partnerships.
Prerequisite: MAR 5805.

MAR 6479 Professional Selling 2 Credits
Grading Scheme: Letter Grade
This is a basic survey course in professional selling. It is designed to teach future business leaders the importance of the selling role, provide them with basic professional selling skills and begin to prepare them for a future role in sales or sales management.

MAR 6507 Customer Insights and Analysis 3 Credits
Grading Scheme: Letter Grade
This course is designed to inform future managers, analysts, consultants, and advisors of insights on customers’ behaviors, with an emphasis on leveraging these insights to develop evidence-based solutions that change customer behavior.

MAR 6508 Customer Analysis 2 Credits
Grading Scheme: Letter Grade
Theory and research in the behavioral and social sciences applied to individual and aggregate behavior of consumers.
Prerequisite: MAR 5806. Designed for M.B.A. students.

MAR 6601 Entrepreneurial Marketing I 2 Credits
Grading Scheme: Letter Grade
The first in a two-course sequence introducing an entrepreneurial perspective on markets and marketing. Approaches marketing as a vehicle for redefining business models and leading customers in ways that produce sustainable advantage. The roles within marketing of opportunity identification, innovation, risk-taking, resource leveraging, proactive behavior, and customer intensity are investigated.

MAR 6602 Entrepreneurial Marketing II 2 Credits
Grading Scheme: Letter Grade
The second in a two-course sequence. An examination of how a firm’s product/service mix, promotional approach, pricing methods, distribution efforts and customer service can be conceptualized, designed and implemented based on entrepreneurial principles. Attention devoted to guerrilla, viral and buzz approaches to accomplishing market outcomes.

MAR 6646 Marketing Research for Managerial Decision Making 3 Credits
Grading Scheme: Letter Grade
Examination of approaches and methods of marketing research with particular attention given to the perspective of the marketing manager.
Prerequisite: MAR 5805 and QMB 5303. Designed for M.B.A. students.

MAR 6648 Marketing Research for Managerial Decision Making 2 Credits
Grading Scheme: Letter Grade
Examination of approaches and methods with particular attention given to the perspective of the marketing manager.
Prerequisite: MAR 5806 and QMB 5305. Designed for M.B.A. students.

MAR 6722 Web-Based Marketing 2 Credits
Grading Scheme: Letter Grade
Provides an understanding of the current online marketing environment and the strategies and tactics of web-based marketing.
Prerequisite: Master’s students in Warrington College of Business Administration and for students who either pursue a career in online business or have general interest in the current marketing environment. Designed for MBA students.

MAR 6816 Advanced Marketing Management (MBA) 3 Credits
Grading Scheme: Letter Grade
Advanced case course dealing with the wide range of strategic problems faced by the marketing manager.
Prerequisite: MAR 5805. Designed for M.B.A. students.

MAR 6817 Advanced Marketing Management 2 Credits
Grading Scheme: Letter Grade
Advanced cases dealing with the wide range of strategic problems faced by the marketing manager.
Prerequisite: MAR 5806.

MAR 6833 Product Development and Management 2 Credits
Grading Scheme: Letter Grade
Management of new product development process including identifying new product opportunities, product concept testing, market feasibility analysis, prototype development, market testing, and commercialization.
Prerequisite: Intended for masters students

MAR 6834 Marketing of Science and Technology 2 Credits
Grading Scheme: Letter Grade
Applying special marketing techniques and strategies to discoveries, inventions, and innovations embodied in products, services, and intellectual property. Emphasizes the particular characteristics of engineering- and science-driven market offerings.
Prerequisite: MAR 5806 or consent of instructor.
The document contains information about various courses, their grading schemes, prerequisites, and credits. Here is a structured representation of the content:

**MAR 6835 Marketing of Science and Technology 3 Credits**
*Grading Scheme:* Letter Grade
Applying specialized marketing techniques and strategies to discoveries, inventions, and innovations embodied in products, services, and intellectual property. Focuses on particular characteristics of engineering and science-driven market offerings.
*Prerequisite:* MAR 5805.

**MAR 6837 Consumer-Centered Product Design 3 Credits**
*Grading Scheme:* Letter Grade
Project-based. Elaboration on product-development model introduced in core marketing course. Focus on intersection of marketing, engineering, and design.

**MAR 6838 Brand Management 3 Credits**
*Grading Scheme:* Letter Grade
Focus on product and brand management decisions needed to build, measure, and manage brand equity. Both conceptual frameworks and financial metrics are emphasized.
*Prerequisite:* MAR 5805 or MAR 5806 or equivalents.

**MAR 6839 Product Development and Management 3 Credits**
*Grading Scheme:* Letter Grade
Provides students with a structured way of thinking about the new product development process from a marketing perspective.

**MAR 6861 Customer Relationship Management 2 Credits**
*Grading Scheme:* Letter Grade
Conceptual foundations, analytical techniques and marketing tactics for managing customer relationships.
*Prerequisite:* MAR 5806.

**MAR 6862 Customer Relationship Management 3 Credits**
*Grading Scheme:* Letter Grade
Acquiring, building, and maintaining mutually beneficial relationships with customers. The customer as a financial asset that companies should measure, manage, and maximize.

**MAR 6905 Individual Work 1-4 Credits, Max 8 Credits**
*Grading Scheme:* Letter Grade
Reading and/or research.
*Prerequisite:* departmental approval.

**MAR 6910 Supervised Research 1-5 Credits, Max 5 Credits**
*Grading Scheme:* S/U Supervised Research

**MAR 6930 Special Topics in Marketing 1-4 Credits, Max 16 Credits**
*Grading Scheme:* Letter Grade
Selected topics in marketing management, research, or theory.
*Prerequisite:* consent of instructor.

**MAR 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**
*Grading Scheme:* S/U Supervised Teaching

**MAR 6957 International Studies in Marketing 1-4 Credits, Max 12 Credits**
*Grading Scheme:* S/U International Studies in Marketing
*Prerequisite:* admission to approved study abroad program and departmental approval.

**MAR 6971 Research for Master's Thesis 1-15 Credits**
*Grading Scheme:* S/U Research for Master's Thesis

**MAR 7507 Perspectives on Consumer Behavior 3 Credits**
*Grading Scheme:* Letter Grade
In-depth analysis of the field. Critically examines various theoretical and methodological approaches through marketing and consumer behavior literatures. Students must develop an original research project.
*Prerequisite:* graduate standing or consent of instructor.

**MAR 7588 Consumer Information Processing and Decision Making 3 Credits**
*Grading Scheme:* Letter Grade
In-depth treatment of consumer information processing and choice behavior as a function of psychological and environmental factors. Underlying concepts and theories of individual judgment and decision making; critical evaluation of research in this area.
*Prerequisite:* MAR 7507 or consent of instructor.

**MAR 7589 Judgment and Decision Making 3 Credits**
*Grading Scheme:* Letter Grade
Literature review related to psychology of judgment and decision making. Discussion of normative and descriptive theories of decision making and empirical evidence that speaks to those theories.
*Prerequisite:* consent of instructor.

**MAR 7626 Multivariate Statistical Methods in Marketing 3 Credits**
*Grading Scheme:* Letter Grade
Review of application of multivariate methods including multiple regression; factor discriminant and cluster analysis; and conjoint measurement to summarize and analyze marketing data.

**MAR 7636 Research Methods in Marketing 3 Credits**
*Grading Scheme:* Letter Grade
Experimental and quasi-experimental design; procedures for laboratory and field experiments; statistical conclusion, internal, external, and construct validity in research design; reliability and validity in measurement; creativity in hypothesis generation and theory testing in behavioral research.
*Prerequisite:* admission to Ph.D. in marketing or consent of instructor.

**MAR 7666 Marketing Decision Models 3 Credits**
*Grading Scheme:* Letter Grade
Development and implementation of model-based approaches to marketing decision making. Model-based analysis of advertising, pricing, promotion, distribution. Research project.
*Prerequisite:* ECO 7408 and departmental approval.

**MAR 7786 Marketing Literature 3 Credits**
*Grading Scheme:* Letter Grade
Survey of academic marketing literature, with special focus on conceptual and empirical studies of marketing strategy and marketing program variables.
*Prerequisite:* admission to Ph.D. in marketing or consent of instructor.

**MAR 7925 Workshop in Marketing Research 3 Credits, Max 9 Credits**
*Grading Scheme:* Letter Grade
In-depth analysis of current research topics. Emphasis on research programs of leading scholars. Students critically appraise the rationale, strengths, and weaknesses of each study.
*Prerequisite:* consent of department.

**MAR 7979 Advanced Research 1-12 Credits**
*Grading Scheme:* S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.
Mass Communication

ADV 5005 Advertising Planning 3 Credits
Grading Scheme: Letter Grade
Introduction to the process of developing advertising strategy, emphasizing theory and research methods.

ADV 5407 Content Marketing 3 Credits
Grading Scheme: Letter Grade
This course teaches students the skills to be content marketers. Content marketing includes photos, words, audio, and video; every medium that helps tell the story of and promote a product or company, often online. This course addresses the what, why, and how of content marketing and marketing strategy.

ADV 6006 Theories of Advertising 3 Credits
Grading Scheme: Letter Grade
Theories dealing with consumer responses to marketing communications: state-of-the-art advertising and marketing communications theory, academic articles examining consumer responses.

ADV 6305 Advanced Media Planning 3 Credits
Grading Scheme: Letter Grade
Media planning to meet advertising goals. Use of research findings. Computer models.
Prerequisite: ADV 4300, MMC 6421, or equivalents.

ADV 6325 Advertising and Social Media 3 Credits
Grading Scheme: Letter Grade
Students will learn to create, write and maintain a social advertising campaign for clients. Learn about transparency and how the advent of social media has changed advertising. Case studies will be examined and students will create several pieces for their portfolio.
Prerequisite: MMC 6XXX Digital Communication Theory, MMC 5427 Research Methods in Digital Communications, MMC 6XXX Introduction to Multimedia Communication, and MMC 6XXX Introduction to Social Media

ADV 6405 International Advertising 3 Credits
Grading Scheme: Letter Grade
Global competition and worldwide markets; technological revolutions; and branding products and services under different cultural, regulatory, and competitive conditions.

ADV 6503 Advertising Creative Strategy and Research 3 Credits
Grading Scheme: Letter Grade
Social science findings as guides for decisions. Use of consumer behavior concepts in shaping advertising message content and improving media selection.
Corequisite: MMC 6421 or equivalent.

ADV 6505 Advertising Research Methods 3 Credits
Grading Scheme: Letter Grade
Introduction to methods most commonly use in professional and scholarly research, including secondary, qualitative, survey, content analysis, and experimental methods.

ADV 6602 Advertising Management 3 Credits
Grading Scheme: Letter Grade
Application of management principles and practice to effective development of advertising/public relations plans. Case studies and discussion of current problems in research, planning, operations, administration, and evaluation.
Prerequisite: ADV 6305 and ADV 6503, or consent of instructor.

COM 6315 Advanced Research Methods 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Scientific method, measurement, analysis. Student research required.
Prerequisite: MMC 6421 and STA 6126 or equivalents, and consent of instructor.

COM 6338 Advanced Web Topics I: Advanced Design 4 Credits
Grading Scheme: Letter Grade
Delving deeply into the processes of website design. Students will have 4 contact hours of instruction per week from lectures posted in E-Learning, not including individual work. Because the class is asynchronous, students may access lectures at any time during the week.
Prerequisite: Digital Design, Intro to Web Design, Digital Imagery

COM 6940 Supervised Teaching 1-3 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

JOU 5007 History of Journalism 3 Credits
Grading Scheme: Letter Grade
Origin, development, and potentiality of print and broadcast media. Evolution of standards, policies, methods, and controls.

JOU 5705 Issues and the Press 3 Credits
Grading Scheme: Letter Grade
Influence of the press in defining and shaping public concern with major social issues.

JOU 6391 Seminar in Journalism as Literature 3 Credits
Grading Scheme: Letter Grade
Analysis of mass media writing, broadcast programs, and graphics to assess their merits both as journalism and as art. Various periods studied; emphasis on 20th century.

MMC 5006 Introduction to Multimedia Communication 3 Credits
Grading Scheme: Letter Grade
Introducing media, journalism and communication themes, issues and how to's of an integrated approach to new multi-media communications to ensure the brand message reaches its intended audience. Taking a real-world viewpoint, students examine the various channels available to communication professionals.
Prerequisite: No prerequisites. Open to Graduate Students Only.

MMC 5015 Electronic Publishing 3 Credits
Grading Scheme: Letter Grade

MMC 5046 Presentation Power 3 Credits
Grading Scheme: Letter Grade
Teaches theory and skills needed for effective small group sales presentations.
MMC 5165 Influence and Selling 3 Credits
Grading Scheme: Letter Grade
Students will learn to apply the techniques most commonly used by a broad range of compliance practitioners and explain how and why they work. They will be able to apply the three keys to influence and the six sources of influence to their current influence challenges.
Prerequisite: Graduate status or certificate or combined degree status

MMC 5206 Advanced Law of Mass Communication 3 Credits
Grading Scheme: Letter Grade
Problems of constitutional law, libel, privacy, and governmental regulation. Not open to students who have taken MMC 4200 or equivalent.

MMC 5215 Technology Policy 3 Credits
Grading Scheme: Letter Grade
The legal structure of radio, television, cable, satellite, and new media forms; the Communication Act, and the Federal Communications Commission.
Prerequisite: Undergraduate or graduate law course, or consent of instructor.

MMC 5259 Customer Management and the Nurturing of Enduring Relationships 3 Credits
Grading Scheme: Letter Grade
The concepts and theories of customer management and ensuring the right people, processes, and technology are employed to nurture long-term customer relationships.
Prerequisite: Admissions to graduate certificate, combined degree, or graduate study.

MMC 5277 Web Design Principles 4 Credits
Grading Scheme: Letter Grade
Completing the course will allow students to be comfortable creating, coding and posting basic HTML and CSS files to the Internet. Gaining a foundational knowledge of website creation and apply it to the planning, design and development of your own web page over the course of the semester.

MMC 5279 UX Design Theory 3 Credits
Grading Scheme: Letter Grade
Students will be introduced to the theories behind Human-Computer Interaction (HCI) and apply them to User Experience Design (UXD). This course has bi-weekly projects that will build off of one another. By the end of this course students will gain the knowledge necessary to effectively communicate and evaluate user experiences.

MMC 5306 International Communication 3 Credits
Grading Scheme: Letter Grade
Analysis and comparison of print and electronic communication systems among nations and cultures; barriers and stimuli to international communications; mass media in national development.

MMC 5308 Communicating for Success 3 Credits
Grading Scheme: Letter Grade
Designed to help international students achieve success in a U.S. graduate-level communications curriculum. Included will be a focus on standards and mores for professional and academic writing, and on the development of public speaking skills.

MMC 5406 Selling Today 3 Credits
Grading Scheme: Letter Grade
Addresses the critical concepts and theories of contemporary sales. Optimal selling requires an appreciation of the changes wrought by digital technologies and the emergence of millennials.

MMC 5422 Customer Research and the Fundamentals of Online Testing 3 Credits
Grading Scheme: Letter Grade
Teaches the development and implementation of an online offer tests, including the selection of a research question, metrics selection, validity assurance, and data interpretation.
Prerequisite: Admissions to graduate certificate, combined degree, or graduate study.

MMC 5427 Research Methods in Digital Communication 3 Credits
Grading Scheme: Letter Grade
Teaching research techniques crucial for understanding Web audiences. Specific tools and techniques of applied research are discussed and students do a research project.
Prerequisite: None.

MMC 5435 Messaging Strategy and the Centrality of the Value Proposition 3 Credits
Grading Scheme: Letter Grade
Developing, measuring, testing, and expressing a value proposition throughout a company and its communications. The course teaches ways to position an offer that achieves a sustainable competitive advantage.
Prerequisite: Admissions to graduate certificate, combined degree, or graduate study.

MMC 5436 Messaging Methodologies and the Practice of Conversion Optimization 3 Credits
Grading Scheme: Letter Grade
Teaches the critical concepts and theories of offer response optimization, including techniques for creating compelling offers that optimize responses in both digital and mobile environments.
Prerequisite: Admissions to graduate certificate, combined degree, or graduate study.

MMC 5449 Consumer and Audience Analytics 3 Credits
Grading Scheme: Letter Grade
Upon successful completion of the course, you should possess a basic understanding of the consumer and audience analytics that are valuable in most contemporary workplaces. The knowledge is helpful in careers related to analytics/research, social media, media business, advertising/marketing, and public relations.

MMC 5465 Communication Leadership 3 Credits
Grading Scheme: Letter Grade
Prepares students to become leaders of organizations. The course explores communication and the variables involved when leaders attempt to influence members to achieve a goal. Topics include power, credibility, motivation, research on leader traits, styles, and situations, and current theories and models of leadership.

MMC 5468 Understanding Audiences 3 Credits
Grading Scheme: Letter Grade
Understanding Audiences

MMC 5636 Introduction to Social Media 3 Credits
Grading Scheme: Letter Grade
Social media and internet marketing have given businesses a new way to brand, promote and sell, allowing them to grow and shift their marketing efforts. Explore the various ways consumers communicate online and discuss how businesses may join the conversation. Students design and implement a social media marketing plan.
MMC 5648 Public Affairs Communication 3 Credits
Grading Scheme: Letter Grade
Public Affairs Communication is structured around the idea that individuals, communities, and organizations have an obligation to work together to participate responsibly in democratic processes and help solve some of the world's most challenging problems. This course equips students with tools and skills to do that anywhere the need arises.

MMC 5708 Foundations of Intercultural Communication 3 Credits
Grading Scheme: Letter Grade
Theory and practice of intercultural communication.

MMC 5717 Cross Platform Media Selling 3 Credits
Grading Scheme: Letter Grade
Sales staff once specialized in specific media platforms. However, media companies now offer buying opportunities in both traditional and digital platforms, and synergy across platforms is a key selling point. As a result, modern media sales requires sales expertise across all platforms.
Prerequisite: Graduate status or certificate or combined degree status

MMC 5731 Digital Sales and Engagement 3 Credits
Grading Scheme: Letter Grade
Social media afford sellers the chance to engage customers and prospects. Social media can be used to create new sales opportunities and service existing ones. This course will teach sales people how to use social media for these purposes.

MMC 5737 Lead Generation and Management 3 Credits
Grading Scheme: Letter Grade
Teaches students marketing strategies that will attract new business, as well as retain and foster repeat customers in the world of digital selling. When executed effectively, these strategies will increase brand awareness, drive leads, boost referrals, maximize a brand's return on investment (ROI), and also create brand loyalists.

MMC 5739 Social Media Advertising for Conversions 3 Credits
Grading Scheme: Letter Grade
Teaches students the skills and best practices of professional paid social media advertisers. They will learn where, how and why businesses use paid social media for lead generation. This course covers strategy, creative direction, ad products per platform and reporting on Facebook, Twitter, Instagram, Pinterest, LinkedIn and Snapchat.

MMC 6135 Data Visualization 3 Credits
Grading Scheme: Letter Grade
Covers the basics of effective data visualization. Students will learn how to find data sets, evaluate the methodology of data sets, create data-driven stories, and visually communicate these stories for various audiences. Visual communication principles and guidelines for effective data visualization, storytelling, and analysis are emphasized.

MMC 6145 Web Interactivity and Engagement 3 Credits
Grading Scheme: Letter Grade
Provides the student with an understanding of the most practical tool of a web manager, the content management system (CMS). Using WordPress, you will gain an understanding of CMSs and how they are valuable tools for saving time and handling large amounts of data. You will also learn more about server scripting using PHP and database integration with MySQL.

MMC 6205 Social Media Ethics 3 Credits
Grading Scheme: Letter Grade
Introduces students to critical issues, including accuracy, privacy and trust. Social media ethics is an ever evolving area of study and issues will be explored using real life case studies, readily updated. Issues will be discussed in relation to how they impact social media content and the relationships between communications organizations and their audiences.

MMC 6213 Strategic Communication Ethics and Concepts 3 Credits
Grading Scheme: Letter Grade
Introduces strategic communication's fundamentals and ethical issues arising from its practice. Students are given a background in concepts such as branding, target audiences, technologies, and historical evolution. Armed with this knowledge, students are introduced to the schools of ethical thought, and via assignments apply these to real-world contexts.

MMC 6278 Advanced Web Topics II 4 Credits
Grading Scheme: Letter Grade
This class will be teaching students about the concept of the semantic web, the features of HTML5 and CSS3 that are used professionally, and the concept of "progressive enhancement". It will also explore, in depth, JavaScript, the integration of third-party APIs, jQuery, and some of the essential jQuery plugins.
Prerequisite: MMC 5326—Digital Design, MMC 6936 Web Design Principles, VIC 5325—Digital Imagery, VIC 5315—Corporate Brand Identity, COM 6338—Advanced Web Design 1

MMC 6400 Mass Communication Theory 3 Credits
Grading Scheme: Letter Grade
Structure, content, process, effects of communication; contributions of other disciplines; barriers to effective communication; use of research concepts.

MMC 6402 Seminar in Mass Communication Theory 4 Credits, Max 16 Credits
Grading Scheme: Letter Grade
Specialized aspects of mass communication theory; in-depth investigation of particular concepts and research literature. Student research required.
Prerequisite: MMC 6400, MMC 6421, or equivalents, statistics, and consent of instructor.

MMC 6406 Innovation and Entrepreneurship in Mass Communication 3 Credits
Grading Scheme: Letter Grade
Focusing on the theoretical and conceptual foundations of innovation and entrepreneurship and relevant scholarship, as well as applications and implications of these foundations within the mass communication industry.

MMC 6409 Science/Health Communication 3 Credits
Grading Scheme: Letter Grade
Overview of the field of mass communication. Nexus of scientists, journalists, public information officers and audiences. Topics include science literacy, framing of science, issues, public involvement, and the impact of science communication on policy.

MMC 6417 New Media, Health Behavior and the Health Environment 3 Credits
Grading Scheme: Letter Grade
Mass communication and health communication theories examined as they related to intended and unintended effects on individual behavior and on public health policy. Focus on effects other than those associated with mass mediated public health campaigns.
MMC 6421 Research Methods in Mass Communication 3 Credits
Grading Scheme: Letter Grade
Introduction to experiments, surveys, content analysis, sampling, measurement. Laboratory applications.

MMC 6423 Content-Analysis Methods 3 Credits
Grading Scheme: Letter Grade
Sampling, category construction, calculation of intercoder reliability, and analysis of data. Evaluation of content analysis methods and opportunity to undertake project using this methodology. Focus on analysis of mass media messages, but includes content analysis of other communication content.

MMC 6426 Qualitative Research 3 Credits
Grading Scheme: Letter Grade
Theory and application in social science and communication. Qualitative data analysis, evaluation, ethical considerations, and writing.

MMC 6428 Collaborative Communication Research 3 Credits
Grading Scheme: Letter Grade
Experience in conducting team research. Student-faculty teams select and work through projects with intent to produce scholarly work for conference presentation, publication, or research grant proposal.

MMC 6429 News and Numbers 3 Credits
Grading Scheme: Letter Grade
Learn to develop and evaluate how numbers and statistics are employed in news-related content. Students will learn to critique and interpret public opinion polls. Employing various story platforms, students will work to create data-driven material in an applied media setting.
Prerequisite: None.

MMC 6455 Mass Communication Statistics 3 Credits
Grading Scheme: Letter Grade
Mass communication statistics provides an introduction to the fundamentals of descriptive and inferential statistics in communication science. Topics covered include central tendency/dispersion, index reliability, factor analysis, chi-square, t-test, ANOVA, regression, and path analysis, among others. Ethical issues germane to the replicability and reproducibility of data are also discussed.

MMC 6456 Data Storytelling and Visualization 4 Credits
Grading Scheme: Letter Grade
Covers the fundamentals of effective data-driven storytelling. Students will learn how to detect and articulate the stories behind data sets and communicate data findings in visual, oral, and written contexts for various audiences and publics. Students will become familiar with associated tools.

MMC 6457 Communication Statistics 2 3 Credits
Grading Scheme: Letter Grade
Mass communication statistics 2 teaches the fundamentals of path analysis and structural equation modeling. Topics to be covered include parallel mediation, serial mediation, moderated mediation, measurement models, path analysis, structural equation modeling, and multiple group analysis.

MMC 6466 Digital Persuasive Communication 3 Credits
Grading Scheme: Letter Grade
Introduces the major theories and concepts prevalent in persuasive communication and provides the opportunity to apply the knowledge to understanding the psychology of persuasion in digital media environments. It will deal with a wide range of digital persuasion issues and topics, particularly in the areas of advertising and marketing communication.

MMC 6475 Audience Research Methods 3 Credits
Grading Scheme: Letter Grade
Covers quantitative and qualitative research methods, strengths and weaknesses of all research methods and their suitability for various goals, and how students should build arguments and rationale for methods. Students will design and strategize execution of research methods to address specific hypotheses and answer research questions regarding audiences.

MMC 6476 Understanding Audiences 3 Credits
Grading Scheme: Letter Grade
An overview of the primary theories used in the study of audiences, including their conceptualization and behavior. Students will learn how to apply academic scholarship to the industry to help them understand and explain industry dynamics, as well as to inform decision making.

MMC 6566 Communicating Privacy 3 Credits
Grading Scheme: Letter Grade
Trains students to effectively communicate privacy and security information, and to recognize the importance of the interdisciplinary study of this topic. This class is a seminar with the expectation that students will have read materials before class, formulated questions, and be prepared to discuss the topics.

MMC 6612 New Media and a Democratic Society 3 Credits
Grading Scheme: Letter Grade
Relationships among new media, citizens, and governments; effects of Internet on democracy and globalization; role of journalism in democratic society.

MMC 6615 Race, Class, and Media 3-4 Credits
Grading Scheme: Letter Grade
Examination of race, class, and gender portrayals in media, from critical and cultural studies perspectives.

MMC 6618 Survey of Political Communication 3 Credits
Grading Scheme: Letter Grade
Role of communication in political process, including study of news coverage of political events, political advertising, political debates, international political communication, and politics and new technologies.

MMC 6638 Global Activism and Social Change Communication 3 Credits
Grading Scheme: Letter Grade
Delves into activism and social change from a global perspective to enhance student understanding of social change as manifested via media and community action. Students will analyze and apply activist rhetoric, strategies for social justice, and methods for inter-movement organizing. They will learn engagement tools in strategic communication.

MMC 6647 Financial Business Essentials for Communication Professionals 3 Credits
Grading Scheme: Letter Grade
Helps students in learning and applying the theoretical and practical concepts related to the business and financial responsibilities of communication professionals. Through projects and assignments students will develop a business acumen related to communication activities. It provides an understanding of these responsibilities whether employed at agencies or organizations.

MMC 6660 Mass Communication and Society 3 Credits
Grading Scheme: Letter Grade
Rights, responsibilities, ethics of communication media; government and media; economic, political, and social determinants of media content.
MMC 6665 Seminar in First Amendment Theory 4 Credits
Grading Scheme: Letter Grade
Investigation into meaning and purpose of press, speech, petition, and assembly clauses of First Amendment. Offered in fall semester, even-numbered years.
Prerequisite: MMC 5206L or equivalent, and consent of instructor.

MMC 6666 Seminar in Research in Mass Communication Law 4 Credits
Grading Scheme: Letter Grade
Investigation of legal research techniques for the mass communication scholar and of literature of a particular mass media law topic. Offered in fall semester, odd-numbered years.
Prerequisite: MMC 5206 or equivalent, and consent of instructor.

MMC 6706 Covering the Arts 3 Credits
Grading Scheme: Letter Grade
This course focuses on fundamentals of arts coverage and marketing arts journalism pieces. It also includes critiques of arts journalism and provides an overview of current trends in the business of the arts. The class features tours of local arts venues and multiple guest speakers from the arts community.

MMC 6725 Social Media and News 3 Credits
Grading Scheme: Letter Grade
This course explores questions such as: What impact does tweeting, status-updating, blogging, etc. have on society? How is the public’s use of social media changing the way we work, study, socialize, vote, invest, pursue interests? What are the effects on our health, our political systems, our relationships and our careers?

MMC 6726 Social Media and Emerging Technology 3 Credits
Grading Scheme: Letter Grade
Introducing research and communication uses of 3D virtual environments and online games. Using Second Life as a virtual platform, students will be required to create an online persona and be trained on navigating, building and communicating in the environment.

MMC 6727 Social Media Metrics 3 Credits
Grading Scheme: Letter Grade
Students gain clear foundation in marketing strategy and apply it to social media marketing. Examine international case studies and determine if social media drive incremental sales volume and earnings. Understand what the drivers of value are for a brand and how social media messages differ from messages in traditional media.

MMC 6728 Branding Using Social and Mobile Media 3 Credits
Grading Scheme: Letter Grade
Special attention focusing on how online tools can enhance and strengthen a product or service’s brand strategy. Using current case studies and step-by-step process, students will be learning to maximize the online efforts while maintaining brand continuity and consistency.

MMC 6730 Social Media Management 3 Credits
Grading Scheme: Letter Grade
Practicing necessary skills for creating high-touch customer experiences, driving community across multiple social media platforms.

MMC 6738 Digital Promotions/Campaigns 3 Credits
Grading Scheme: Letter Grade
Examines the evolving world of digital communications with a focus on how to use social media strategically to create value. Hands-on experience supported by theoretical, strategic and professional best practices. Students will get a comprehensive knowledge of and experience in how to develop an integrated digital public relations campaign.

MMC 6746 Developing Intercultural Competence 3 Credits
Grading Scheme: Letter Grade
Aims to help build an understanding of intercultural communication competence based on foundational texts in order to reflect on students’ intercultural abilities. Becoming an interculturally-minded professional requires self-reflection, interpersonal skills, cultural knowledge, and an open mind. Students will strengthen competencies to achieve success for themselves and their organizations.

MMC 6905 Individual Work 1-3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Letter Grade

MMC 6910 Supervised Research 1-3 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

MMC 6929 Communication Colloquium 2 Credits, Max 8 Credits
Grading Scheme: S/U
Provides common grounding in subjects across doctoral students’ research approaches. Students enroll in the fall during the first year.

MMC 6930 Seminar in Mass Communication Teaching 3 Credits
Grading Scheme: Letter Grade
Research and training for teaching and supervision of student mass media.

MMC 6936 Special Topics in Mass Communication 1-3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Special Topics in Mass Communication
Prerequisite: Consent of instructor or graduate adviser.

MMC 6949 Professional Internship 1-3 Credits, Max 3 Credits
Grading Scheme: S/U
Training in an approved mass communication office; instructor receives reports from on-site supervisor.

MMC 6951 Masters Project Seminar 1 Credit
Grading Scheme: Letter Grade
Working through the process of creating a masters-level project that will showcase professional skills and serve as a capstone for a masters program. The class will assist with with conceptualizing and producing a professional quality journalism project by the last semester of the masters program.

MMC 6971 Research for Master’s Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master’s Thesis
Prerequisite: consent of instructor.
MMC 6973 Project in Lieu of Thesis 1-9 Credits  
Grading Scheme: S/U  
Developing, testing, and evaluating an original mass communication project.  
Prerequisite: consent of instructor.

MMC 7979 Advanced Research 1-12 Credits  
Grading Scheme: S/U  
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

MMC 7980 Research for Doctoral Dissertation 1-12 Credits  
Grading Scheme: S/U  
Research for Doctoral Dissertation

PUR 5507 Persuasion Theory and Research 3 Credits  
Grading Scheme: Letter Grade  
Introduction to the principal theories and empirical research programs exploring how communication, particularly from public relations efforts, impacts persuasion.  
Prerequisite: None.

PUR 6005 Theories of Public Relations 3 Credits  
Grading Scheme: Letter Grade  
Theories that dominate the field. Evolution of theories, their critiques, and current standing.

PUR 6006 Public Relations Foundations 3 Credits  
Grading Scheme: Letter Grade  
Roles and responsibilities of public relations professionals and the function of public relations in institutions and society.

PUR 6206 Public Relations Ethics and Professional Responsibility 3 Credits  
Grading Scheme: Letter Grade  
Aims to study public relations ethics and social responsibility practiced in organizations. It focuses on different ethical and social responsibility models and their effects on the organization and stakeholders. The course has two components: readings and critiques of classic and current research and case studies development.

PUR 6403 Crisis and Risk Management 3 Credits  
Grading Scheme: Letter Grade  
Theories, applications and issues of crisis/risk management, exploring the difference between crisis-prone and crisis-prepared organization.  
Prerequisite: None.

PUR 6409 International Issues and Crisis Communication 3 Credits  
Grading Scheme: Letter Grade  
Focuses on practical applications of theory and research to identify and strategically manage issues that can materially affect the continuity of organizations globally. Emphasis is placed on preparing managers for effective communication during crises, including the formulation of a strategic crisis communication plan and evaluation programs.

PUR 6416 Public Relations and Fund Raising 3 Credits  
Grading Scheme: Letter Grade  
Applying public relations theories and concepts to the practice-centered study of fundraising in nonprofit organizations. Principles and processes of building relationships with donors and of designing and implementing programs in annual giving.

PUR 6446 Public Relations and Philanthropy 3 Credits  
Grading Scheme: Letter Grade  
Applying public relations theories and concepts to the practice-centered study of philanthropy, organizations, and the role of each in society. Effective strategies for managing relationships between philanthropic organizations and stakeholders.

PUR 6475 Digital Social Advocacy 3 Credits  
Grading Scheme: Letter Grade  
Aims to explore and develop theoretical and practical implications of social advocacy for the profession of public relations with emphasis on usage of digital media. Social advocacy is defined as the deliberate effort of groups of people to mobilize for or against institutions, governments, causes, and/or public figures.

PUR 6506 Public Relations Research 3 Credits  
Grading Scheme: Letter Grade  
Applied research methods for strategic management of public relations. Emphasis on using formative research for planning and implementing programs/campaigns and evaluative research for measuring effectiveness.

PUR 6607 Public Relations Management 3 Credits  
Grading Scheme: Letter Grade  
Application of strategic management to development of public relations plans and programs. Emphasis on theoretical framework for relationship management in public relations.

PUR 6608 International Public Relations 3 Credits  
Grading Scheme: Letter Grade  
Factors to assist conceptualization and execution of international public relations activities. Explores the relationship between environmental variables and international public relations practices. Review of empirical evidence about public relations practices in other countries and methodological issues pertaining to conducting research.

PUR 6616 Corporate Reputation and Communication 3 Credits  
Grading Scheme: Letter Grade  
Examines the fundamental roles that communication plays in corporate reputation affairs, including its production, conceptualization, dimensions, topics and attributes, monitoring, measurement, evaluation, management, effects, valorization, and valuation. The course prepares students involved in consulting, and those who are in strategic planning, market research, competitive intelligence, and general management.

PUR 6934 Problems in Public Relations 3 Credits  
Grading Scheme: Letter Grade  
Special topics, case studies, community relations, and theory-based analysis of public relations problems.

RTV 6309 Advanced TV Reporting 3 Credits  
Grading Scheme: Letter Grade  
Advanced course in news writing, editing and processing for television news.  
Prerequisite: Grade of B- in JOU 6349 .

RTV 6508 Audience Analysis 3 Credits  
Grading Scheme: Letter Grade  
Methods of audience analysis. Survey research, sampling, and program content analysis. Analysis of secondary audience data.

RTV 6801 Telecommunication Management 3 Credits  
Grading Scheme: Letter Grade  
Management principles of the telecommunications industry, with practical and theoretical application for television, radio, film, online, and other electronic media sectors.
RTV 6807 Telecommunication Outlet Systems and Practices 3 Credits
Grading Scheme: Letter Grade
Structural and procedural elements of broadcast stations, cable systems, and other local radio-television facilities. Review of research and models in telecommunications administration, economic planning and control, merchandising and positioning, sales and advertising.

RTV 6973 Project in Lieu of Thesis 1-9 Credits
Grading Scheme: S/U
Development, testing, and evaluation of an original electronic media product, audience research, or management analysis.
Prerequisite: consent of instructor.

VIC 5315 Corporate and Brand Identity on the Web 3 Credits
Grading Scheme: Letter Grade
Synthesizing two different but complementary tools of communication: graphic design and assembly (both print and electronic). You will learn fundamental design principles and techniques for effective visual communication.

VIC 5325 Digital Imagery in Web Design 4 Credits
Grading Scheme: Letter Grade
Constructing, deconstructing and further analyzing the impact of visual messages in interactive media. Gaining an understanding of how audiences form meanings, the importance of signs and symbols and how to manipulate images to reflect a point of view.

VIC 5326 Digital Media Layout and Design 3 Credits
Grading Scheme: Letter Grade
Introduction to the skills and concepts that will help create documents for both print and interactivity. The course teaches both the theory and application of design principles. Using Adobe InDesign, students will apply their understanding of these principles to create a portfolio project. While InDesign permits several possible workflows, this course will focus on those that most readily translate into digital design.

VIC 6316 Brand Management 3 Credits
Grading Scheme: Letter Grade
Developing an understanding of the importance of brand equity, how to build, measure, and manage brand equity. It will cover topics in the utilities of branding, steps/process of building brands, methods of measuring brand equity, strategies in managing brand portfolios, and management of brands over time, geographic boundaries, market segments.

Materials Science and Engineering

ECH 6726 Interfacial Phenomena I 2 Credits
Grading Scheme: Letter Grade
Air-liquid and liquid-liquid interfaces; surface-active molecules, adsorption at interfaces, foams, micro- and macro-emulsions, retardation of evaporation and damping of waves by films, surface chemistry of biological systems.

ECH 6727 Interfacial Phenomena II 2 Credits
Grading Scheme: Letter Grade
Solid-gas, solid-liquid, solid-solid interfaces. Adsorption of gases and surface-active molecules on metal surfaces, contact angle and spreading of liquids, wetting and dewetting, lubrication, biolubrication, flotation, adhesion, biological applications of surfaces.
Prerequisite: CHM 2046 and 2046L.

EGN 5949 Practicum/Internship/Cooperative Work Experience 1-6 Credits, Max 6 Credits
Grading Scheme: S/U
Practical cooperative engineering work under approved industrial and faculty supervision.
Prerequisite: graduate student.

EGN 6640 Entrepreneurship for Engineers 3 Credits
Grading Scheme: Letter Grade
Introduction to entrepreneurship, idea generating and feasibility analysis, and business planning. Lectures, case studies, student-led discussions, team business plans, and investor presentations.

EMA 5008 Particle Science and Technology: Theory and Practice 3 Credits
Grading Scheme: Letter Grade
Introduction to field by surveying theoretical and practical aspects. Particulate preparation, particle characterization, surface modifications, particulate systems, and technological applications.
Prerequisite: PHY 2049/2049L or equivalent and CHM 2046/2046L or equivalent.

EMA 5095 Critical Analysis of Research in Materials Science & Engineering 3 Credits
Grading Scheme: Letter Grade
Critical methods for reviewing technical papers, for writing effective technical papers, and for developing meaningful research projects, in the field of materials science and engineering.
Corequisite: EMA 6313

EMA 5108 Vacuum Science and Technology 3 Credits
Grading Scheme: Letter Grade
Introduction to the generation and use of vacuum for scientific research and industrial production. Kinetic theory of gases discussed as necessary to understand vacuum phenomena. Description of components and materials, vacuum systems design and uses in metallurgy, electronics, physics, and chemistry.
Prerequisite: CHM 2045, PHY 3101, MAP 2302, or equivalents, or consent of instructor.

EMA 5365 Biomimetic Synthesis 3 Credits
Grading Scheme: Letter Grade
Introduction to field by surveying theoretical and practical aspects. Particulate preparation, particle characterization, surface modifications, particulate systems, and technological applications.
Prerequisite: consent of instructor.

EMA 6001 Properties of Materials - A Survey 3 Credits
Grading Scheme: Letter Grade
Review of physical properties of materials such as mechanical, electrical, optical, magnetic, and thermal properties.
Prerequisite: Bachelor’s degree in physics, chemistry, or engineering.

EMA 6005 Thin and Thick Films 3 Credits
Grading Scheme: Letter Grade
Techniques for depositing thin metallic semiconductor and dielectric films. The relationships between deposition technique and thin film properties. Properties unique to thin films.
Prerequisite: (EMA3010 & CHM2046 & PHY2048) or equivalents
EMA 6105 Fundamentals and Applications of Surface Science 3 Credits
Grading Scheme: Letter Grade
Fundamental and experimental description of phenomena occurring at surface of solids, including structure, composition, atomic and molecular processes, and electronic properties. Experimental approaches and data used to support theoretical models.
Prerequisite: (CHM2045 & MAP2302) or equivalents or consent of instructor

EMA 6106 Advanced Phase Diagrams 3 Credits
Grading Scheme: Letter Grade
Phase diagrams considering systems with as many as four components; emphasis on pressure temperature composition diagrams.
Prerequisite: (EMA4120 & EMA4224) or equivalents

EMA 6107 High Temperature Materials 3 Credits
Grading Scheme: Letter Grade
Physical and mechanical metallurgy. Principles of strengthening alloys, alloy and process selection, alloy development, and design principles for elevated temperature applications.
Prerequisite: (EMA4120 & EMA4224) or equivalents

EMA 6110 Electron Theory of Solids for Materials Scientists I 3 Credits
Grading Scheme: Letter Grade
Prerequisite: (EMA3010 & MAP2302 & PHY2049) or equivalents

EMA 6111 Electron Theory of Solids for Materials Scientists II 3 Credits
Grading Scheme: Letter Grade
Atomistic (classical) and electron theory of optical properties of metals, alloys, and dielectrics. Nonlinear optics, lasers. Raman-spectra.

EMA 6114 Properties of Functional Materials 3 Credits
Grading Scheme: Letter Grade
The course will cover fundamental principles governing the structure of materials and its implications on properties. Structure-property relations will be showcased by covering the mechanical properties of materials.
Prerequisite: EMA 6313.

EMA 6128 Materials Microstructures 3 Credits
Grading Scheme: Letter Grade
Geometry of microstructures: kinematics and kinetics of microstructural evolution in materials processing.
Prerequisite: EMA 6316 or equivalent.

EMA 6136 Diffusion, Kinetics, and Transport Phenomena 3 Credits
Grading Scheme: Letter Grade
Physical basis, equation, and theories of diffusion, tracer, chemical, multicomponent, and multiphase diffusion in general force fields.
Prerequisite: EMA 4125 or equivalent.

EMA 6165 Polymer Physical Science 3 Credits
Grading Scheme: Letter Grade
Solid state properties of amorphous and semi-crystalline polymers.
Prerequisite: EMA3066 or equivalent

EMA 6166 Polymer Composites 3 Credits
Grading Scheme: Letter Grade
Physical and mechanical properties of polymers and polymer composites as related to preparation and microstructure.

EMA 6227 Advanced Mechanical Metallurgy II 3 Credits
Grading Scheme: Letter Grade
Continuation of EMA 6226.

EMA 6265 Mechanical Properties of Polymers 3 Credits
Grading Scheme: Letter Grade
Linear and nonlinear viscoelastic behavior of polymers with emphasis on molecular and microstructure aspects.
Prerequisite: EMA 3066 or equivalent.

EMA 6313 Structure and Mechanical Properties of Materials 3 Credits
Grading Scheme: Letter Grade
Covers fundamental principles governing the structure of materials and its implications on properties. Structure-property relations will be showcased by covering the mechanical properties of materials.

EMA 6316 Materials Thermodynamics 3 Credits
Grading Scheme: Letter Grade
Thermodynamics of materials systems, surfaces in solids, irreversible processes.
Prerequisite: EMA4314 or equivalent

EMA 6319 Applied Colloid and Interfacial Chemistry for Engineers 3 Credits
Grading Scheme: Letter Grade
Principles used to disperse powders in liquids with practical examples relating to ceramic and metal particle processing properties.
Prerequisite: EMA 6316 or equivalent

EMA 6412 Synthesis and Characterization of Electronic Materials 3 Credits
Grading Scheme: Letter Grade
Principles of materials growth and characterization in electronic and photonic industries. Bulk and epitaxial growth technologies, corresponding characterization methods for evaluation and quality control. Theoretical bases for these techniques.
Prerequisite: (EMA3413 & EMA4314) or equivalents

EMA 6416 Organic Electronics 3 Credits
Grading Scheme: Letter Grade
Basics of semiconductors, electronic structures, charge transport properties, and optoelectronic devices based on organic semiconductors.
Prerequisite: EMA3413 or equivalent

EMA 6445 Electroceramics 3 Credits
Grading Scheme: Letter Grade
Basic physical, chemical and mathematical principles of ceramic conductors, dielectrics and ferroelectrics and their applications are discussed. Emphasizes structure-processing-microstructure property relationships.

EMA 6446 Solid State Ions 3 Credits
Grading Scheme: Letter Grade
Defect solid state and its relation to electronic properties of ceramic materials; defect equilibria and transport; influence of chemical and electric potentials and interfaces; and application of ionically conducting solids in solid-state electrochemical transducer systems and devices.
Prerequisite: EMA 6316 or equivalent, or consent of instructor.

EMA 6448 Ceramic Processing 3 Credits
Grading Scheme: Letter Grade
Introduction to the science of ceramic processing, with emphasis on theoretical fundamentals. Examples of state-of-the-art industrial processes discussed.

EMA 6461 Polymer Characterization 3 Credits
Grading Scheme: Letter Grade
Use of a broad variety of spectroscopic and other scattering phenomena in polymer research.
Prerequisite: EMA3066 or equivalent
EMA 6507 Scanning Electron Microscopy and Microanalysis 3 Credits
Grading Scheme: Letter Grade
Principles and theories of microscopy with an emphasis on scanning electron microscopy (SEM). Provides the necessary theoretical background to become an effective user of MAIC SEM facilities.
Prerequisite: EMA3010 or equivalent

EMA 6507L Scanning Electron Microscopy and Microanalysis Lab 1 Credit
Grading Scheme: Letter Grade
Practical training to become a proficient user of MAIC SEM facilities, leading to an authorization as a JEOL SEM-6400 user at the MAIC.
Corequisite: EMA 6507.

EMA 6510 Survey of Materials Analysis Techniques 3 Credits
Grading Scheme: Letter Grade
Principles and techniques used in characterization of materials. Chemical, microstructural, and surface analysis of materials; metals, ceramics, polymers, and semiconductor systems.
Prerequisite: EMA3010 or equivalent

EMA 6516 X-Ray Methods for Materials Characterization 3 Credits
Grading Scheme: Letter Grade
Provides an introduction to the principles and methods of materials characterization via x-ray interactions. The course will focus primarily on diffraction and scattering techniques for crystallographic and thin film analysis.

EMA 6516L X-Ray Methods Laboratory for Materials Characterization 1 Credit
Grading Scheme: Letter Grade
Provides an introduction to the practical use of x-ray diffraction for materials characterization.
Prerequisite: EMA6XXX - X-Ray Methods for Materials Characterization

EMA 6518 Transmission Electron Microscopy 3 Credits
Grading Scheme: Letter Grade
Prerequisite: EMA 3513C or equivalent.

EMA 6518L Transmission Electron Microscopy Laboratory 1 Credit
Grading Scheme: Letter Grade
Specimen preparation for analysis in TEM. Demonstration of principles of contrast theories. Specialized methods for characterizing structure and composition of materials at high spatial resolution.

EMA 6519L Specialized Research Techniques in Materials Science 1-2 Credits
Grading Scheme: Letter Grade
Utilizing primarily STEM, TEM, SEM, EMP, FIM, and optical metallography.
Prerequisite: EMA 6507C or equivalent.

EMA 6540 Fundamentals of Crystallography 3 Credits
Grading Scheme: Letter Grade
The course will cover the derivation and analysis of structure-property relationships in common electroceramic material systems based on their crystal structure, symmetry and anisotropy.

EMA 6541 Applied Crystallography and Powder Diffraction 3 Credits
Grading Scheme: Letter Grade
Explores crystal structures, microstructures, and diffraction. Emphasizes the determination of structure from diffraction patterns. Hands-on and practical applications directly related to graduate student research are integrated components of the course.

EMA 6580 Science of Biomaterials I 3 Credits
Grading Scheme: Letter Grade
Introduction to variables that control compatibility and performance of biomaterials, including physical and chemical properties, corrosion, fatigue, and interfacial histochemical changes.
Prerequisite: (CHM2045 or CHM2095) or equivalent

EMA 6581 Polymeric Biomaterials 3 Credits
Grading Scheme: Letter Grade
Biomedical implant and device applications of synthetic and natural polymers. Biocompatibility and interfacial properties of polymers in physiological environment, especially concerning short-term devices (catheters) and long-term implants (intraocular lenses, vascular and mammary prostheses, etc.).
Prerequisite: ((CHM2045 or CHM2095) & EMA3066) or equivalents

EMA 6583 The Science of Cell Material Interactions 3 Credits
Grading Scheme: Letter Grade
Biological aspects of the various processes involved as cells interact with biomaterial. Interactions of materials with biological systems examined from the molecular (e.g. protein), cellular, tissue and systemic (whole body) perspectives.
Prerequisite: Bachelor's degree in materials science and engineering or biomedical engineering or related field.

EMA 6589 Mechanical Behavior of Biomaterials 3 Credits
Grading Scheme: Letter Grade
Basis for elastic and viscoelastic response of biological materials to stress and strain. Foundation for composite behavior of organic-organic and organic-inorganic materials. Description of modeling biological structures to achieve mechanical optimization.
Prerequisite: EMA 4223 or equivalent.

EMA 6590 Advances in Biomaterials and Tissue Engineering for Healthcare 3 Credits
Grading Scheme: Letter Grade
Use of new bioactive and bio-nano structures, surfaces and properties for healthcare applications, including tissue engineering, regenerative medicine, stem cell engineering, protein therapeutics, and bio-photonics testing of cell-material interactions. Socio-economic issues affecting cost and availability of new materials and technologies for healthcare.

EMA 6591 Clinical Applications of Biomaterials and Tissue Engineering 3 Credits
Grading Scheme: Letter Grade
Biomaterials, implants, devices, and new concepts in regenerative medicine and tissue engineering. Current technologies for replacement of tissues and organs, with emphasis upon case histories of specific medical and dental clinical applications, including economic and ethical concern analyses.

EMA 6616 Advanced Electronic Materials Processing 3 Credits
Grading Scheme: Letter Grade
Materials requirements for high speed devices and processing modules needed for their fabrication. Examples of current industrial processes.
Prerequisite: EMA3413 or equivalent
EMA 6625 Advanced Metals Processing 3 Credits
Grading Scheme: Letter Grade
Advanced treatment of solidification phenomena during metals processing. Topics to include nucleation, kinetics, solidification structure, segregation, and effects of processing variables on structure and properties.
Prerequisite: (EMA4120 & EMA4224) or equivalents

EMA 6667 Polymer Processing 2-3 Credits, Max 3 Credits
Grading Scheme: Letter Grade
Major processing methods for polymers and polymeric composites as related to the rheological behavior of these systems. Synthesis of polymers via industrial processes.
Prerequisite: EMA 3066 or equivalent.

EMA 6715 Fracture of Brittle Materials 3 Credits
Grading Scheme: Letter Grade
Prerequisite: EMA 4223, EGM 3520, or equivalent.

EMA 6803 Classical Methods in Computational Materials Science 3 Credits
Grading Scheme: Letter Grade
Proficiency developing and using common tools for computational materials research at the atomic level.

EMA 6804 Quantum Methods in Computational Materials Science 3 Credits
Grading Scheme: Letter Grade
Theory, methods, and application of common quantum mechanical software (GAUSSIAN and VASP) for computational study of materials.
Prerequisite: EMA 6313, C/C++, Fortran, or other suitable scientific programming language.

EMA 6808 Error Analysis and Optimization Methodologies in Materials Research 3 Credits
Grading Scheme: Letter Grade
Statistical approach to materials research, basic and relevant statistical concepts, error analysis, factorial matrices, reducing variance, nested designs and sampling plans, mixture designs, optimization techniques, response surface method, and Taguchi method.

EMA 6905 Individual Work in Materials Science and Engineering 1-4 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Individual Work in Materials Science and Engineering

EMA 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

EMA 6920 Professional Development for Materials Science and Engineering 1 Credit
Grading Scheme: S/U
Professional development training as a graduate student in Materials Science and Engineering, including serving as teaching assistant in the instruction of materials science and engineering courses, and developing and defending research proposals.
Prerequisite: Graduate Status

EMA 6936 Seminar in Materials Science and Engineering 1 Credit, Max 14 Credits
Grading Scheme: S/U
Offered in fall and spring. Required of all students.

EMA 6938 Special Topics in Materials Science and Engineering 1-4 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Special Topics in Materials Science and Engineering

EMA 6941 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
A supervised teaching experience.

EMA 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

EMA 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

EMA 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

ENU 6805 Introduction to Nuclear Reactor Materials 3 Credits
Grading Scheme: Letter Grade
Introducing the materials used in nuclear energy systems and their response to the reactor environment. The majority of materials related issues encountered in the nuclear power plants are discussed in this course.

Mathematics

MAA 5104 Advanced Calculus for Engineers and Physical Scientists I 3 Credits
Grading Scheme: Letter Grade
Advanced Calculus for Engineers and Physical Scientists I

MAA 5105 Advanced Calculus for Engineers and Physical Scientists II 3 Credits
Grading Scheme: Letter Grade
Advanced Calculus for Engineers and Physical Scientists II
Prerequisite: MAA 5104.

MAA 5228 Modern Analysis I 3 Credits
Grading Scheme: Letter Grade
Topology of metric spaces, numerical sequences and series, continuity, differentiation, the Riemann-Stieltjes integral, sequences and series of functions, the Stone-Weierstrass theorem, and the Lebesgue theory.
Prerequisite: advanced calculus.

MAA 5229 Modern Analysis II 3 Credits
Grading Scheme: Letter Grade
Modern Analysis II
Prerequisite: MAA 5228.

MAA 5404 Introduction to Complex Variables for Engineers and Physical Scientists 3 Credits
Grading Scheme: Letter Grade
Introduction to Complex Variables for Engineers and Physical Scientists
MAA 6406 Complex Analysis I 3 Credits
Grading Scheme: Letter Grade
Prerequisite: MAA 5229.

MAA 6407 Numerical Analysis 3 Credits
Grading Scheme: Letter Grade
Numerical techniques to solve systems of nonlinear equations to approximate functions, to compute derivatives, to evaluate integrals, and to integrate systems of differential equations. Introduction to numerical techniques for partial differential equations. Companion to MAD 6406.
Prerequisite: MAA 4212, MAA 5105, or MAA 5229; and programming language.

MAP 5202 Internship in College Teaching
Grading Scheme: S/U
Supervised Teaching
Prerequisite: consent of graduate adviser.

MAP 5204 Internship in Elementary School Mathematics
Grading Scheme: Letter Grade
Internship in Elementary School Mathematics
Prerequisite: consent of graduate adviser.

MAP 5489 Modeling in Mathematical Biology 3 Credits
Grading Scheme: Letter Grade
Introduction to Partial Differential Equations
Prerequisite: consent of graduate adviser.

MAP 5345 Introduction to Partial Differential Equations 3 Credits
Grading Scheme: Letter Grade
Introduction to Partial Differential Equations

MAP 5489 Modeling in Mathematical Biology 3 Credits
Grading Scheme: Letter Grade
Mathematical models of biological systems. Models of growth, predator-prey populations, competition, chemostat, epidemics, excitable systems, and analytical tools such as linearization, phase-plane analysis, Poincare-Bendixson theory, Lyapunov functions, and bifurcation analysis.
Prerequisite: undergraduate course in ordinary differential equations.

MAP 5345 Introduction to Partial Differential Equations 3 Credits
Grading Scheme: Letter Grade
Exercises in solving partial differential equations.

MAP 6207 Combinatorial Theory II 3 Credits
Grading Scheme: Letter Grade
Combinatorial Theory II

MAP 6406 Numerical Linear Algebra 3 Credits
Grading Scheme: Letter Grade
Topics most useful in applications with emphasis on numerical techniques: systems of linear equations, positive definite and toepplitz systems, least squares problems, singular value decomposition, and eigenvalues. Numerical stability and efficiency of algorithms as well as effect of perturbations on the problem. Companion to MAD 6407.
Prerequisite: MAS 3114, 4105, or 4124; and programming language.
MAP 6356 Partial Differential Equations I 3 Credits
Grading Scheme: Letter Grade
Cauchy-Kowalewski theorem, first order equations, classification of equations, hyperbolic equations, elliptic equations, parabolic equations, hyperbolic systems, nonlinear hyperbolic systems, existence theory based on functional analysis. Applications to physical sciences.
Prerequisite: MAA 5229, MAP 5345 or MAP 6506.

MAP 6357 Partial Differential Equations II 3 Credits
Grading Scheme: Letter Grade
Partial Differential Equations II
Prerequisite: MAP 6356.

MAP 6375 Numerical Partial Differential Equations 3 Credits
Grading Scheme: Letter Grade
Prerequisite: MAD 6406 and MAD 6407 or consent of instructor.

MAP 6376 Finite Element Method 3 Credits
Grading Scheme: Letter Grade
Prerequisite: MAD 6406 and MAD 6407 or consent of instructor.

MAP 6467 Stochastic Differential Equations and Filtering Theory I 3 Credits
Grading Scheme: Letter Grade
Introduction to random functions; Brownian motion process. Ito’s stochastic integral; Ito’s stochastic calculus; stochastic differential equations. Linear filtering; Kalman filtering; nonlinear filtering theory.

MAP 6468 Stochastic Differential Equations and Filtering Theory II 3 Credits
Grading Scheme: Letter Grade
Stochastic Differential Equations and Filtering Theory II
Prerequisite: MAP 6467.

MAP 6472 Probability and Potential Theory I 3 Credits
Grading Scheme: Letter Grade
Random variables, independence and conditioning. Laws of large numbers and the Central Limit Theorem. Stochastic processes, martingales, Gaussian processes, Markov processes, potentials and excessive functions.
Prerequisite: MAA 5229 or STA 6326.

MAP 6473 Probability and Potential Theory II 3 Credits
Grading Scheme: Letter Grade
Probability and Potential Theory II
Prerequisite: MAP 6472

MAP 6487 Biomathematics Seminar I 3 Credits
Grading Scheme: Letter Grade
Stochastic processes, differential equations, and reaction-diffusion equations used to model various biological processes. Among the applications covered are the following: population dynamics, epidemiology, genetics, enzyme kinetics, cell differentiation and morphogenesis, nerve impulse generation, and aggregation of slime mold. The course is designed to benefit graduate students in biological sciences, as well as mathematics.
Prerequisite: MAC 2312, MAP 2302, STA 6326 or MAP 4102.

MAP 6488 Biomathematics Seminar II 3 Credits
Grading Scheme: Letter Grade
Continuation of MAP 6487.
Prerequisite: MAP 6487.

MAP 6505 Mathematical Methods of Physics and Engineering 3 Credits
Grading Scheme: Letter Grade
Orthogonal functions; theory of distributions; integral equations; eigenfunctions and Green’s functions; special functions; boundary and initial value problems, with emphasis on potential theory (Laplace and Poisson equations); the wave equation; and the diffusion equation.
Prerequisite: MAA 5404, MAP 5304, MAP 5345, MAS 5157 or equivalent.

MAP 6506 Mathematical Methods of Physics and Engineering II 3 Credits
Grading Scheme: Letter Grade
Mathematical Methods of Physics and Engineering II
Prerequisite: MAP 6505.

MAP 6941 Internship in Applied Mathematics 1-5 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Mathematical research on projects sponsored by a university laboratory or an off-campus industrial internship program.
Prerequisite: consent of supervisory committee chair.

MAP 7436 Seminar in Applied Mathematics I 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Various topics in applications of mathematics both classical and in areas of current research.

MAP 7437 Seminar in Applied Mathematics II 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Seminar in Applied Mathematics II

MAS 5311 Introductory Algebra I 3 Credits
Grading Scheme: Letter Grade
The basic algebraic systems: groups, rings, vector spaces, and modules. Linear transformations, matrices, and determinants.
Prerequisite: MAS 4105 and 4302.

MAS 5312 Introductory Algebra II 3 Credits
Grading Scheme: Letter Grade
Introductory Algebra II

MAS 6331 Algebra I 3 Credits
Grading Scheme: Letter Grade
Solvable and nilpotent groups, Jordan-Holder theorem, abelian groups, Galois theory, Noetherian rings, Dedekind domains, Jacobson radical, Jacobson density theorem, Wedderburn-Artin theorem.
Prerequisite: MAS 5312.

MAS 6332 Algebra II 3 Credits
Grading Scheme: Letter Grade
Algebra II
Prerequisite: MAS 6331.
MAS 7215 Theory of Numbers I 3 Credits  
Grading Scheme: Letter Grade  
Introduction to theory of numbers; theorems on divisibility, congruence, number-theoretic functions; primitive roots and indices; quadratic reciprocity law; Diophantine equations and continued functions.  
Prerequisite: 2 of MAA 6407, MAA 6617, MAS 6332.

MAS 7216 Theory of Numbers II 3 Credits  
Grading Scheme: Letter Grade  
Theory of Numbers II  
Prerequisite: MAS 7215.

MAS 7396 Advanced Topics in Algebra I 3 Credits, Max 6 Credits  
Grading Scheme: Letter Grade  
Current topics in algebra.  
Prerequisite: MAA 6407, MAA 6617, MAS 6332 or MTG 6347.

MAS 7397 Topics in Algebra II 3 Credits  
Grading Scheme: Letter Grade  
Topics in Algebra II

MAT 6905 Individual Work 3 Credits, Max 9 Credits  
Grading Scheme: Letter Grade  
Individual Work

MAT 6910 Supervised Research 1-5 Credits, Max 5 Credits  
Grading Scheme: S/U  
Supervised Research

MAT 6932 Special Topics in Mathematics 3 Credits, Max 9 Credits  
Grading Scheme: Letter Grade  
Special Topics in Mathematics  
Prerequisite: consent of graduate adviser, who should be consulted well in advance of registration.

MAT 6971 Research for Master's Thesis 1-15 Credits  
Grading Scheme: S/U  
Research for Master's Thesis

MAT 7979 Advanced Research 1-12 Credits  
Grading Scheme: S/U  
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

MAT 7980 Research for Doctoral Dissertation 1-15 Credits  
Grading Scheme: S/U  
Research for Doctoral Dissertation

MHF 5107 Introduction to Set Theory 3 Credits  
Grading Scheme: Letter Grade  
Basic axioms and concepts of set theory, axiom of choice, Zorn's lemma, Schroder-Bernstein theorem, cardinal numbers, ordinal numbers, and the continuum hypothesis.

MHF 5207 Foundations of Mathematics 3 Credits  
Grading Scheme: Letter Grade  

MHF 6306 Mathematical Logic I 3 Credits  
Grading Scheme: Letter Grade  
Languages, models, and theories; Godel’s completeness and incompleteness theorems; formal number theory and axiomatic set theory; applications to other areas of mathematics.

MHF 6307 Mathematical Logic 2 3 Credits  
Grading Scheme: Letter Grade  
The three sub-areas Model theory, computability theory, and set theory will be covered. Specific topics may include axiomatization of set theory, transfinite recursion and cardinal arithmetic, Goedel’s constructible universe, Cohen’s method of forcing, Turing degrees, and Post’s problem.  
Prerequisite: MHF 6306.

MTG 5316 Introduction to Topology I 3 Credits  
Grading Scheme: Letter Grade  
Basic axioms and concepts of point-set topology, compactness, connectedness, separation axioms, metric spaces, metrization. Tietze extension theorem. Urysohn lemma, Tychonoff theorem, fundamental group.

MTG 5317 Introduction to Topology II 3 Credits  
Grading Scheme: Letter Grade  
Introduction to Topology II  
Prerequisite: MTG 5316.

MTG 5411 Introduction to Fractal Geometry 3 Credits  
Grading Scheme: Letter Grade  
Introduction to techniques for generating and analyzing fractal sets. Hausdorff dimension, self-similarity, and iterated function systems. If time permits, Brownian paths, Julia sets, and Mandelbrot set.  
Prerequisite: advanced calculus or consent of instructor.

MTG 5412 Introduction to Dynamical Systems and Chaos 3 Credits  
Grading Scheme: Letter Grade  
Introduction to nonlinear dynamical systems and chaos. One-dimensional systems, bifurcation theory, symbolic dynamics, Sarkovskii’s theorem, Schwarzian derivative, Bernoulli shifts and subshifts of finite type, and kneading theory. If time permits, toral automorphisms, Henon map and complex dynamics.  
Prerequisite: advanced calculus or consent of instructor.

MTG 6256 Differential Geometry I 3 Credits  
Grading Scheme: Letter Grade  
Foundations of the theory of smooth manifolds, vector fields, and differential forms. Topics chosen from a list including differential topology, Lie groups, symplectic geometry, Riemannian geometry, and applications to physics.  
Prerequisite: consent of instructor.

MTG 6257 Differential Geometry II 3 Credits  
Grading Scheme: Letter Grade  
Differential Geometry II

MTG 6346 Topology I 3 Credits  
Grading Scheme: Letter Grade  
A basic introduction to advanced topology. Topics covered include general topology, algebraic topology, homotopy theory and topology of manifolds.  
Prerequisite: MTG 5317.

MTG 6347 Topology II 3 Credits  
Grading Scheme: Letter Grade  
Topology II  
Prerequisite: MTG 6346.
MTG 6401 Ergodic Theory and Dynamical Systems I 3 Credits
Grading Scheme: Letter Grade
Prerequisite: MTG 5317, MAA 6617, or consent of instructor.

MTG 6402 Ergodic Theory and Dynamical Systems II 3 Credits
Grading Scheme: Letter Grade
Continuation of MTG 6401.
Prerequisite: MTG 6401.

MTG 7396 Advanced Topics in Topology I 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Topics change yearly.
Prerequisite: MTG 6347.

MTG 7397 Advanced Topics in Topology II 3 Credits
Grading Scheme: Letter Grade
Discussion of advanced topics in topology and its applications.
Prerequisite: MTG 7396.

**Mechanical and Aerospace Engineering**

BME 5580 Introduction to Microfluidics and BioMEMS 3 Credits
Grading Scheme: Letter Grade
Introduction to concepts of miniaturization, materials and methods for microfabrication, principles of microfluidics, and biological applications of microfluidic devices and biomedical microelectromechanical systems.
Prerequisite: EGG 3353C or consent of instructor.

EAS 5242 Mechanics of Composite Materials 3 Credits
Grading Scheme: Letter Grade

EAS 5938 Special Topics in Aerospace Engineering 1-4 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Special Topics in Aerospace Engineering

EAS 6135 Molecular Theory of Fluid Flows 3 Credits
Grading Scheme: Letter Grade
Introduction to the molecular dynamics of gases and liquids, the Boltzmann equation, Chapman-Enskog expansion and derivation of Euler and Navier-Stokes equations, and lattice Boltzmann methods; and application to gas, liquid, and multiphase flows.
Prerequisite: EGM 6812 or equivalent.

EAS 6138 Gasdynamics 3 Credits
Grading Scheme: Letter Grade
Theory of sound waves, subsonic and supersonic flows, shockwaves, explosions and implosions.
Prerequisite: EAS 4103 or EML 5714.

EAS 6242 Advanced Structural Composites 3 Credits
Grading Scheme: Letter Grade
Prerequisite: EGM 3520.

EAS 6413C Spacecraft Attitude Estimation and Control 3 Credits
Grading Scheme: Letter Grade
Sensors and actuators used in spacecraft attitude navigation and control, how to process data from sensors, and how to command actuators. Kalman and extended Kalman filtering, control methods based on momentum exchange devices (reaction wheels, control moment gyroscopes), and thrusters.
Prerequisite: (EAS 4510 or EAS 6939) and EML 5215, with minimum grades of B.

EAS 6415 Guidance and Control of Aerospace Vehicles 3 Credits
Grading Scheme: Letter Grade
Applying modern control theory to aerospace vehicles. Parameter identification methods applied to aircraft and missiles.
Prerequisite: EAS 4412 or equivalent.

EAS 6905 Aerospace Research 1-6 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Aerospace Research

EAS 6910 Supervised Research 1-5 Credits
Grading Scheme: S/U

EAS 6939 Special Topics in Aerospace Engineering 1-6 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Laboratory, lectures, or conferences covering selected topics in space engineering.

EAS 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

EAS 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

EAS 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

EGM 5111L Experimental Stress Analysis 3 Credits
Grading Scheme: Letter Grade
Introduction to techniques of experimental stress analysis in static systems. Lecture and laboratory include applications of electrical resistance strain gauges, photoelasticity, brittle coatings, moire fringe analysis, and X-ray stress analysis.
Prerequisite: EGM 3520.

EGM 5121C Data Measurement and Analysis 3 Credits
Grading Scheme: Letter Grade
Tools for random data analysis (including types of random data, mean values, mean-square values, probability density and distribution functions, moments and characteristic functions, and spectral and correlation analysis); bias and random error estimates in data measurements; input-output system models; and measurement examples.

EGM 5423 High Strain Rate Behavior of Materials 3 Credits
Grading Scheme: Letter Grade
Dynamic behavior of materials, comparison of material response between quasistatic and extremely high strain rates, deformation mechanisms, microstructural evolution at high strain rate, dynamic fracture, constitutive modeling, mechanical properties.
Prerequisite: EGM3520 or equivalent
EGM 5533 Applied Elasticity and Advanced Mechanics of Solids 3 Credits  
Grading Scheme: Letter Grade  
Bars, beams, thin-walled structures, and simple continua in the elastic and inelastic range. Virtual work approaches, elastic energy principles, plastic limit theorems, and creep deformation procedures. Introduction to instability and fracture mechanics. Design applications.  
Prerequisite: EGM 3520.

EGM 5584 Biomechanics of Soft Tissue 3 Credits  
Grading Scheme: Letter Grade  
Introduction to solid and fluid mechanics of biological systems. Rheological behavior of materials subjected to static and dynamic loading. Mechanics of cardiovascular, pulmonary, and renal systems. Mathematical models and analytical techniques used in biosciences.  
Prerequisite: EGN 3353C and EGM 3520.

EGM 5816 Intermediate Fluid Dynamics 3 Credits  
Grading Scheme: Letter Grade  
Basic laws of fluid dynamics. Introduction to potential flow, viscous flow, boundary layer theory, and turbulence.  
Prerequisite: EGN 3353C (or CWR 3201), MAP 2302.

EGM 6321 Principles of Engineering Analysis I 3 Credits  
Grading Scheme: Letter Grade  
Prerequisite: EGM 4313 or MAP 4305.

EGM 6322 Principles of Engineering Analysis II 3 Credits  
Grading Scheme: Letter Grade  
Prerequisite: EGM 4313 or MAP 4341.

EGM 6341 Numerical Methods of Engineering Analysis I 3 Credits  
Grading Scheme: Letter Grade  
Finite-difference calculus; interpolation and extrapolation; roots of equations; solution of algebraic equations; eigenvalue problems; least-squares method; quadrature formulas; numerical solution of ordinary differential equations; methods of weighted residuals. Use of digital computer.  
Prerequisite: EGM 4313 or equivalent.

EGM 6342 Fundamentals of Computational Fluid Dynamics 3 Credits  
Grading Scheme: Letter Grade  
Fundamentals of computational fluid dynamics. Spatial discretisations, semi-discretisations, time-integration methods, full discretisations.  
Prerequisite: EGM 6341 and EGM 6813 or consent of instructor.

EGM 6352 Advanced Finite Element Methods 3 Credits  
Grading Scheme: Letter Grade  
The discontinuous Galerkin method applied to transient problems. Optimization theory applied to formulating mixed FEM; treatment of constraints (e.g., incompressibility). General shape functions. Electromagnetics, heat, fluids, and solids. Other advanced topics.  
Prerequisite: EGM 6351.

EGM 6365 Structural Optimization 3 Credits  
Grading Scheme: Letter Grade  
Prerequisite: EML 4500, EGM 4350, EML 5526, or EGM 6451.

EGM 6570 Principles of Fracture Mechanics 3 Credits  
Grading Scheme: Letter Grade  
Introduction to the mechanics of fracture of brittle and ductile materials. Linear elastic fracture mechanics; elastic-plastic fracture; fracture testing; numerical methods; composite materials; creep and fatigue fracture.  
Prerequisite: EGM 6611.

EGM 6611 Continuum Mechanics 3 Credits  
Grading Scheme: Letter Grade  
Prerequisite: EGM 3520.

EGM 6671 Continuum Mechanics 3 Credits  
Grading Scheme: Letter Grade  
Virtual work, stability, extremum principles. Applications on the microscale, miniscale, and macroscale. Thermodynamics, internal variables, damage parameters, and time and temperature effects. Fracture mechanics. Finite elastoplasticity.  
Prerequisite: EGM 6611.

EGM 6812 Fluid Mechanics I 3 Credits  
Grading Scheme: Letter Grade  
Prerequisite: EGN 3353C.

EGM 6813 Fluid Mechanics II 3 Credits  
Grading Scheme: Letter Grade  
Prerequisite: EGM 6812.

EGM 6855 Bio-Fluid Mechanics and Bio-Heat Transfer 3 Credits  
Grading Scheme: Letter Grade  
Biothermal fluid sciences. Emphasizes physiological processes occurring in human blood circulation and underlying physical mechanisms, from an engineering perspective.  
Prerequisite: undergraduate fluid mechanics.

EGM 6905 Individual Study 1-6 Credits, Max 12 Credits  
Grading Scheme: Letter Grade  
Individual Study  

EGM 6934 Special Topics in Engineering Mechanics 1-6 Credits, Max 12 Credits  
Grading Scheme: Letter Grade  
Special Topics in Engineering Mechanics
EGM 6936 Graduate Seminar 1 Credit, Max 6 Credits
Grading Scheme: Letter Grade
Discussions and presentations in the fields of graduate study and research.

EGM 7819 Computational Fluid Dynamics 3 Credits
Grading Scheme: Letter Grade
Prerequisite: EGM 6342 and EGM 6813 or equivalent.

EGM 7845 Turbulent Fluid Flow 3 Credits
Grading Scheme: Letter Grade
Prerequisite: EGM 6813 or equivalent.

EGM 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

EGM 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

EGN 5945 Practicum/Internship/Cooperative Work Experience 1-6 Credits, Max 6 Credits
Grading Scheme: S/U
Practical cooperative engineering work under approved industrial and faculty supervision.
Prerequisite: graduate student.

EGN 6640 Entrepreneurship for Engineers 3 Credits
Grading Scheme: Letter Grade
Introduction to entrepreneurship, idea generating and feasibility analysis, and business planning. Lectures, case studies, student-led discussions, team business plans, and investor presentations.

EGN 6913 Engineering Graduate Research 0-3 Credits
Grading Scheme: S/U
Course will provide the student with supervised research in a laboratory setting.

EML 5045 Computational Methods for Design and Manufacturing 3 Credits
Grading Scheme: Letter Grade
Geometric and solid modeling, feature-based design, and parametric models. Applications to product design, rapid prototyping, and manufacturing.
Prerequisite: EML 3023 or consent of instructor.

EML 5104 Classical and Statistical Thermodynamics 3 Credits
Grading Scheme: Letter Grade

EML 5131 Combustion 3 Credits
Grading Scheme: Letter Grade
Chemical thermodynamics, chemical kinetics, flame propagation, detonation and explosion, combustion of droplets and spray.
Prerequisite: EML 3101 or consent of instructor.

EML 5215 Analytical Dynamics I 3 Credits
Grading Scheme: Letter Grade
Prerequisite: dynamics.

EML 5223 Structural Dynamics 3 Credits
Grading Scheme: Letter Grade
Vibration analysis and synthesis of continuous and multidegree-of-freedom lumped-parameter systems. Computational and experimental techniques in modal analysis.
Prerequisite: EML 4220.

EML 5224 Acoustics 3 Credits
Grading Scheme: Letter Grade
Prerequisite: ENG 3353C, EGM 4313, or consent of instructor.

EML 5233 Failure of Materials in Mechanical Design 3 Credits
Grading Scheme: Letter Grade
Prerequisite: 6EG, 7EG, 8EG, 9EG, or EML3005

EML 5311 Control System Theory 3 Credits
Grading Scheme: Letter Grade

EML 5318 Computer Control of Machines and Processes 3 Credits
Grading Scheme: Letter Grade
Basic concepts, including hardware and software. Modeling of machines, processes, and their controllers.
Prerequisite: CGS 2425 or consent of instructor.

EML 5465 Energy Management for Mechanical Engineers 3 Credits
Grading Scheme: Letter Grade
Prerequisite: consent of instructor.

EML 5515 Gas Turbines and Jet Engines 3 Credits
Grading Scheme: Letter Grade
Theory and analysis of gas turbine engines and major components.
Prerequisite: EGN 3353C or EAS 4101 or equivalent.

EML 5516 Design of Thermal Systems 3 Credits
Grading Scheme: Letter Grade
Modeling of thermal equipment; system simulation; optimization, search methods, thermal system design and optimization using dynamic, geometric, and linear programming; simulation of large systems, vector and reduced gradient searches.
Prerequisite: EML 4141 and 4702 or equivalent.
EML 5526 Finite Element Analysis and Application 3 Credits
Grading Scheme: Letter Grade
Fundamentals, including discrete system analysis, dynamic analysis of structures, steady state and transient heat transfer analysis, and incompressible fluids analysis. Modeling, analysis, and design using FEA software.
Prerequisite: EGM 3520 or equivalent.

EML 5595 Mechanics of the Human Locomotor System 3 Credits
Grading Scheme: Letter Grade
Analyzing the human musculoskeletal system as sensors, levers, and actuators. Joint articulations and their mechanical equivalents. Kinematic and kinetic analysis of human motion. Introduction to modeling human body segments to analyze human activities.
Prerequisite: EGM 3401, 3520.

EML 5598 Orthopedic Biomechanics 3 Credits
Grading Scheme: Letter Grade
Mechanical properties of the human body’s hard and soft tissues. Mechanical and biological considerations for repair and replacement of soft and hard tissues and joints. Fracture fixation, orthopedic implants for hip and knee, and orthotic and prosthetic devices.
Prerequisite: mechanics of materials.

EML 5605 Advanced Refrigeration 3 Credits
Grading Scheme: Letter Grade
Analysis and design considerations for vapor compression, absorption, steam-jet, thermoelectric, and air refrigeration systems.
Prerequisite: EML 4601.

EML 5714 Introduction to Compressible Flow 3 Credits
Grading Scheme: Letter Grade
One-dimensional and quasi-one-dimensional compressible fluid flows. Mach waves, normal shocks, oblique shocks, Prandtl-Meyer expansions, isentropic flow with area change, Fanno flow, Rayleigh flow.

EML 6154 Conduction Heat Transfer 3 Credits
Grading Scheme: Letter Grade
Heat conduction in homogeneous, heterogeneous, isotropic, anisotropic, stationary, and moving bodies; in Cartesian, cylindrical and spherical systems. Examines exact and approximate solutions.
Prerequisite: MAP 2302, EML 4141.

EML 6155 Convective Heat Transfer I 3 Credits
Grading Scheme: Letter Grade
Applying equations of motion and energy to forced and free convection with laminar and turbulent flow. Solution techniques to include simplification to ordinary differential equations, boundary layer approximations, similarity transformations, and integral approximations. Phenomenological treatment of turbulent transport.
Prerequisite: EML 4702, 4141.

EML 6156 Multiphase Convection Heat Transfer 3 Credits
Grading Scheme: Letter Grade
Detailed coverage of advanced convection heat transfer topics: boiling and condensation, high-velocity convection, transpiration cooling, convection around bodies, free jet flow, oscillating fluids, and microelectronic cooling.
Prerequisite: EML 6155.

EML 6157 Radiation Heat Transfer 3 Credits
Grading Scheme: Letter Grade
Theory and analysis of radiation exchange in transparent and absorbing, and emitting and scattering media.
Prerequisite: MAP 2302, EML 4141.

EML 6229 Introduction to Random Dynamical Systems 3 Credits
Grading Scheme: Letter Grade
Analysis of stochastic systems found in science and engineering applications. Practical application of uncertainty analysis in nonlinear dynamical systems.
Prerequisite: Knowledge of functional analysis and MATLAB or similar programming language.

EML 6267 Advanced Manufacturing Processed and Analysis 3 Credits
Grading Scheme: Letter Grade
Integrated treatment of the analysis and applications of advanced manufacturing processes.

EML 6281 Geometry of Mechanisms and Robots I 3 Credits
Grading Scheme: Letter Grade
Developing applications to basic theory of the mathematics required to design spatial mechanisms and robot arms. Examples include mathematical description of the elements of mechanisms and robot arms (namely linkages and joints); their mobility and their analysis.

EML 6282 Geometry of Mechanisms and Robots II 3 Credits
Grading Scheme: Letter Grade
Applying the theory of screws to determine stationary and uncertainty configurations of mechanisms and robot arms. Dexterity and workspace of robot arms.

EML 6323 Nontraditional Manufacturing 3 Credits
Grading Scheme: Letter Grade
Focusing on nontraditional additive and subtractive manufacturing processes using electrical, chemical, ultrasonic, magnetic, and photonic energy - including processes and equipment.
Prerequisite: Graduate standing.

EML 6324 Fundamentals of Production Engineering 3 Credits
Grading Scheme: Letter Grade

EML 6350 Introduction to Nonlinear Control 3 Credits
Grading Scheme: Letter Grade
Introduction to nonlinear analysis and control systems theory. Lyapunov-based analysis and design techniques.

EML 6351 Nonlinear Control II: Adaptive Control 3 Credits
Grading Scheme: Letter Grade
Control methods for uncertain nonlinear systems. Lyapunov-based robust, adaptive, learning, and estimation-based methods.
Prerequisite: EML 6350.

EML 6352 Optimal Estimation and Kalman Filtering 3 Credits
Grading Scheme: Letter Grade
Methods of estimating parameters and random variables from noisy measurements with applications. State estimation of linear and nonlinear dynamic systems with Kalman filtering and extended Kalman filtering, with mechanical and aerospace engineering applications such as target tracking.
Prerequisite: EML 5311 or EEL 5182 or Equivalent

EML 6365 Robust Control Synthesis 3 Credits
Grading Scheme: Letter Grade
Application of uncertainty modeling and robust controls to dynamic systems for both analysis and synthesis.
Microbiology and Cell Science

BSC 6438 R for Functional Genomics 3 Credits
Grading Scheme: Letter Grade
Introductory course to the basics of the R language and to state of the art methods for functional genomics data analysis. Students will learn how to write R scripts, choose appropriate statistical tools and how to use linux environments to analyse high-throughput genomics data. 
Prerequisite: BSC2010 or BSC2011 or MCB3020 or MCB3023 or BCH4024 or CHM3218 or equivalent AND STA6166 or STA6167 or equivalent.

BSC 6459 Fundamentals of Bioinformatics 3 Credits
Grading Scheme: Letter Grade
An introduction to the basic bioinformatics tools used in computational biology for life science research. The course will use web-based resources that analyze gene and protein sequences as pertinent data examples.

ENU 5626 Radiation Biology 3 Credits
Grading Scheme: Letter Grade
Effects of radiation on biological molecules, cells, and man including cancer and mutagenesis; use of radiation in treatment of disease.
Prerequisite: one year each of college biology, chemistry, and physics; permission of instructor.

MCB 5205 Microbiology of Human Pathogens 3 Credits
Grading Scheme: Letter Grade
Surveying advanced topics and current scientific literature related to human host-pathogen interactions and microbial pathogenesis, focusing on emerging bacterial and viral pathogens as agents of human disease, biosecurity, molecular identification methods, spread of multi-drug resistance among bacterial pathogens, drug discovery and alternative treatment research.

MCB 5252 Microbiology, Immunology, and Immunotherapeutics 4 Credits
Grading Scheme: Letter Grade
Microbiology and immunology for pharmacy students. Microorganisms and infection, control with antimicrobials, host immune response, immune disorders.
Prerequisite: CHM 2210, 2211, and consent of instructor.

MCB 5305L Microbial Genetics and Biotechnology Laboratory 2 Credits
Grading Scheme: Letter Grade
Methods for mutagenesis, gene transfer and genetic mapping, plasmid isolation, restriction enzyme use, construction of chimeric (recombinant) plasmids, phage isolation and preparation.
Prerequisite: MCB 3023/3023L and 4303 or PCB 4522 with grade of C or higher.

MCB 5505 General Virology 3 Credits
Grading Scheme: Letter Grade
Basic information on families of viruses from humans, plants, insects, animals, and bacteria. Medical, clinical, diagnostic, biotechnological, and molecular aspects of these viruses.
Prerequisite: MCB 3020/3020L and 4203 with grade of C or higher.

MCB 5705 Astrobiology 3 Credits
Grading Scheme: Letter Grade
Astrobiology examines the origin, evolution, and future of life in our solar system. Topics will include: planet and star formation, biosphere formation, evolutionary processes biogeochemistry, microbial adaptation to extreme environments, planetary habitability, and microbiology on the International Space Station.
Prerequisite: MCB 6656 Environmental Microbiology.

MCB 6151 Prokaryotic Diversity 3 Credits
Grading Scheme: Letter Grade
An introduction to the diversity of Bacteria and Archaea. Discussions will provide a conceptual and historical framework for understanding their 1) origin and evolution; 2) morphological, metabolic, and molecular characteristics; 3) genetic and physiological diversity; 4) importance in human/animal/plant health; and 5) roles in elemental cycling.

MCB 6317 Molecular Biology of Gene Expression 1 Credit
Grading Scheme: Letter Grade
Synthesis, processing, transport, and translation of RNA in microorganisms and eukaryotes. Additional topics include epigenetic regulation of gene expression.
MCB 6318 Comparative Microbial Genomics 2 Credits
Grading Scheme: Letter Grade
Methods to allow experimental scientists to efficiently use genomic and post-genomic data that is publicly available. Examples taken primarily from the field of microbial metabolism and regulation.
Prerequisite: PCB 4522 and a working knowledge of basic bioinformatic tools.

MCB 6355 Microbial/Host Defense 1 Credit
Grading Scheme: Letter Grade
Principles of host defense to microbial invasion in a context of cellular biology involving both plants and animals.
Prerequisite: MCB 4203 and PCB 5235: Immunology or equivalents, with the minimum grade of a C.

MCB 6417 Microbial Metabolism and Energetics 1 Credit
Grading Scheme: Letter Grade
Principles of energy and biosynthetic metabolism in aerobic and anaerobic microorganisms. Current biotechnology which incorporates these principles.
Prerequisite: MCB 4403 and BCH 4024 or CHM 3218 or equivalent.

MCB 6424 Probiotics 3 Credits
Grading Scheme: Letter Grade
Covers the use of microorganisms to promote a healthy status in the host. This course will provide a conceptual background in microbiology and immunology for the use of microorganisms for the prevention or treatment of animal and human diseases.

MCB 6457 Metabolic Regulation 1 Credit
Grading Scheme: Letter Grade
Environmental sensing and mechanisms of microbial response. Molecular signaling, regulation of genetic information at posttranscriptional and transcriptional levels, effects on metabolism and physiology.
Prerequisite: MCB 4403 and BCH 4024 or CHM 3218 or equivalent.

MCB 6465 Microbial Metabolic Engineering 1 Credit
Grading Scheme: Letter Grade
Principles of anaerobic fermentation and its role in production of fuels and chemicals from various feedstocks including lignocellulosic biomass. Evaluation of methods of depolymerization of complex carbohydrate feedstocks to simple sugars for fermentation.
Prerequisite: MCB 4403 and BCH 4024 or CHM 3218 or equivalent.

MCB 6485 Advanced Techniques in Microbiology and Cell Science 2-4 Credits, Max 4 Credits
Grading Scheme: Letter Grade
Application of advanced techniques to experimental research in biochemistry, cell biology, and microbiology.
Prerequisite: consent of instructor.

MCB 6656 Environmental Microbiology 3 Credits
Grading Scheme: Letter Grade
Overview of microorganisms in the environment including: occurrence, abundance, and distribution; current research methodologies to decipher microbial processes and activities, marine microbial ecology, microbial interactions with the environment and practices of applied environmental microbiology.
Prerequisite: MCB 3020 or MCB 3023 with a grade of C or better.

MCB 6670C The Microbiome 3 Credits
Grading Scheme: Letter Grade
Increase knowledge, appreciation and use of genomics pertaining to the breadth of microbial diversity across a wide variety of organisms and habitats using methods that do not require culturing of the myriad of inhabitants. Students will use tools, practice analysis and interpretation of genomic data sets to analyze different microbiomes.
Prerequisite: MCB 3020 or MCB 3023 with minimum grades of C.

MCB 6772 Advanced Topics in Cell Biology 1 Credit
Grading Scheme: Letter Grade
In each semester a specific topic in cell biology with microbiological interest will be considered in a comparative discussion of animal and plant systems.

MCB 6781 Extremophiles 3 Credits
Grading Scheme: Letter Grade
Students will learn about the evolution, physiology, biochemistry and molecular biology of extremophiles with emphasis on archaea and their viruses. Principles of energy metabolism at the limits of life will be discussed. Research that incorporates cutting-edge techniques and biotechnology applications for using extremophiles to solve real-world problems is highlighted.
Prerequisite: CHM 2211 (C) & (MCB 3020 or 3023) (C) & (MCB 3020L or 3023L) (C).

MCB 6905 Experimental Microbiology 1-8 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Application of physical, chemical and biological techniques to experimental problems in microbiology. Individual laboratory study.
Prerequisite: eight credits in microbiology and cell science.

MCB 6930 Seminar 1 Credit, Max 8 Credits
Grading Scheme: S/U
Attendance required of all graduate majors at all research presentations.

MCB 6937 Special Topics in Microbiology 1-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Contemporary research in a particular aspect of general microbiology.

MCB 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

MCB 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master’s Thesis

MCB 7922 Journal Colloquy 1 Credit, Max 8 Credits
Grading Scheme: Letter Grade
Critical presentation and discussion of recent original articles in the microbiological literature. Attendance required.

MCB 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

MCB 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation
PCB 5136L Techniques in Microbial and Cell Biology 3 Credits
Grading Scheme: Letter Grade
A laboratory in experimental bacteriology and cell biology. Emphasis on experimental approaches and techniques used in study of cells and microorganisms. Experiments in microscopy, cell fractionation, metabolism, physiology, genetics, and regulation.
Prerequisite: B grade or higher in MCB 3020L, CHM 3120/3120L.

PCB 5235 Immunology 3 Credits
Grading Scheme: Letter Grade
Immune system of vertebrate animals. The cellular and molecular events involved in immune responsiveness and resistance to infectious diseases.
Prerequisite: C grade or higher in MCB 3020L.

Music

DIG 6288 Music and Sound Design for Digital Media 3 Credits
Grading Scheme: Letter Grade
Techniques, tools, and current research in music and sound design for digital media. For digital arts and science non-music majors.
Prerequisite: graduate-level status or consent of instructor.

MUC 5315 Introduction to Electroacoustic Music 3 Credits
Grading Scheme: Letter Grade
Survey of techniques, history, literature, and materials of electroacoustic music.
Prerequisite: MUC 2102 or equivalent.

MUC 6445 Electroacoustic Music Composition: Digital I 3 Credits
Grading Scheme: Letter Grade
Introduction to direct-digital software synthesis systems through flowcharting, programming, and instrument design. Focuses on using Csound software.
Prerequisite: MUC 4401 or MUC 6444 or consent of instructor.

MUC 6446 Electroacoustic Music Composition--Digital II 3 Credits
Grading Scheme: Letter Grade
Continuation of MUC 6445. Composition and research in direct-digital software synthesis systems. Includes advanced instrument design, algorithmic composition, and interactive digital signal processing.
Prerequisite: MUC 6445 or consent of instructor.

MUC 6625 Jazz Composition and Arranging 3 Credits
Grading Scheme: Letter Grade
Provides graduate instruction in jazz composition and arranging and techniques for commercial song writing. Students will study chord movement, melodic development and composition techniques for various styles of music. Students will complete original compositions and arrangements, contra-facts, sax solis, big band chart and know the basics of string writing.

MUC 6930 Graduate Composition 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Composition of chamber works for instrumental and/or vocal ensembles.

MUC 6932 Composition Seminar 1-3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Identifying problematic techniques in developing compositional craft for research, presentation, and discussion.

MUC 7447 Advanced Seminar in Electroacoustic Music 3 Credits
Grading Scheme: Letter Grade
Composition and research in advanced topics in computer music.
Prerequisite: MUC 6446 or consent of instructor.

MUC 7931 Advanced Graduate Composition 3 Credits, Max 18 Credits
Grading Scheme: Letter Grade
Composition for large instrumental and/or vocal ensembles.

MUC 7938 Seminar in Digital Sound Processing, Control, and Composition 3 Credits
Grading Scheme: Letter Grade
Topics in current research and digital audio theory, languages, algorithms, and applications for electroacoustic music.
Prerequisite: MUC 6446 or consent of instructor.

MUE 6080 Historical and Philosophical Foundations of Music Education 3 Credits
Grading Scheme: Letter Grade
Historical development and philosophy. Compares the U.S. with other countries and cultures. Individuals, associations and institutions that shape the music education program.

MUE 6385 Music in Higher Education 3 Credits
Grading Scheme: Letter Grade
Various aspects and programs of music in higher education for persons who intend to teach in or administer departments of music.

MUE 6399 Creative Thinking in Music 3 Credits
Grading Scheme: Letter Grade
Introducing the study of musical creativity by examining literature in and outside of music, emphasizing the process and its role in teaching/learning. The class explores how the mind works with music to produce creative results. Students engage in activities to explore the creative process and derive applications to K-12 music.

MUE 6444 Materials and Methods of String Class Teaching 2 Credits
Grading Scheme: Letter Grade
Survey of materials and methods suitable for public school string classes and orchestras.

MUE 6497 Public School Orchestral Literature 2 Credits
Grading Scheme: Letter Grade
Survey of materials suitable for various educational levels.

MUE 6644 Electroacoustic Music Composition--Digital II 3 Credits
Grading Scheme: Letter Grade
Continuation of MUC 6445. Composition and research in direct-digital software synthesis systems. Includes advanced instrument design, algorithmic composition, and interactive digital signal processing.
Prerequisite: MUC 6445 or consent of instructor.

MUC 7447 Advanced Seminar in Electroacoustic Music 3 Credits
Grading Scheme: Letter Grade
Composition and research in advanced topics in computer music.
Prerequisite: MUC 6446 or consent of instructor.

MUC 7931 Advanced Graduate Composition 3 Credits, Max 18 Credits
Grading Scheme: Letter Grade
Composition for large instrumental and/or vocal ensembles.

MUC 7938 Seminar in Digital Sound Processing, Control, and Composition 3 Credits
Grading Scheme: Letter Grade
Topics in current research and digital audio theory, languages, algorithms, and applications for electroacoustic music.
Prerequisite: MUC 6446 or consent of instructor.

MUE 6080 Historical and Philosophical Foundations of Music Education 3 Credits
Grading Scheme: Letter Grade
Historical development and philosophy. Compares the U.S. with other countries and cultures. Individuals, associations and institutions that shape the music education program.

MUE 6385 Music in Higher Education 3 Credits
Grading Scheme: Letter Grade
Various aspects and programs of music in higher education for persons who intend to teach in or administer departments of music.

MUE 6399 Creative Thinking in Music 3 Credits
Grading Scheme: Letter Grade
Introducing the study of musical creativity by examining literature in and outside of music, emphasizing the process and its role in teaching/learning. The class explores how the mind works with music to produce creative results. Students engage in activities to explore the creative process and derive applications to K-12 music.

MUE 6444 Materials and Methods of String Class Teaching 2 Credits
Grading Scheme: Letter Grade
Survey of materials and methods suitable for public school string classes and orchestras.

MUE 6497 Public School Orchestral Literature 2 Credits
Grading Scheme: Letter Grade
Survey of materials suitable for various educational levels.

MUE 6644 Electroacoustic Music Composition--Digital II 3 Credits
Grading Scheme: Letter Grade
Continuation of MUC 6445. Composition and research in direct-digital software synthesis systems. Includes advanced instrument design, algorithmic composition, and interactive digital signal processing.
Prerequisite: MUC 6445 or consent of instructor.

MUC 6930 Graduate Composition 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Composition of chamber works for instrumental and/or vocal ensembles.

MUC 6932 Composition Seminar 1-3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Identifying problematic techniques in developing compositional craft for research, presentation, and discussion.
MUE 6785 Research in Music Education 3 Credits  
**Grading Scheme:** Letter Grade  
Materials and specialized techniques of research in music education.

MUE 6790 Capstone Project for Music Education 3 Credits  
**Grading Scheme:** S/U  
Completing an original research project that addresses an identified issue or need within the field of music education.  
**Prerequisite:** Advanced standing in the graduate program; MUE 6785; permission of instructor

MUE 6931 Instructional Design in Music Education 3 Credits  
**Grading Scheme:** Letter Grade  
Explores the ways in which artistic forms of understanding and reflection can be useful in designing and evaluating education programs.

MUE 7045 Seminar in Music Teacher Education 3 Credits  
**Grading Scheme:** Letter Grade  
Examination of philosophical, historical, and contemporary practices in undergraduate and graduate music teacher education. Review of the research literature. Topics will include curricular frameworks, fieldwork models, development of teacher identity, teacher induction, teacher assessment, professional development, and the demands of policy stakeholders.  
**Prerequisite:** Admission to the PhD in music education program.

MUE 7046 Sociology of Music Education 3 Credits  
**Grading Scheme:** Letter Grade  
The purpose of this course is to gain knowledge and understanding of the social factors that impact music education in the United States and around the world.  
**Prerequisite:** Admission to an MM, MME, or PhD program in music.

MUE 7746 Measurement and Evaluation of Music 3 Credits  
**Grading Scheme:** Letter Grade  
Examines methods and techniques for measuring and evaluating learning in music.  
**Prerequisite:** MUS 6685.

MUE 7784 Quantitative Research Methods 3 Credits  
**Grading Scheme:** Letter Grade  
Intended to give students a thorough grounding in quantitative research methods appropriate for music education inquiry. Topics to be covered include quantitative research designs, survey design, data gathering, statistical analysis, and interpretation of results.  
**Prerequisite:** MUE 6785.

MUE 7786 Qualitative Research in Music Education 3 Credits  
**Grading Scheme:** Letter Grade  
The purpose of this course is to further understand and develop the skills required to design, conduct, and report music education research using qualitative approaches. Theoretical frameworks, data analysis procedures, and ethical considerations are examined.  
**Prerequisite:** MUE 6785 or equivalent.

MUE 7924 Doctoral Colloquium in Music Education 0 Credits  
**Grading Scheme:** S/U  
A forum for students to explore the role of research, research paradigms, critical issues, emerging events, scholarly writings, and professional organizations in music education through interaction with prominent speakers, faculty, and each other. A venue for sharing research and navigating the path to establish a scholarly identity and academic career.

MUE 7938 Music Education Seminar 3 Credits  
**Grading Scheme:** Letter Grade  
Contemporary issues and problems in music education. Investigating and planning research relevant to selected problems.

MUE 7940 Internship 1-12 Credits, Max 18 Credits  
**Grading Scheme:** S/U  
A supervised internship for doctoral students in music, arranged to support professional goals and/or the students' cognate studies. The internship provides an opportunity for each student to work in a professional setting in a position that carries responsibility and is of particular interest.  
**Prerequisite:** Graduate standing in music.

MUG 6105 Graduate Conducting 3 Credits, Max 15 Credits  
**Grading Scheme:** Letter Grade  
Conducting larger works from the standard repertoire for band, orchestra, and chorus.

MUG 7106 Advanced Graduate Conducting 3 Credits, Max 15 Credits  
**Grading Scheme:** Letter Grade  
For conducting emphasis. Conducting major works for band, orchestra, and chorus. Emphasizes analysis and interpretation.

MUH 5219 Graduate Music History Review 3 Credits  
**Grading Scheme:** Letter Grade  
Credit earned will not apply to the credit-hour requirement of any graduate degree offered in the School of Music.

MUH 5505 Introduction to Ethnomusicology 3 Credits  
**Grading Scheme:** Letter Grade  
Field research. Using oral, written, and media sources. Transcription and analysis. Interpretative techniques.  
**Prerequisite:** consent of instructor.

MUH 5684 Introduction to Historical Musicology 3 Credits  
**Grading Scheme:** Letter Grade  
Critical approaches to the history of the discipline, fundamental concepts and methodologies, and significant musicological writings representing style periods and conceptual issues.  
**Prerequisite:** successful completion of the complete undergraduate music history sequence; graduate student status; and successful completion of the music history entrance exam or the review course.

MUH 6515 Musics of the World 3 Credits  
**Grading Scheme:** Letter Grade  
Providing students with knowledge and experiences to allow them to accurately distinguish musical characteristics of musics from around the world, identify local examples of diverse musical traditions, explore the methods used in ethnomusicology, and develop approaches to world music pedagogy.

MUH 6526 American Vernacular Music 3 Credits  
**Grading Scheme:** Letter Grade  
Introducing American vernacular music from the 1840s to the recent past, examining the cultural/social history and an analytic study of multiple musical styles. Processes used by vernacular musicians? playing, improvising, songwriting, collaboration, listening, facility on multiple instruments? will be explored, as will curricular implications for K-12 settings.

MUH 6545 The Guitar in Latin American Culture 3 Credits  
**Grading Scheme:** Letter Grade  
Cultural view of Latin American peoples through the sounds of the guitar, focusing on the history of modern classical guitar and its role in mediating Iberian and Latin American music.

MUH 6548 Seminar in Caribbean Music 3 Credits  
**Grading Scheme:** Letter Grade  
Examines historical, social, and aesthetic dimensions of Caribbean music and music making.
MUH 6549 Seminar in Brazilian Music 3 Credits
Grading Scheme: Letter Grade
Examines historical, social, and aesthetic dimensions of Brazilian music and music making.

MUH 6635 Seminar in American Music 3 Credits
Grading Scheme: Letter Grade
History and literature of American music from the landing of the pilgrims to the present.

MUH 6665 History of Opera 3 Credits
Grading Scheme: Letter Grade
Historical development of opera and its literature from the Florentine Camerata to the present.

MUH 6671 Seminar in Renaissance Music 3 Credits
Grading Scheme: Letter Grade
Selected topics from the Renaissance era for research and study.

MUH 6672 Seminar in Baroque Music 3 Credits
Grading Scheme: Letter Grade
Selected topics from the Baroque era for research and study.

MUH 6673 Seminar in Classical Music 3 Credits
Grading Scheme: Letter Grade
Selected topics from the Classical era for research and study.

MUH 6674 Seminar in Nineteenth-Century Music 3 Credits
Grading Scheme: Letter Grade
Selected topics from the nineteenth century for research and study.

MUH 6675 Seminar in Twentieth-Century Music 3 Credits
Grading Scheme: Letter Grade
Selected topics from the 20th century for research and study.

MUH 6931 Nationalism in Music 3 Credits
Grading Scheme: Letter Grade
Historical development of nationalist movements in music. Emphasizes the 19th and 20th centuries.

MUH 6935 Special Topics in Music History 3 Credits
Grading Scheme: Letter Grade
Centering around topics of current interest or of special interest to students or instructors. Topics or focus may vary from semester to semester.
Prerequisite: MUH 5219 or passing grade on music history diagnostic exam.

MUH 7411 Medieval and Renaissance Notation 3 Credits
Grading Scheme: Letter Grade
Practical, theoretical, and repertorial study of notation from ca. 1000-1600.

MUH 7938 Musicology Seminar 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Contemporary issues and selected topics in musicology.
Prerequisite: MUS 6716.

MUL 6486 Piano Literature 3 Credits
Grading Scheme: Letter Grade
Survey of piano literature from Baroque to present.

MUL 6495 Graduate Organ Literature 3 Credits
Grading Scheme: Letter Grade
An historical survey of the major trends and styles of organ composition from the Renaissance to the present.

MUL 6505 Symphonic Literature 3 Credits
Grading Scheme: Letter Grade
Symphonic Literature

MUL 6555 Survey of Wind Literature 3 Credits
Grading Scheme: Letter Grade
Literature for chamber and larger wind ensembles from Baroque to present.

MUL 6565 Chamber Music Literature 3 Credits
Grading Scheme: Letter Grade
Survey of music literature for chamber ensemble from Baroque to present.

MUL 6645 Choral Literature 3 Credits
Grading Scheme: Letter Grade
Survey of choral music from Renaissance to present.

MUM 6501 Music Production in Commercial Media 3 Credits
Grading Scheme: Letter Grade
Covers a review of music for commercials, Programming Logos, jingles and radio station IDs. It covers the basics of home recording studios, techniques in Logic recording software and using a mixing board. Students will develop compilation tracks and sample media to demonstrate the concepts covered during the course.

MUN 6010 Graduate Ensemble 1 Credit, Max 3 Credits
Grading Scheme: Letter Grade
For graduate students holding positions of leadership and participating in music ensembles.

MUN 6125 Concert Band 1 Credit, Max 4 Credits
Grading Scheme: Letter Grade
Performance of general and popular band literature.

MUN 6135 Symphonic Band 1 Credit, Max 4 Credits
Grading Scheme: Letter Grade
Performance of traditional and contemporary band literature.

MUN 6145 Symphonic Wind Ensemble 1 Credit, Max 4 Credits
Grading Scheme: Letter Grade
Performance of wind ensemble literature.

MUN 6215 University Orchestra 1 Credit, Max 4 Credits
Grading Scheme: Letter Grade
Standard orchestra literature.

MUN 6315 University Choir 1 Credit, Max 4 Credits
Grading Scheme: Letter Grade
Advanced choral group providing specialized study performance opportunities for vocally qualified students.

MUN 6325 Women's Chorale 1 Credit, Max 4 Credits
Grading Scheme: Letter Grade
Vocal training and public performance of standard female chorus repertoire.

MUN 6335 Men's Glee Club 1 Credit, Max 4 Credits
Grading Scheme: Letter Grade
Vocal training and public performance of standard male chorus repertoire.

MUN 6445 Percussion Ensemble 1 Credit, Max 4 Credits
Grading Scheme: Letter Grade
Study and performance of ensemble literature for percussion instruments.

MUN 6496 World Music Ensemble 1 Credit, Max 4 Credits
Grading Scheme: Letter Grade
Rehearsal and performance of folk and traditional music of the world.
MUN 6497 New Music Ensemble 1 Credit, Max 15 Credits  
**Grading Scheme:** Letter Grade  
Rehearsal and performance of repertoire for small ensembles written in the 20th and 21st centuries.  
**Prerequisite:** consent of instructor.

MUN 6649 Musical Theatre Instrumental Ensemble 1 Credit, Max 4 Credits  
**Grading Scheme:** Letter Grade  
This course provides graduate students with an understanding of how an advanced theatre production is prepared. The student will engage in individual coaching with undergraduates, vocal preparation with the performers, and find opportunities to conduct. They will receive instruction in musical theatre styles/performance practices from the 1930s - present.  
**Prerequisite:** Audition required or by recommendation of faculty.

MUN 6715 Jazz Band 1 Credit, Max 4 Credits  
**Grading Scheme:** Letter Grade  
Standard and experimental jazz ensemble. Jazz laboratory.

MUN 6816 Steel Drum Ensemble 1 Credit, Max 8 Credits  
**Grading Scheme:** Letter Grade  
Rehearsal, performance and historical aspects of steel drum.  
**Prerequisite:** consent of instructor.

MUR 6206 Survey of Hymnody 3 Credits  
**Grading Scheme:** Letter Grade  
Historical development of hymns in liturgical use, the scope of hynmic literature, and the major trends in hynmal compilation and editing.

MUR 6705 Sacred Music Literature 3 Credits  
**Grading Scheme:** Letter Grade  
The development of congregational and choral song from the early church to the present. Survey of instrumental forms in worship music.

MUS 6685 Psychology of Music 3 Credits  
**Grading Scheme:** Letter Grade  
Cultural influences, learning conditions, biological constraints, psychoacoustical phenomena, and musical taste. Measuring and predicting musical taste and ability.

MUS 6716 Methods of Musical Research and Bibliography 3 Credits  
**Grading Scheme:** Letter Grade  
Materials and specialized techniques of research in musicology.

MUS 6905 Projects and Problems 1-3 Credits, Max 12 Credits  
**Grading Scheme:** Letter Grade  
Approved problems for study and research.

MUS 6910 Supervised Research 1-5 Credits, Max 5 Credits  
**Grading Scheme:** S/U  
**Supervised Research**

MUS 6940 Supervised Teaching 1-5 Credits, Max 5 Credits  
**Grading Scheme:** S/U  
**Supervised Teaching**

MUS 6971 Research for Master's Thesis 1-15 Credits  
**Grading Scheme:** S/U  
**Research for Master's Thesis**

MUS 6973 Individual Project 1-10 Credits, Max 10 Credits  
**Grading Scheme:** S/U  
Creative project or graduate recital in lieu of written thesis. Project or recital must be acceptable to the candidate's supervisory committee and to the Graduate School.

MUS 7656 Teaching Music and the Creative Process 3 Credits  
**Grading Scheme:** Letter Grade  
Examines the creative process, appropriate pedagogical applications, and curricular implications.  
**Prerequisite:** graduate composition major or consent of instructor.

MUS 7905 Projects and Problems 1-3 Credits, Max 12 Credits  
**Grading Scheme:** Letter Grade  
For doctoral students. Approved problems for study and research.

MUS 7951 Individual Project 1-6 Credits, Max 12 Credits  
**Grading Scheme:** S/U  
Individual projects for doctoral students in music.  
**Prerequisite:** Graduate standing in music.

MUS 7955 Preparation for Doctoral Project 1-6 Credits, Max 6 Credits  
**Grading Scheme:** S/U  
For individual capstone projects for Doctor of Musical Arts students who have not yet passed their comprehensive examination but wish to begin work on their project. The scope and focus of the project will be determined by the student in consultation with his/her supervisor and doctoral committee.

MUS 7956 Doctoral Project 1-6 Credits  
**Grading Scheme:** S/U  
For individual capstone projects for Doctor of Musical Arts (DMA) students in music who have passed their comprehensive examination. The scope and focus of the project will be determined by the student in consultation with his/her supervisor and doctoral committee.

MUS 7979 Advanced Research 1-12 Credits  
**Grading Scheme:** S/U  
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

MUS 7980 Research for Doctoral Dissertation 1-15 Credits  
**Grading Scheme:** S/U  
Research for Doctoral Dissertation

MUT 6051 Graduate Music Theory Review 3 Credits  
**Grading Scheme:** Letter Grade  
Review of core materials in preparation for graduate course in music theory.

MUT 6177 Graduate Jazz Theory 3 Credits  
**Grading Scheme:** Letter Grade  
Provides graduate instruction in jazz fundamentals, harmony, chord symbols, scales and modes, piano voicings and techniques in memorizing standards. Through completing this course students will have a solid knowledge of how to efficiently teach jazz theory and understand how to operate and manage online jazz theory technology platforms.

MUT 6445 Advanced Counterpoint 3 Credits  
**Grading Scheme:** Letter Grade  
Emphasizes advanced harmonic techniques and fugal writing.  
**Prerequisite:** MUT 4411, 4421.

MUT 6531 Figured Bass and Continuo Performance 3 Credits  
**Grading Scheme:** Letter Grade  
Theoretical principles and practical application of figured bass realization and continuo performance practice techniques.
MUT 6565 Late Nineteenth- and Twentieth-Century Styles 3 Credits
Grading Scheme: Letter Grade
Analysis of exemplary works of the late 19th and 20th centuries.
Prerequisite: MUT 6629.

MUT 6576 Contemporary Styles 3 Credits
Grading Scheme: Letter Grade
Recent trends in music through score study and analysis, composition exercises, and supplementary readings.
Prerequisite: MUT 6629.

MUT 6617 Approaches to Theoretical Analysis in Music Education 3 Credits
Grading Scheme: Letter Grade
Developing and enhancing skills in analyzing Western classical music, with an emphasis on application to the field of Music Education. Students will synthesize the essential concepts of music theory and analysis through examining selections from the repertoire to expand upon and refine analytical approaches learned in the undergraduate theory curriculum. Course activities will include analysis of music using visual and aural processes.

MUT 6627 Seminar in Reductive Analysis 3 Credits
Grading Scheme: Letter Grade
Advanced study in reductive approach to analysis of music.
Prerequisite: MUT 6629.

MUT 6629 Analytical Techniques 3 Credits
Grading Scheme: Letter Grade
Study of analytical systems and methodology emphasizing style analysis and the integration of all elements of music.

MUT 6751 Pedagogy of Music Theory 3 Credits
Grading Scheme: Letter Grade
Techniques and art of teaching music theory and conditions for effective learning.
Prerequisite: MUT 6629.

MUT 6936 Music Theory Seminar 1-3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Selected topics from current research for study, presentation, and discussion.
Prerequisite: MUT 6629.

MUT 7316 Advanced Orchestration 3 Credits
Grading Scheme: Letter Grade
Analysis of 19th- and 20th-century compositions for full orchestra. Orchestration of original scores and arrangements for full orchestra.

MUT 7585 Seminar in Musical Style 3 Credits
Grading Scheme: Letter Grade
Analysis of exemplary works from the Medieval period to the early 19th century.
Prerequisite: MUT 6629.

MUT 7760 History of Music Theory 3 Credits
Grading Scheme: Letter Grade
The study of musical theories, primarily through readings, from ancient Greece to the present.

MVK 5156 Improvisational Keyboard Skills and Related Technology 2 Credits
Grading Scheme: Letter Grade
Improvisational skills, electric keyboard technology, and musical styles outside the classical realm.
Prerequisite: upper-division and graduate keyboard majors and minors, or consent of instructor.

MVK 6605 Organ Pedagogy 3 Credits
Grading Scheme: Letter Grade
Principles, methods, and practices currently used in the teaching of organ.

MVO 6250 Secondary Music Performance 1-3 Credits, Max 15 Credits
Grading Scheme: Letter Grade
Offered in piano, voice, organ, harpsichord, historical instruments, conducting, carillon, and all standard band and orchestral instruments.

MVO 6460 Music Performance 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Offered in piano, voice, organ, harpsichord, historical instruments, conducting, carillon, and all standard band and orchestral instruments.

MVO 7460 Music Performance 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
For doctoral students. Offered in piano, voice, organ, harpsichord, historical instruments, conducting, carillon, and all standard band and orchestral instruments.

MVS 6651 String Pedagogy I 3 Credits
Grading Scheme: Letter Grade
Survey of Suzuki violin pedagogy from Unit IA (Pre-Twinkle) through Unit IV (Vivaldi A Minor Concertos).

MVO 6651 Vocal Pedagogy 3 Credits
Grading Scheme: Letter Grade
Study and teaching of vocal techniques.
Prerequisite: SPA 3101 or equivalent.

MVO 6760 Secondary Music Performance 3 Credits
Grading Scheme: Letter Grade
Offered in piano, voice, organ, harpsichord, historical instruments, conducting, carillon, and all standard band and orchestral instruments.

MVO 7605 Organ Pedagogy 3 Credits
Grading Scheme: Letter Grade
Principles, methods, and practices currently used in the teaching of organ.

MVS 6651 String Pedagogy I 3 Credits
Grading Scheme: Letter Grade
Survey of Suzuki violin pedagogy from Unit IA (Pre-Twinkle) through Unit IV (Vivaldi A Minor Concertos).

MVO 6651 Vocal Pedagogy 3 Credits
Grading Scheme: Letter Grade
Study and teaching of vocal techniques.
Prerequisite: SPA 3101 or equivalent.

Nuclear and Radiological Engineering

EGN 6913 Engineering Graduate Research 0-3 Credits
Grading Scheme: S/U
Course will provide the student with supervised research in a laboratory setting.

ENU 5142 Reliability and Risk Analysis for Nuclear Facilities 3 Credits
Grading Scheme: Letter Grade
Nuclear facilities’ safety systems including reliability and probabilistic risk assessment.
Prerequisite: ENU 4144 or 5005 and 4934 or ENU 6935.

ENU 5176L Principles of Nuclear Reactor Operations Laboratory 1 Credit
Grading Scheme: Letter Grade
Principles of reactor operations applied to startup, operation, and control of the training reactor to include performing reactor physics measurements and instrumentation and control calibrations.
Prerequisite: ENU 4144 or equivalent and consent of instructor.

ENU 5186 Nuclear Fuel Cycles 3 Credits
Grading Scheme: Letter Grade
Fuel cycle from uranium mining through waste management. Reactor fuel cycle including economics and advanced fuel management. Nodal code evaluation of criticality, power peaking and power sharing through operating cycle, use of burnable poisons and reshuffle and reload for uranium and plutonium cycles.
Prerequisite: ENU 4104.

ENU 5192 Nuclear Reactor Power Plant System Dynamics and Control 3 Credits
Grading Scheme: Letter Grade
Control theory analysis applied to nuclear power reactor dynamic models with feedback and to integrated nuclear power plant dynamic models with feedback.
Prerequisite: ENU 4192 and EEL 4657 or EML 5311.
ENU 5516L Nuclear Engineering Laboratory II 2 Credits
Grading Scheme: Letter Grade
Laboratory practice in neutron and gamma detection and analysis. Determination of basic neutron parameters in nonmultiplying and multiplying media.
Prerequisite: ENU 4612L or ENU 5615L and 4104 or ENU 6106.

ENU 5615C Nuclear Radiation Detection and Instrumentation 4 Credits
Grading Scheme: Letter Grade
Interaction of radiation with matter, radiation-detection systems, pulse shaping, amplification, amplitude and time-analyzing circuitry; counting and measuring devices and control systems for nuclear reactors.
Prerequisite: ENU 3003 and EEL 3303L or equivalent; Corequisite: ENU 6051; or prereq of ENU 4605 or equivalent.

ENU 6051 Radiation Interaction Basics and Applications I 3 Credits
Grading Scheme: Letter Grade
Interaction of X-rays, gamma rays, neutrons, and charged particles with matter; radioactive decay, nuclear moments, and nuclear transitions. Application to basic problems in nuclear engineering sciences.

ENU 6052 Radiation Transport Basics and Applications 3 Credits
Grading Scheme: Letter Grade

ENU 6061 Survey of Medical Radiological Physics 1 Credit
Grading Scheme: Letter Grade
An overview of the areas of medical radiological physics including diagnostic radiography, nuclear medicine, and radiation therapy. Basic radiation physics, biology, and safety.
Prerequisite: undergraduate classical and modern physics, and differential equations.

ENU 6106 Nuclear Reactor Analysis I 3 Credits
Grading Scheme: Letter Grade
Nuclear criticality, neutron transport equation, multigroup neutron diffusion theory, and perturbation theory. Reactor kinetics: point model, reactivity feedback, and space-time models.
Prerequisite: ENU 6051.

ENU 6126 Fundamentals of Reactor Kinetics 3 Credits
Grading Scheme: Letter Grade
Nuclear reactor kinetics, including mathematics, transport and diffusion considerations, steady state and time dependent reactor physics, delayed neutron properties, photoneutrons, and neutron reactions, approximations and solutions to the kinetics equations, numerical solution methods using explicit, implicit, integral, marching, and finite difference solution methods.
Prerequisite: ENU 4001, ENU 4605, ENU 4103.

ENU 6135 Nuclear Thermal Hydraulics 4 Credits
Grading Scheme: Letter Grade
Treatment of nuclear thermal sciences: thermodynamics, fluid mechanics, heat transfer, two-phase flow, boiling; sub-channel thermal hydraulics, steam generator design, balance of plant analysis.
Prerequisite: EML 4140 and (ENU 4133 or EGN 3353C)

ENU 6136 Advanced Nuclear Thermal Hydraulics 3 Credits
Grading Scheme: Letter Grade
Topics in advanced nuclear thermal hydraulics, fluid mechanics, and heat transfer including areas of ongoing research and applications to current and future nuclear fission reactors.
Prerequisite: ENU 4134 or EGM 6812 or EML 6155 or ENU 6135

ENU 6627 Therapeutic Radiological Physics 3 Credits
Grading Scheme: Letter Grade
Prerequisite: ENU 5615C, ENU 6051.

ENU 6651 Clinical Rotation in Radiation Therapy 3 Credits
Grading Scheme: Letter Grade
Experience in clinical therapeutic radiological procedures, patient dosimetry, and treatment planning.
Prerequisite: working knowledge of therapeutic radiological physics.

ENU 6655 Advanced Diagnostic Radiological Physics 3 Credits
Grading Scheme: Letter Grade
Applying advanced physical principles, image acquisition, and processing techniques to clinical imaging physics. Methods and principles of MRI and ultrasound imaging. Digital image archiving, transmission and processing standards, and networks.

ENU 6835 Nuclear Fuels 3 Credits
Grading Scheme: Letter Grade
Survey of the nuclear fuels from ore to waste, including mining, pin design, fabrication, in-core performance, storage, disposal and fuel economics.

ENU 6905 Individual Work 1-6 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Supervised study or research in areas not covered by other graduate courses.

ENU 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

ENU 6935 Nuclear and Radiological Engineering Seminar 1 Credit, Max 3 Credits
Grading Scheme: Letter Grade
Discussion of research, current trends in the nuclear related industry, government, and research establishments.

ENU 6936 Special Projects in Nuclear and Radiological Engineering Sciences 1-9 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Nonthesis research projects.

ENU 6937 Special Topics in Nuclear and Radiological Engineering Sciences 1-9 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Special Topics in Nuclear and Radiological Engineering Sciences

ENU 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

ENU 6972 Research for Engineer's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Engineer's Thesis

ENU 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.
ENU 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

Packaging Science

PKG 5003 Advanced Distribution and Transport Packaging 3 Credits
Grading Scheme: Letter Grade

PKG 5006 Advanced Packaging Principles 3 Credits
Grading Scheme: Letter Grade
Modern lab instruments and procedures employed for packaging used to solve problems from packaging industry.
Prerequisite: chemistry, physics, or biology.

PKG 5105 Advanced Consumer Products Packaging 3 Credits
Grading Scheme: Letter Grade
Major packaging methods, materials, forms, and strategies used for consumer products. Packaging plans with associated mock-ups for proposed consumer product are prepared as specific team projects.

PKG 5256C Advanced Analytical Packaging Methods 3 Credits
Grading Scheme: Letter Grade
Materials, uses, functions, and production processes of packaging. Historical, societal, and technological drivers of packaging.

PKG 6100 Advanced Computer Tools for Packaging 3 Credits
Grading Scheme: Letter Grade
Label design, bar code technology, spreadsheets, visual basic programming, 3D package design, and distribution efficiency analysis.

PKG 6905 Individual Work in Packaging 1-6 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Special problems in packaging sciences.

PKG 6932 Special Topics in Packaging Sciences 1-6 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Lectures, laboratory, and/or special projects.

Public Health—Clinical and Health Psychology

CLP 6307 Human Higher Cortical Functioning 3 Credits
Grading Scheme: Letter Grade
Models that explain linkages between brain and behavior. Focus on both functions and dysfunctions.

CLP 6407 Psychological Treatment I 3 Credits
Grading Scheme: Letter Grade
Current dynamic and personality theories, practices, and related research in psychotherapy.
Prerequisite: admission to CLP or consent of instructor.

CLP 6430 Clinical Psychological Assessment 4 Credits
Grading Scheme: Letter Grade
Introduction to concepts, theory, and practices in clinical psychological assessment across the lifespan.
Prerequisite: admission to the Clinical Psychology doctoral program.

CLP 6476 Lifespan Psychopathology 4 Credits
Grading Scheme: Letter Grade
Diagnostic issues, theoretical formulas, clinical manifestations, and research related to child and adult psychopathology across the lifespan.
Prerequisite: admission to Clinical Psychology doctoral program.

CLP 6527C Measurement, Research Design, and Statistical Analysis in Clinical Psychology I 3-4 Credits
Grading Scheme: Letter Grade
Integration and interaction among research design, tests and measurements, and statistics.
Prerequisite: admission to CLP.

CLP 6528C Measurement, Research Design, and Statistical Analysis in Clinical Psychology II 3-4 Credits
Grading Scheme: Letter Grade
Continuation of CLP 6527C.
Prerequisite: CLP 6527C.

CLP 6529 Applied Multivariate Methods in Psychology 3 Credits
Grading Scheme: Letter Grade
Application of multivariate methods (MANOVA, discriminant functions, factor analysis, SEM) to research problems in psychology.
Prerequisite: CLP 6528C or equivalent

CLP 6905 Individual Work 1-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Reading or research in areas in clinical psychology.

CLP 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

CLP 6943 Core Practicum in Clinical Psychology 1-4 Credits, Max 8 Credits
Grading Scheme: S/U
Supervised training in appropriate work settings.
Prerequisite: consent of program director.

CLP 6945 Advanced Practicum in Neuropsychology 1-3 Credits, Max 3 Credits
Grading Scheme: S/U
Supervised clinical experience in neuropsychological assessment and cognitive rehabilitation of patients with neurologic impairments.
Prerequisite: CLP 7427C, consent of area head and program director.

CLP 6946 Advanced Practicum in Applied Medical Psychology 1-3 Credits, Max 8 Credits
Grading Scheme: S/U
Supervised clinical experience in inpatient and outpatient consultation, assessment and intervention with psychosomatic, stress-related, and somatopsychic disorders.
Prerequisite: consent of area head and program director.

CLP 6947 Practicum in Intervention 1-4 Credits, Max 18 Credits
Grading Scheme: S/U
Designed for individual with special interests and needs.
Prerequisite: consent of program director.
CLP 6948 Advanced Practicum in Clinical Child Psychology 1-3 Credits, Max 8 Credits  
Grading Scheme: S/U  
Supervised clinical experiences working with children or adolescents in either inpatient or outpatient settings.  
Prerequisite: CLP 6943, consent of area head and program director.

CLP 6971 Research for Master's Thesis 1-15 Credits  
Grading Scheme: S/U  
Research for Master's Thesis

CLP 7317 Advanced Health Psychology and Behavior Medicine 3 Credits  
Grading Scheme: Letter Grade  
Theory, research, and clinical applications related to core topic areas. Special attention to pathophysiology, research methods, issues of diversity, and ethical concerns.  
Prerequisite: CLP 7936.

CLP 7427C Neuropsychological Assessment of Children 3 Credits  
Grading Scheme: Letter Grade  
Research, theory, and basic procedures.  
Prerequisite: PSB 6067 or consent of instructor.

CLP 7428C Neuropsychological Assessment of Adults 3 Credits  
Grading Scheme: Letter Grade  
Research, theory, and basic procedures.  
Prerequisite: PSB 6067 or consent of instructor.

CLP 7525 Best Methods for Studying Psychological Change 3 Credits  
Grading Scheme: Letter Grade  
Application of change methods (ongitudinal mixed effects, latent growth models, survival analysis) to research problems in psychology.  
Prerequisite: CLP 6529

CLP 7934 Special Topics In Clinical Psychology 1-9 Credits, Max 15 Credits  
Grading Scheme: Letter Grade  
Advanced seminar for in-depth examination of selected issues and topics.  
Prerequisite: admission to CLP.

CLP 7949 Internship 1-2 Credits, Max 6 Credits  
Grading Scheme: S/U  
Reading assignments and conferences. Must include 1500 work hours; designed as a 2-semester sequence.  
Prerequisite: admission to candidacy for the doctorate, successful completion of the qualifying examination, and consent of the program director.

CLP 7979 Advanced Research 1-12 Credits  
Grading Scheme: S/U  
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

CLP 7980 Research for Doctoral Dissertation 1-15 Credits  
Grading Scheme: S/U  
Research for Doctoral Dissertation

PSB 6115C Clinical and Cognitive Neuroscience: Methods and Theory 3 Credits  
Grading Scheme: Letter Grade  
Provides an overview of methods in clinical and cognitive neuroscience with lab-based exposure to methodology. Methods covered will include, but are not limited to, structural and functional magnetic resonance imaging, electroencephalography, transcranial electrical stimulation, TMS, PET, etc.  
Prerequisite: Must be a graduate student in Clinical and Health Psychology. All others must petition to Dr. Woods. Prior coursework in neuroanatomy will be an important precursor, but can be waived (e.g., CLP 6945, PSB 6088, GMS 6007, CLP 7428).

Public Health—Environmental and Global Health

PHC 6006 An Introduction to One Health Problem Solving 2 Credits  
Grading Scheme: Letter Grade  
Infectious disease surveillance, diagnostic tools, outbreak investigations, vaccine trials, public health interventions, biodefense, emerging infectious diseases, and analytic approaches to infectious disease prevention and control.

PHC 6018 Environmental Ecology of Human Pathogens 3 Credits  
Grading Scheme: Letter Grade  
The course will discuss environmental reservoirs of human pathogens and introduces microbiological techniques necessary to detect and identify the variety of pathogens present in the environment.  
Prerequisite: PHC 6313 or by permission of the instructor.

PHC 6036 Environmental Infectious Diseases: A Molecular Approach 3 Credits  
Grading Scheme: Letter Grade  
Providing students with an overview of environmental microbiology and review the latest tools in microbial ecology. The course will emphasize innovative methods in studying microbial diversity. The course is designed for students preparing for careers in public health.  
Prerequisite: None.

PHC 6301 Aquatic Systems and Environmental Health 3 Credits  
Grading Scheme: Letter Grade  
Physical and chemical nature of water; effects of contaminant and other stressors in different aquatic ecosystems. Taxonomic and ecological summary of aquatic biota, from algae and invertebrates to vertebrates and pathogens.  
Prerequisite: PHC 6313

PHC 6304 Environmental Toxicology Applications in Public Health 3 Credits  
Grading Scheme: Letter Grade  
Environmental toxicology examines exposure to chemical, biological, and physical agents and associated health effects in humans and wildlife. Students will analyze environmental fate of chemicals, exposure routes, mechanisms of toxicity, and critique common approaches used by public health professional when dealing with toxicants.  
Prerequisite: BSC2010. CHM2045 preferred but not required

PHC 6312 Water Quality and Human Health 3 Credits  
Grading Scheme: Letter Grade  
Relationship between water quality and human health and how water quality of determines human health in developed and developing world.  
Prerequisite: PHC 6313
PHC 6346 Occupational and Environmental Health Among Agriculture Workers 3 Credits
Grading Scheme: Letter Grade
Providing the student with an overview of occupational and environmental health with a special emphasis on zoonotic infection risks to animal workers. Approaches for occupational disease processes, surveillance, industrial hygiene risk factor analyses, prevention and control will be presented. The course is designed to prepare for careers in occupational health.
Prerequisite: None.

PHC 6424 Environmental Policy and Risk Management in Public Health 3 Credits
Grading Scheme: Letter Grade
Provides students with an in depth understanding of the government's environmental health structure, environmental policy making processes, important environmental policies, and application of these policies through risk assessment and management techniques to protect the public and the environment.
Prerequisite: PHC 6313.

PHC 6445 Global Public Health and Development II 3 Credits
Grading Scheme: Letter Grade
Second in series of two global public health and development courses created specifically for the new Master's in Development Practice (MDP) program. Practical approaches for identification, design, planning, monitoring, and evaluation of global public health interventions in their broader development context.
Prerequisite: PHC 6764

PHC 6446 Systems Thinking in One Health 3 Credits
Grading Scheme: Letter Grade
Delivers transversal tools for professionals to engage in health in a globalized environment. The tools are communication, managing conflict, leadership, behavioral change, qualitative methods, economics, international and comparative legislation, medical geography, and ethics in health. We will synthesize these tools and their use through a systems thinking approach.

PHC 6512 Environmental Management of Vector-Borne Diseases 3 Credits
Grading Scheme: Letter Grade
Planning, organization, implementation, and monitoring the activities for control of environmental factors or their interaction with man to prevent or minimize vector propagation and man-vector-pathogen contact.

PHC 6515 Introduction to Entomology Zoonotic Diseases and Food Safety 3 Credits
Grading Scheme: Letter Grade
This course introduces students to basic applied field techniques in the study of medical entomology and vector borne diseases. Students will learn about the entomology techniques used for collection and analysis the samples to understand vector borne disease transmission.
Prerequisite: General microbiology, principles of infectious diseases, or epidemiology of infectious diseases.

PHC 6520 Foodborne Diseases 3 Credits
Grading Scheme: Letter Grade
Discussing major pathogens associated with foodborne diseases, their epidemiology, and approaches to outbreak investigation and control of foodborn illness. Teaching/learning methods include lectures, case studies, readings, and an individual project.
Prerequisite: PHC 6001 Principles of Epidemiology

PHC 6561 Public Health Laboratory Techniques 1 Credit
Grading Scheme: Letter Grade
Laboratory techniques used in emerging infectious respiratory disease research and epidemiologic surveillance.
Prerequisite: Biosafety and bloodborne pathogen training program: http://ufbiosafety.classroom24-7.com/

PHC 6671 Emerging Infectious Diseases in One Health 3 Credits
Grading Scheme: Letter Grade
Applies One Health (the intersection of animal and human health and the environment) to understand the emergence of disease-causing microbes and the critical drivers of microbial evolution. Extensive discussion of the global emergence of new infectious disease agents and how factors within One Health influence microbial evolution and disease emergence.
Prerequisite: MCB3020 Basic Biology of Microorganisms; MCB3023 Principles of Microbiology; MCB4203 Bacterial Pathogens; MCB4304 Genetics of Microorganisms or by permission of the instructor

PHC 6702 Environmental Monitoring and Exposure Assessment 3 Credits
Grading Scheme: Letter Grade
Exposure to hazardous chemical, physical and biological agents occurs through inhalation, ingestion, or contact with a variety of environmental media including air, water, food, or soil. Students will acquire and apply the key knowledge needed to perform environmental monitoring for exposure assessment in environmental health research and practice.
Prerequisite: at least one undergraduate course in biostatistics or statistics.
Corequisite: access to a computer with Excel, SPSS, or SAS.

PHC 6706 Scientific Communication in Public Health 3 Credits
Grading Scheme: Letter Grade
Scientific communication skills are critical to to public health researchers and allied professionals. Multiple outreach approaches will be used to develop and deliver meaningful content targeted for different audience perspectives. The course consists of lectures, student presentation opportunities and intensive constructive critique.
Prerequisite: Current good standing in public health graduate program or permission of instructor.

PHC 6722 Environmental and Global Health Research Methods Rotation 1-4 Credits
Grading Scheme: Letter Grade
Providing opportunities for PhD students to gain first-hand experience observing the implementation of research methods needed to employ during the course of their dissertation research. Upon completion, students will be required to write a detailed report of the experience.

PHC 6764 Global Public Health and Development I 3 Credits
Grading Scheme: Letter Grade
First in series of two global public health and development courses. Public health and anthropologic principles, methods, and study designs.

PHC 6900 Environmental and Global Health Journal Club 1 Credit
Grading Scheme: Letter Grade
Discussing and developing high quality written and oral critiques of recent literature from top peer-reviewed journals on three diseases with global impact that have key environmental drivers, dengue, TB, and Chagas disease. Developing critical thinking and writing skills in evaluating the scientific literature.

PHC 6937 Special Topics in Public Health 1-6 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Special Topics in Public Health
PHC 6947 Occupational Health Field Research Experience 3-5 Credits
Grading Scheme: Letter Grade
The field research experience is providing an opportunity for MHS students to work in a public health, occupational health, or agricultural health setting. Each placement is different, but all placements depend upon completion of most concentration coursework, the ability to work with minimal supervision, and permission of the student’s faculty advisor.
Prerequisite: PHC 6001 Principles of Epidemiology in Public Health and PHC 6313 Environmental Health Concepts in Public Health

PHC 7307 Quantitative Assessment of Environmental Health Impacts 3 Credits
Grading Scheme: Letter Grade
Introduces applied modeling of environmental health impact assessment for graduate students and health professionals by focusing on burden of diseases, transmission and control of environmentally-mediated infectious pathogens through the use of statistical and mathematical tools.
Prerequisite: PHC 6313 and PHC 6050

PHC 7935 Critical Thinking in Environmental and Global Health 1 Credit
Grading Scheme: Letter Grade
Providing students with the critical thinking and integrative skills necessary to understand contemporary environmental health problems, critically understand the existing literature, develop research and assessment questions, and identify appropriate methodological tools to address the questions. The course is offered as a weekly seminar that revolves around a focal reading, followed by additional background reading and discussion.
Prerequisite: PHC 6313 Environmental Health Concepts in Public Health and PHC 6702 Exposure Measurement and Assessment

PHC 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PHC 7980 Research for Doctoral Dissertation 1-15 Credits, Max 15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

Public Health—Health Services Research

HSA 5174 Fundamentals of Health Care Finance 3 Credits
Grading Scheme: Letter Grade
Introduction to basic theory and principles of finance as applied to the health care industry. Financial statements, cost measurement, budgeting, and capital investment decisions.
Prerequisite: consent of instructor.

HSA 6105 Professional Skills Seminar 1 Credit, Max 4 Credits
Grading Scheme: S/U
Presentations by speakers from health-related organizations and programs designed to improve career planning and professional skills. May be repeated for credit.
Prerequisite: consent of instructor.

HSA 6114 U.S. Health Care System 3 Credits
Grading Scheme: Letter Grade
Overview of structural elements of the contemporary system. Historical antecedents, patients, providers, payers, and the role of health policy.
Prerequisite: consent of instructor.

HSA 6115 Introduction to Management of Health Services Organizations 3 Credits
Grading Scheme: Letter Grade
Organizational principles and practices as applied to management. Organizational theory, managerial role, managing groups, work design, and organization design.
Prerequisite: consent of instructor.

HSA 6126 U.S. Health Insurance System 3 Credits
Grading Scheme: Letter Grade
Description and analysis of U.S. health insurance systems. Topics include private vs. public insurers, demands for health insurance, health plan types, premium setting, and reimbursement of providers.
Prerequisite: consent of instructor.

HSA 6152 Overview of U.S. Health Policy 3 Credits
Grading Scheme: Letter Grade
Survey and critical analysis of federal and state health policy processes and outcomes as they relate to the effectiveness and efficiency of health services in the U.S. and selected countries.
Prerequisite: consent of instructor.

HSA 6177 Advanced Health Care Finance 3 Credits
Grading Scheme: Letter Grade
Applying accounting and financial management theory and principles to the health care industry, emphasizing managed care organizations and integrated delivery systems.
Prerequisite: consent of instructor.

HSA 6188 Strategic Management in Health Administration 3 Credits
Grading Scheme: Letter Grade
The relationship of a health care organization to its environment. Strategic management processes, business planning, and other perspectives to aid in managing complex health care organizations.
Prerequisite: consent of instructor.

HSA 6196 Healthcare Data Analytics II 3 Credits
Grading Scheme: Letter Grade
This course is the second in a two course series on the use of data analytics in health care decision making to help health services organizations get more effectiveness and efficiency from their operations. Specific topics to be covered include process flow, simulation, decision-making, quality improvement, forecasting, capacity management, project management, and inventory management.
Prerequisite: consent of instructor.

HSA 6198 Information Management in Health Administration 3 Credits
Grading Scheme: Letter Grade
Survey of management information systems. Analyzing system requirements, system design and evaluation, selecting computer resources, and managing the implementation process.
Prerequisite: consent of instructor.

HSA 6342 Human Resource Management for Health Services Managers 3 Credits
Grading Scheme: Letter Grade
Knowledge and skills needed for effective management in complex health services organizations. Focuses on human resource acquisition, retention, and exit, as well as labor relations issues.
Prerequisite: consent of instructor.
HSA 6385 Performance Management for Health Care Managers 3 Credits
Grading Scheme: Letter Grade
Overview, emphasizing implementation. Aspects of performance defined in relation to structure, process, and outcomes, and meeting expectations and requirements of patients, insurers, government, and other organizations.
Prerequisite: consent of instructor.

HSA 6395 Healthcare Data Analytics I 3 Credits
Grading Scheme: Letter Grade
Introduces students to the use of data analytics in healthcare decision making to help health services organizations get more effectiveness and efficiency from their operations. It is the first in a two course series in the Masters of Health Administration degree program.

HSA 6427 Legal and Ethical Issues in Health Administration 3 Credits
Grading Scheme: Letter Grade
Survey of legal and ethical issues relating to health administration. Topics include government regulation, tort liability and malpractice, the professional-patient relationship, right to die, and patients without decisional capacity.
Prerequisite: consent of instructor.

HSA 6436 Health Economics 3 Credits
Grading Scheme: Letter Grade
Fundamental economic relations governing production, consumption, reimbursement, and financing of health services. Characteristics of markets for acute and long-term care services, insurance, and health care labor. Economic evaluation of technology.
Prerequisite: consent of instructor.

HSA 6855 Internship in Health Administration 5 Credits
Grading Scheme: S/U
Supervised fieldwork in a health administration setting.

HSA 6905 Individual Study in Health Administration 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Individual Study in Health Administration

HSA 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

HSA 6911 Research Seminar in Health Services Research 1 Credit, Max 6 Credits
Grading Scheme: S/U
Research presentations by graduate students.

HSA 6930 Special Topics in Health Services Administration 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Selected topics in theory and research in health services administration.

HSA 6939 Capstone Seminar in Health Administration 3 Credits
Grading Scheme: Letter Grade
Analysis of cases dealing with administrative and policy issues in health services. Emphasizes problem-solving in ill-defined, multi-faceted situations.
Prerequisite: consent of instructor.

HSA 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

HSA 7106 Seminar in Health Care Access and Utilization 3 Credits
Grading Scheme: Letter Grade
Overview of context and processes in which individuals seek and obtain health care services; distributional issues; equity.
Prerequisite: consent of instructor.

HSA 7116 Health Services Organizational Research 3 Credits
Grading Scheme: Letter Grade
Major perspectives in organization theory and their applications to the health care sector.
Prerequisite: consent of instructor.

HSA 7157 Research Foundations of Health Policy 3 Credits
Grading Scheme: Letter Grade
In-depth examination of U.S. health policy issues concerning cost, quality, and access; and interdisciplinary research methods used to address such issues.
Prerequisite: consent of instructor.

HSA 7437 Advanced Health Economics 3 Credits
Grading Scheme: Letter Grade
Exposure to advanced economics models of the health care sector, including static and dynamic models of consumer and producer behavior, risk selection in insurance markets, and optimal reimbursement mechanisms.
Prerequisite: consent of instructor.

HSA 7707 Health Services Research Methods I 3 Credits
Grading Scheme: Letter Grade
Current and historical thinking about the philosophy of science and scientific modeling. Experimental and quasi-experimental design. Introduction to measurement and sampling.
Prerequisite: consent of instructor.

HSA 7708 Health Services Research Methods II 3 Credits
Grading Scheme: Letter Grade
Review and appraisal of methods. Findings and examples from historical and contemporary studies. Introduction to qualitative and quantitative research methodologies.
Prerequisite: consent of instructor.

HSA 7759 Quality and Outcomes in Health Services Research 3 Credits
Grading Scheme: Letter Grade
Current research concerning small area variation, outcomes, appropriateness, and effectiveness. Theory and specifics of alternative quality improvement and assurance approaches. History of approaches to health care quality assessment.
Prerequisite: consent of instructor.

HSA 7795 Quality and Outcomes in Health Services Research 3 Credits
Grading Scheme: Letter Grade
Examination of health services research related to costs and financing. Cost measurement and analysis, health insurance, sources and methods of payment, current policy.
Prerequisite: consent of instructor.

HSA 7905 Advanced Individual Study in Health Services Research 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Advanced Individual Study in Health Services Research

HSA 7936 Seminar in Health Care Costs and Financing 3 Credits
Grading Scheme: Letter Grade
Overview, emphasizing implementation. Aspects of performance defined in relation to structure, process, and outcomes, and meeting expectations and requirements of patients, insurers, government, and other organizations.

HSA 7938 Advanced Seminar in Health Services Research 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Advanced Seminar in Health Services Research
Prerequisite: completion of graduate core program and preliminary dissertation topic.
HSA 7979 Advanced Research 1-4 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

HSA 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

Occupational Therapy

OTH 5770C Research for Occupational Therapy 3 Credits
Grading Scheme: Letter Grade
Principles and skills necessary for critical review of the occupational therapy literature.

Prerequisite: OT graduate student.

OTH 6539 Occupational Therapy Theory 3 Credits
Grading Scheme: Letter Grade
Preparation for entry-level position through introduction of basic principles of management and systems.

OTH 6636 Principles of Occupational Therapy Screening and Evaluation II 4 Credits
Grading Scheme: Letter Grade
Builds on OTH 6635. Application of screening and evaluation principles to evaluation process and learning to administer tools to adult population.

Prerequisite: OTH 6635.

OTH 6641 Occupational Therapy Interventions I 4 Credits
Grading Scheme: Letter Grade
Occupational therapy theory and treatment as it relates to infants, children, adolescents, and their families.

OTH 6642 Occupational Therapy Interventions II 6 Credits
Grading Scheme: Letter Grade
Basic interventions for adults through elders using ICDH systems as framework. Planning and applied treatment approaches including acquisition, restorative, and compensatory strategies.

Prerequisite: OTH 6641.

OTH 6707 OT Manager 6 Credits
Grading Scheme: Letter Grade
Leadership development, developing independent practice for consultation, client and professional advocacy, case management, and business entrepreneurship.

OTH 6708 Issues in Occupational Therapy Practice I 2 Credits
Grading Scheme: Letter Grade
Current health care issues.

OTH 6709 Issues in Occupational Therapy Practice II 2 Credits
Grading Scheme: Letter Grade
Forum for debating viewpoints regarding current practice issues relevant to occupational therapy.

OTH 6720 Trends and Issues in Health Care 6 Credits
Grading Scheme: Letter Grade
Managed health care, public policy, and intervention within social and behavioral contexts. Effects on occupational therapy service delivery.

OTH 6819 Competency 1 Credit
Grading Scheme: S/U
Competency

OTH 6861 Specialty Internship 2-10 Credits
Grading Scheme: S/U
Prereq or coreq: OTH 6780. Field experience in clinical, community, educational, and administrative settings approved by the department.

OTH 6905 Individual Work 1-10 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Project related to teaching, research, administration, or clinical practice.

OTH 6907 Professional Development Project 6 Credits
Grading Scheme: Letter Grade
Concepts and strategies for assessment of practice outcomes and program evaluation. Independent design, implementation, and reporting of an independent project.

OTH 6933 Special Topics in Occupational Therapy 2-4 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Selected topics in theory and research in occupational therapy.

Physical Therapy

RSD 6718 Neuroplasticity: A Foundation for Neurorehabilitation 3 Credits
Grading Scheme: Letter Grade
Evidence for plasticity after injury or disease. Factors that influence recovery. Medical approach to enhancing recovery. Potential approaches in physical rehabilitation to facilitate and optimize plasticity.

Rehabilitation Science

RSD 6110 Rehabilitation Science Theory and Application I 3 Credits
Grading Scheme: Letter Grade
Philosophical and theoretical foundations. History of the development of rehabilitation services and funding. Evolution of health care systems in the U.S.

RSD 6401 Skeletal Muscle in Aging and Disease, and Implications for Rehabilitation 3 Credits
Grading Scheme: Letter Grade
Addresses the impact of aging and various diseases on skeletal muscle biology, the mechanisms therein, and preclinical (animal model) or clinical approaches to therapeutically treating the muscle to improve function.

Prerequisite: This course is open to all Rehabilitation Science PhD students. As such, admission to the RSD program is a prerequisite. Graduate students from other programs are encouraged to register with prior permission of the instructor.

RSD 6700 Rasch Measurement: Introduction and Application 3 Credits
Grading Scheme: Letter Grade
Applying Rasch measurement to social and health science data. Rasch pertains to Item Response Theory approaches used to analyze educational, survey, self-report, and clinical data; and is a precursor to computerized adaptive testing.

Prerequisite: for doctoral students.

RSD 6706 Scientific Writing for the Rehabilitation Professional 3 Credits
Grading Scheme: S/U
A systematic approach to scientific writing using the student's scientific project (article, chapter, grant, other) as a focus for participation.

Corequisite: Scientific writing project.
RSD 6710 Motor Control: Translating from Fundamental Research to Rehabilitation Practice 3 Credits
Grading Scheme: Letter Grade
Defines fundamental concepts and theories related to motor control
and movement science and discusses these concepts in the context of
neurorehabilitation. The course also emphasizes atypical motor control
functions and underlying neurophysiological mechanisms following
disease/injury. Students will practice scientific writing and presentation
skills through weekly in-class presentations.
Prerequisite: This course is open to all Rehabilitation Science PhD
students. As such, admission to the RSD program is a prerequisite.
Graduate students from other programs are encouraged to register with
prior permission of the instructor.

RSD 6900 College Classroom: Teaching Process and Practice 3 Credits
Grading Scheme: Letter Grade
Information and skills required for successful teaching faculty in college
classroom.

RSD 6905 Individual Work 1-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Special project or research.
Prerequisite: RSD 6112 , consent of adviser, and project approval.

RSD 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

RSD 6920 Rehabilitation Science Journal Club 1 Credit, Max 5 Credits
Grading Scheme: Letter Grade
Class critically evaluates published papers in broad fields related to
Rehabilitation Science. Students present assigned reading including a
brief summary of the rationale/background, methodology, results, and
implications of the data. Students will learn to present research data to a
diverse audience and how to receive and answer research questions.
Prerequisite: Open to all PhD students in Rehabilitation Science. Other
graduate students are invited to register with permission of the instructor.
However, the course is limited to 12 students.

RSD 6930 Special Topics in Rehabilitation Science 1-4 Credits, Max 9
Credits
Grading Scheme: Letter Grade
Special Topics in Rehabilitation Science
Prerequisite: RSD 6112 , RSD 6705 .

RSD 6938 Doctoral Seminar in Rehabilitation Science 1 Credit, Max 5
Credits
Grading Scheme: Letter Grade
Students meet and interview national and international scientists
studying rehabilitation to discuss key professional and scientific issues
related to rehabilitation science. As part of this course, students attend
and critique the Rehabilitation Science Seminars, complete seminal
readings in visiting scientists’ area of focus and moderate and participate
in discussion.
Prerequisite: Open to all Rehabilitation Science PhD students. Other
graduate students are invited to register with approval of the instructor.

RSD 6940 Supervised Teaching 1-3 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

RSD 7979 Advanced Research 1-12 Credits, Max 12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed
for students with a master’s degree in the field of study of for student
who have been accepted for a doctoral program. Not appropriate for
students who have been admitted to candidacy.

RSD 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

Philosophy

PHH 5405 Modern Philosophy I 3 Credits
Grading Scheme: Letter Grade
Close reading of central text of the rationalists in the early modern period,
especially Descartes, Spinoza, and Leibniz.

PHH 5406 Modern Philosophy II 3 Credits
Grading Scheme: Letter Grade
Close reading of central texts of the empiricists in the modern period,
especially Locke, Berkeley, and Hume.

PHH 5605 Studies in Continental Philosophy 3 Credits
Grading Scheme: Letter Grade
Close reading of central texts of the major figures in the European
continental tradition, such as Husserl, Heidegger, and Sartre.

PHH 6105 Seminar in Ancient Philosophy 3 Credits, Max 18 Credits
Grading Scheme: Letter Grade
Advanced study of particular topics or themes in the philosophy of Greek
and Roman antiquity.
Prerequisite: PHP 5005 or PHP 5015, depending on topic.

PHH 6425 Seminar in Modern Philosophy 3 Credits, Max 18 Credits
Grading Scheme: Letter Grade
Advanced study of particular topics or themes in philosophy of the
seventeenth and eighteenth centuries. S/U option only if admitted to
candidacy.
Prerequisite: PHH 5406 or consent of instructor.

PHI 5135 Graduate Logic 3 Credits
Grading Scheme: Letter Grade
Propositional calculus, quantificational logic through completeness, and
an introduction to modal logic.

PHI 5225 Philosophy of Language 3 Credits
Grading Scheme: Letter Grade
Advanced survey of central issues in contemporary philosophy of
language, such as the theory of meaning, compositionality, reference,
truth, and logical form.

PHI 5325 Philosophy of Mind 3 Credits
Grading Scheme: Letter Grade
Advanced survey of central issues in contemporary philosophy of mind,
such as approaches to the mind-body problem, theories of mental
content and consciousness, mental causation, and methodology in
psychology.

PHI 5365 Epistemology 3 Credits
Grading Scheme: Letter Grade
Advanced survey of central issues in contemporary epistemology such as
major theories of knowledge, justification, and truth.
PHI 5405 Philosophy of Science 3 Credits
Grading Scheme: Letter Grade
Advanced survey of central issues in the philosophy of science, such as the nature of the scientific method, and the differences between the natural and social sciences.

PHI 5425 Philosophy of Social Science 3 Credits
Grading Scheme: Letter Grade
Advanced survey of the central issues in the philosophy of social science, such as reduction, covering laws, rational reconstruction, interpretation, and causation.

PHI 5505 Metaphysics 3 Credits
Grading Scheme: Letter Grade
Advanced survey of issues in contemporary metaphysics, such as existence, identity, universals and abstract objects, the nature of particulars, modalities, and causation.

PHI 5665 Ethical Theory 3 Credits
Grading Scheme: Letter Grade
Advanced survey of central issues in ethical theory, such as consequentialism and deontology, theories of justice, and moral skepticism.

PHI 5696 Ethics and Emerging Technology 3 Credits
Grading Scheme: Letter Grade
A foundational course introducing students to important interactions between ethics, economics, and public policy in assessing the social value of emerging technologies.
Prerequisite: student in the College of Liberal Arts and Sciences.

PHI 5905 Individual Work 1-6 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Problem, author, or topic not treated in available courses.
Prerequisite: Consent of instructor, graduate coordinator, and chair.

PHI 5934 Topics in Philosophy 3 Credits, Max 18 Credits
Grading Scheme: Letter Grade
Rotating topics may focus upon any area of philosophy not covered by other 5000-level courses.
Prerequisite: Admission to the graduate program in philosophy or approval of instructor.

PHI 5935 Proseminar 3 Credits
Grading Scheme: S/U
Mandatory for entering students. Methods of inquiry and research.

PHI 6105 Seminar in Logic 3 Credits, Max 18 Credits
Grading Scheme: Letter Grade
Advanced seminar in logic, covering topics in model theory and recursion theory, beyond level of PHI 5135, including a careful treatment of Godel's incompleteness theorems and a modest study of undecidability. S/U option available if student admitted to Ph.D. candidacy.
Prerequisite: PHI 5135.

PHI 6226 Seminar in Philosophy of Language 3 Credits, Max 18 Credits
Grading Scheme: Letter Grade
Advanced study of particular topics or themes in the philosophy of language, such as compositionality, pragmatics, speech act theory, semantics of attitude reports or deflationary theories of truth. S/U option available if student admitted to Ph.D. candidacy.

PHI 6306 Seminar in Epistemology 3 Credits, Max 18 Credits
Grading Scheme: Letter Grade
Advanced study of particular topics in epistemology, such as epistemic justification, skepticism, or foundationalism. S/U option available if student admitted to Ph.D. candidacy.
Prerequisite: PHI 5365 or PHP 5785.

PHI 6326 Seminar in Philosophy of Mind 3 Credits, Max 18 Credits
Grading Scheme: Letter Grade
Advanced study of particular topic or theme in philosophy of mind, such as theories of mental representation, the mind-body explanatory gap, nativism, or the problem of mental causation. S/U option available if student admitted to Ph.D. candidacy.

PHI 6406 Seminar in Philosophy of Science 3 Credits, Max 18 Credits
Grading Scheme: Letter Grade
Advanced study of particular topics or themes in the philosophy of science, such as the scientific explanation, laws, and theories of space and time. S/U option available if student admitted to Ph.D. candidacy.
Prerequisite: PHI 5136 and PHI 5405.

PHI 6506 Seminar in Metaphysics 3 Credits, Max 18 Credits
Grading Scheme: Letter Grade
Advanced study of particular topics or themes in contemporary metaphysics, such as identity, Platonism and nominalism, the nature of particulars, necessity and possibility, events and facts, and the nature of causation. S/U option available if student admitted to Ph.D. candidacy.

PHI 6639 Topics in Ethics of Technology 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Variable topic seminar focusing on the ethical dimensions of one or more central areas of emerging technology.
Prerequisite: PHI 5696 or instructor permission.

PHI 6667 Seminar in Ethics 3 Credits, Max 18 Credits
Grading Scheme: Letter Grade
Advanced study of particular topics or themes in ethical theory, such as noncognitivism, moral realism, virtue ethics, and consequentialism. S/U option available if student admitted to Ph.D. candidacy.

PHI 6698 Bioethics and Biotechnology 3 Credits
Grading Scheme: Letter Grade
An introduction to bioethics, with a strong emphasis on the ethical dimensions of biotechnology.

PHI 6699 Ethics, AI, and Data 3 Credits
Grading Scheme: Letter Grade
Provides a foundation for addressing ethical issues arising from technological advances in Artificial Intelligence and Big Data, with a focus on the social value and liabilities of these technologies.

PHI 6905 Individual Work 1-9 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Advanced study of author or topic not treated in available courses.
Prerequisite: Consent of instructor, graduate coordinator, and chair.

PHI 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

PHI 6934 Special Topics 1-4 Credits, Max 18 Credits
Grading Scheme: Letter Grade
Special research topics falling outside of the scope of other research seminars. S/U option available if student admitted to Ph.D. candidacy.

PHI 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching
Avoid drug interactions and false claims.

Course provides an overview of commonly used supplements to assist herbal dietary supplements are extensively used by consumers. This course provides an overview of commonly used supplements to assist healthcare practitioners in providing patients with adequate counseling to avoid drug interactions and false claims.

PHA 6357 Herbal & Dietary Supplements 3 Credits
Grading Scheme: Letter Grade
Herbal dietary supplements are extensively used by consumers. This course provides an overview of commonly used supplements to assist healthcare practitioners in providing patients with adequate counseling to avoid drug interactions and false claims.

PHA 6416 Pharmaceutical Analysis I 3 Credits
Grading Scheme: Letter Grade
Theory and applications of relevant analytical techniques for analysis of drugs in biological samples. Offered spring term in odd-numbered years.

PHA 6417 Pharmaceutical Analysis II 3 Credits
Grading Scheme: Letter Grade
Absorption, fluorescence, phosphorescence, and spectroanalysis of drugs and related compounds.

PHA 6425 Drug Biotrans and Molecular Mechanisms of Toxicity 3 Credits
Grading Scheme: Letter Grade
Enzymology and mechanisms of drug biotransformation pathways. Examples of drugs and other xenobiotics that exhibit toxicity related to biotransformation.

Prerequisite: Introductory organic chemistry, biochemistry.

PHA 6432 Fundamentals of Pharmaceutical Chemistry 1 Credit
Grading Scheme: Letter Grade
This is a foundation course whose aims are providing an introduction to the principles of pharmaceutical chemistry, including an understanding of drug structure-activity relationships, prediction of the physico-chemical properties of a drug, basic knowledge of the major pathways of drug metabolism, and factors that can contribute to drug-drug interactions.

PHA 6435 Biosynthetic Logic of Medicinal Natural Products 3 Credits
Grading Scheme: Letter Grade
Covers topics of biosynthesis of the major families of medical natural products, structural and biochemical understanding of their biosynthetic logic, gene cluster identification, genome mining, and production of bioactive "unnatural products" for drug discovery and development.

Prerequisite: Students are expected to have the background of Biochemistry, Enzymology, and Bioorganic Chemistry. Or permission of instructors.

PHA 6444 Pharmaceutical Chemistry I 3 Credits
Grading Scheme: Letter Grade
Students are shown how to predict the solubilities, structure-activity relationships, basic synthesis routes for selected structures, metabolism and pharmacological activity/potency of various drug classes. In particular, anticoagulants, ACE inhibitors, glucocorticoid steroids, nitrate esters, adrenergics, cholinergics, diuretics, anesthetics, antihyperlipidemics, muscle relaxants, anxioytics, antidepressants, sedative hypnotics and vitamins are covered.

PHA 6447 Drug Design 3 Credits
Grading Scheme: Letter Grade
Relevant disciplines and their effect on new drug development, from discovery of a new active lead compound to final refinement as a commercial product.

Prerequisite: organic chemistry, biochemistry, pharmacology, or consent of instructor.

PHA 6448 High Throughput Drug Discovery 2 Credits
Grading Scheme: Letter Grade
Introduction to combinatorial chemistry, multi-compound based technologies, and their use in screening bioassays to discover lead compounds.

Prerequisite: organic chemistry, biochemistry, or consent of instructor.

PHA 6471 Synthetic Medicinal Chemistry 3 Credits
Grading Scheme: Letter Grade
Review of acid and base properties of pharmacologically active molecules. Review of mechanisms of synthetic reactions, and their applications.
PHA 6472 Organic Synthesis of Drug Molecules 3 Credits
Grading Scheme: Letter Grade
Covers advanced topics in drug molecule synthesis, including: organic reaction mechanisms, retrosynthetic analysis, asymmetric synthesis, heterocyclic chemistry, natural product synthesis, drug design and synthesis, structure-activity relationships. Secondary topics that will be included in this course include: anticancer/antibacterial agents, screening approaches.
Prerequisite: CHM 5224 or permission of instructor.

PHA 6476 Advanced Combinatorial Chemistry in Drug Discovery 3 Credits
Grading Scheme: Letter Grade
Designed to introduce students combinatorial chemical synthesis to fully understand the functions and mechanism of action of biopolymers for medical purpose.
Prerequisite: Students are expected to have previous knowledge on general chemistry and organic synthesis.

PHA 6534 Toxicology of Chemical Weapons 3 Credits
Grading Scheme: Letter Grade
Providing healthcare providers, first responders, and others that may be exposed to chemical weapons with an understanding of their toxicology and treatment approaches.

PHA 6535 Principles of Nucleotide Activity 2 Credits
Grading Scheme: Letter Grade
This course will be introducing the students to the chemical structure of DNA and RNA; the synthetic processes for DNA and RNA synthesis; biochemical reactions and pathways for nucleotide synthesis; DNA replication, transcription and translation; covalent and reversible interactions of nucleic acids with small molecules and proteins and an overview of techniques for the analysis of nucleic acids.

PHA 6543 Pharmaceutical Chemistry II 3 Credits
Grading Scheme: Letter Grade
Showing students how to predict the solubilities, structure-activity relationships, basic synthesis routes for selected structures, metabolism and pharmacological activity/potency of various drug classes. In particular anti-diabetics, anti-convulsants, H1 and H2 antagonists, analgetics, non-steroidal anti-inflammatory drugs, hormones, antibiotics, antiviral agents, and antineoplastic agents are covered.

PHA 6556 Introduction to Clinical Toxicology 3 Credits
Grading Scheme: Letter Grade
Introducing the basic methods and procedures commonly employed in Clinical Toxicology as well as the concept of Clinical Toxicology as an interdisciplinary science within the field of healthcare.

PHA 6557 Clinical Toxicology 1 3 Credits
Grading Scheme: Letter Grade
Providing students with an understanding of the toxic effects and clinical applications of various therapeutic drug classes including cardiovascular, CNS, analgetic, anesthetic, antineoplastic, and antibiotic drugs.
Prerequisite: VME 6602

PHA 6840 Medicinal Chemistry of Drugs of Abuse 3 Credits
Grading Scheme: Letter Grade
Pharmacological effects of commonly encountered licit and illicit pharmaceutical compounds.

PHA 6850 Principles of Forensic Science 3 Credits
Grading Scheme: Letter Grade
Introducing the basic disciplines of forensic science. The course is composed of twelve modules.

PHA 6851 Forensic Analysis of DNA 3 Credits
Grading Scheme: Letter Grade

PHA 6852 Mammalian Molecular Biology 3 Credits
Grading Scheme: Letter Grade
Focus on the principles of modern molecular biology and biochemistry and expand on the concepts you may have already encountered in other classes in this program. The content will also include the applications of experimental techniques and procedures routinely used in this field.

PHA 6853 Biological Evidence and Serology 3 Credits
Grading Scheme: Letter Grade

PHA 6854 Forensic Immunology 3 Credits
Grading Scheme: Letter Grade

PHA 6855 Forensic Genetics 3 Credits
Grading Scheme: Letter Grade
Principles of inheritance. Genetic polymorphisms and forensic implications, population genetics and paternity testing.

PHA 6856 Blood Spatter and Distribution 3 Credits
Grading Scheme: Letter Grade
Blood spatter creation and interpretation. Recording, collection, and processing of bloodstains and blood spatter evidence.

PHA 6905C Research Procedures in Medicinal Chemistry 1-4 Credits
Grading Scheme: S/U
Research Procedures in Medicinal Chemistry

PHA 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

PHA 6934 Seminar in Medicinal Chemistry 1 Credit, Max 3 Credits
Grading Scheme: Letter Grade
Weekly presentation and discussion of research reports based on college programs or literature.

PHA 6935 Selected Topics in Pharmacy 1-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Open to all departments in the College of Pharmacy.

PHA 6936 Advanced Topics in Pharmaceutical Sciences 1-2 Credits, Max 4 Credits
Grading Scheme: Letter Grade
Written and oral presentation of research designs, protocols, papers, and critical appraisals with discussion and critical review of such topics.

PHA 6938 Research Seminar 1 Credit, Max 3 Credits
Grading Scheme: Letter Grade
Seminar required of graduate students in the College of Pharmacy.

PHA 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

PHA 6971 Research for Master’s Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master’s Thesis
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

**PHA 7980 Research for Doctoral Dissertation 1-15 Credits**  
Grading Scheme: S/U  
Research for Doctoral Dissertation

**Pharmacy—Pharmaceutical Outcomes and Policy**

**PHA 5270 Health Care and Patient Safety 3 Credits**  
Grading Scheme: Letter Grade  
Provides an overview of applicable federal, state, local, and health and safety laws relevant to the practice of health care risk management and patient safety.

**PHA 5271 Health Care Risk Management 3 Credits**  
Grading Scheme: Letter Grade  
Introduction to the concept of risk management in health care settings, describing its development, role of the health care risk manager, and connection between risk management, quality improvement and corporate compliance.

**PHA 5272 Risk Management, Liability and Compliance 3 Credits**  
Grading Scheme: Letter Grade  
Applicable standards of health care risk management, including the principles of malpractice and insurance, the conduct of malpractice litigation, and the settlement of malpractice claims.

**PHA 6206 Introduction to Pharmaceutical Microeconomics 3 Credits**  
Grading Scheme: Letter Grade  
Introducing students to the fundamentals of microeconomic theory from the perspective of pharmaceutical markets. This course will cover the main elements of microeconomic theory, focusing on the behavior of individuals and firms and the interaction among these agents in both competitive and non-competitive pharmaceutical markets. The class will focus on concepts such as consumer choice, opportunity costs, supply and demand, elasticity, competition, monopoly and oligopoly and the application of these concepts to the markets for pharmaceutical products and services.

**PHA 6227 Institutional Pharmacy Leadership I 3 Credits**  
Grading Scheme: Letter Grade  
Addresses leadership topics relevant to institutional pharmacy with an emphasis on case study analysis. Topics include leading people, leading the pharmacy enterprise, leading change and innovation, providing leadership in safety and quality, and information technology and systems.

**PHA 6228 Institutional Pharmacy Leadership II 3 Credits**  
Grading Scheme: Letter Grade  
Addresses leadership topics relevant to institutional pharmacy with emphasis on case-study analysis. Topics include leadership in effective financial management, building presence with executive leadership, leading for results, and gaining leadership skills through self-development.

**PHA 6235 Advanced Pharmaceutical Law 2 Credits**  
Grading Scheme: Letter Grade  
Study of the federal Food, Drug, and Cosmetics Act and various state and local laws applicable to drug manufacturers, wholesalers, distributors, and drug-related products, including analyses of recent court decisions.

**PHA 6250 Patient Responsibility in Health Care 3 Credits**  
Grading Scheme: Letter Grade  
This course examines the ways in which patients can accept responsibility for promoting good outcomes of the therapeutic modalities that the health care professionals and institutions provide. The focus is on how patients can foster a productive relationship with health care providers and institutions, and how they can participate actively in efforts to prevent failures of quality in the provision of health care.

**PHA 6254 Structure, Process and Outcomes of Regulation II 2 Credits**  
Grading Scheme: Letter Grade  
A continuation course that emphasizes the role of the legislative, executive and judicial branches of state and federal government in the establishment of standards for pharmacy practice and drug distribution. It also places special emphasis on the administrative rule making process. Additionally, the course focuses on the purpose of government agencies, the approach to standards setting by each type of agency, and the effects of regulation on public health.

**PHA 6260 Introduction to Pharmaceutical Outcomes and Policy II 2 Credits**  
Grading Scheme: Letter Grade  
Introduction to drug distribution systems, pharmacoepidemiology, economic evaluation of drugs, and databases regarding medication use.

**PHA 6264 Pharmacoeconomics and Health Technology Assessment 3 Credits**  
Grading Scheme: Letter Grade  
Introduction to major analytical techniques used in economic evaluation of medical technologies.  
Prerequisite: STA 6200 or STA 6126 or equivalent, HSC 6506 or 5103 or equivalent, or consent of instructor.

**PHA 6265 Introduction to Pharmaceutical Outcomes and Policy I 3 Credits**  
Grading Scheme: Letter Grade  
Introduces students to the breadth of research issues in Pharmaceutical Outcomes and Policy, including legal, educational, regulatory and financial aspects of medication use; patient and provider behavior in medication use; the structure of pharmaceutical supply chain; and patient safety and risk management.

**PHA 6266 Introduction to Pharmaceutical Outcomes and Policy II 2 Credits**  
Grading Scheme: Letter Grade  
Introduction to drug distribution systems, pharmacoepidemiology, economic evaluation of drugs, and databases regarding medication use.

**PHA 6268 Pharmacoepidemiology and Patient Safety 3 Credits**  
Grading Scheme: Letter Grade  
Exposure to research methodologies in pharmacoepidemiology relevant to drug safety, drug effectiveness, and outcome assessment. Emphasizing observational study designs, including patient follow-up studies, case-control and cohort designs.

**PHA 6269 Pharmaceutical Products and Public Policy 3 Credits**  
Grading Scheme: Letter Grade  
Relationships among pharmaceutical manufacturers, institutions, managed care, professions, and the public. The government’s role in assuring high quality pharmaceutical products and services. Quality controls managed by the public and by industry. Congressional oversight of medication development, production, and use.

**PHA 6273 Structure, Process and Outcomes of Regulation I 2 Credits**  
Grading Scheme: Letter Grade  
Emphasizes the role of the legislative, executive and judicial branches of state and federal government in the establishment of standards for pharmacy practice and drug distribution. It also places special emphasis on the administrative rule making process. Additionally, the course focuses on the purpose of government agencies, the approach to standards setting by each type of agency, and the effects of regulation on public health.
PHI 6274 Federal Regulations of Drugs and Pharmacy 3 Credits
Grading Scheme: Letter Grade
The Federal Food, Drug and Cosmetic Act, regulations promulgated by the Food and Drug Administration, and judicial interpretations of controversies in this area. Federal regulation of drug research, new drug approval, drug marketing and drug distribution. The balance sought by the FDA and other federal agencies in the protection of the public from unsafe and/or ineffective drugs, without unnecessarily restricting access to therapeutics.

PHI 6275 Federal Regulations of Controlled Substances 3 Credits
Grading Scheme: Letter Grade
The Federal Controlled Substances Act, regulations promulgated by the Drug Enforcement Administration, and judicial interpretations of controversies in this area. The “closed-system” of controlled substance distribution created under federal law. Federal restrictions on the manufacture, distribution and use of drugs that are subject to abuse. Treatment programs for the disease of addiction.

PHI 6276 Pharmacy Benefit Design & Management 3 Credits
Grading Scheme: Letter Grade
An overview of managed care pharmacy, focusing on the structure and function of the prescription benefits management within health plans and PBMs and the role of pharmacists with a managed care pharmacy department.

PHI 6277 Ethics in Drug Development Production and Use 3 Credits
Grading Scheme: Letter Grade
Governments, health professionals, patients and research institutions look to the field of ethics for guidance on how decisions should be made in the treatment of patients and in research. A process for ethical decision making. Basic theories and principles of biomedical ethics, with emphasis on utilitarianism. Application of principles to subjects such as informed consent, abortion/contraception, physician-assisted dying, experimentation with human subjects, and confidentiality.

PHI 6278 State Regulation of Drugs and Pharmacy 3 Credits
Grading Scheme: Letter Grade

PHI 6279 Pharmaceutical Outcomes and Policy Seminar 1 Credit, Max 3 Credits
Grading Scheme: S/U
Development, reasons for, and possible approaches to resolving a contemporary issue in health outcomes or policy. Students analyze particular aspects of the issue and present results for class discussion.

PHI 6280 Medicare and Medicaid 3 Credits
Grading Scheme: Letter Grade
Costs and financing of Medicare and Medicaid. Eligibility, program administration, benefits, and relationships between state and federal agencies.

PHI 6281 Practices and Procedures of Administrative Agencies 3 Credits
Grading Scheme: Letter Grade
Organization, responsibilities, administrative practices, procedures, and politics of FDA and CMS.

PHI 6283 Commercial Applications of Pharmacoconomics 3 Credits
Grading Scheme: Letter Grade
Fundamental methods of pharmacoeconomic analysis. Focuses on the theory, methods, and application of technology assessment in health care. Applications will be drawn from a variety of health care settings, including pharmaceuticals.

PHI 6286 Pharmaceutical Microeconomics 3 Credits
Grading Scheme: Letter Grade
Introduction to basic microeconomic principles as they are applied to pharmaceuticals. Elucidation of the economic tools and the fundamental concepts of choice, opportunity costs, supply and demand, elasticity, utility maximizing behavior, competition, monopolies and oligopolies in the healthcare market.

PHI 6287 Pharmaceutical Health Economics 3 Credits
Grading Scheme: Letter Grade
Examines economic principles and issues of health care and pharmaceuticals in the United States. Topics examined include health care structure and financing, market failures, human capital, and producer and consumer behavior.

PHI 6288 Critical Review of Research Methods 3 Credits
Grading Scheme: Letter Grade
Research design and methodology utilized in clinical research with a focus on understanding each component of the research process, including how to formulate a research question, develop hypotheses, analyze instruments, collect relevant data, data analysis, and critically interpret the results, while preserving the ethical guidelines for human subject research.

PHI 6289 Regulating Clinical Research 3 Credits
Grading Scheme: Letter Grade
Introduces history and current regulatory environment of human subjects research as a background to regulatory frameworks and contemporary issues structuring the development of clinical medical research, including federal regulations of Departments of Health and Human Services and those of the Food and Drug Administration, as well as non-federal sources of regulation.

PHI 6290 Pharmaceutical Fraud and Abuse 3 Credits
Grading Scheme: Letter Grade
Understanding of federal fraud, waste and abuse laws and regulations related to health care. Fraud, waste, and abuse laws and regulations are the focus of many different health care laws and regulations with the number growing each year. This course will introduce students to these laws and regulations and allow them to distinguish among the different regulations. The course will also focus on areas where health care entities can prevent violations of fraud, waste, and abuse.
Prerequisite: None.

PHI 6291 Pharmaceutical Health Care Systems 3 Credits
Grading Scheme: Letter Grade
Emphasizes designing a prescription benefit program meeting the needs of a reformed health care system; negotiating the health care system as the advocate for patients who are from special populations; and presenting to lawmakers a compelling argument for reform.

PHI 6476 Advanced Combinatorial Chemistry in Drug Discovery 3 Credits
Grading Scheme: Letter Grade
Designed to introduce students combinatorial chemical synthesis to fully understand the functions and mechanism of action of biopolymers for medical purpose.
Prerequisite: Students are expected to have previous knowledge on general chemistry and organic synthesis.

PHI 6717 Measurement in Pharmacy Administration Research 3 Credits
Grading Scheme: Letter Grade
Examination of some of the techniques adapted from the social sciences for research in the field of pharmacy administration.
Prerequisite: STA 6217 or equivalent.
PH 6793 Evidentiary Basis of Pharmaceutical Use 3 Credits  
**Grading Scheme:** Letter Grade  
The overall goal of the course is to familiarize students with methods and tools to evaluate the medical literature. Students will be exposed to an array of study designs and analytic methods. In clinical cases, students evaluate strengths and weaknesses of the published literature and use evidence to support their recommendations about the appropriate use of pharmaceuticals.

PH 6796 Study Design in Pharmaceutical Outcomes & Policy Research 3 Credits  
**Grading Scheme:** Letter Grade  
Methods for evaluation and improvement of drug therapy outcomes including critical appraisal of drug and clinical service literature with special focus on patient and medication safety.

PH 6798 The Use and Abuse of Statistics in Drug Regulation 3 Credits  
**Grading Scheme:** Letter Grade  
Explores statistical methods used to make inferences about data obtained in clinical trials. This course demonstrates how statistics are used to rule out the possibility that the conclusions of a research project are the result of chance. Potential problems in the use of statistics are reviewed. The course examines published research articles reporting results that are not supported by the statistical tools used in the described study. The student is taught how to engage in critical analysis of the statistics in a proposed scientific study.

PH 6799 Patient Safety Program Evaluation 3 Credits  
**Grading Scheme:** Letter Grade  
Explores the methodologies through which patient safety data are collected and evaluated. The use of existing databases on patient safety will be examined. The course includes design of a patient safety study, the evaluation of data, and the use of results from program evaluation to implement improvements to ongoing programs.

PH 6805 Applied Data Interpretation and Reporting of Findings in Pharmacy 3 Credits  
**Grading Scheme:** Letter Grade  
Develops research skills including generation of questions; hypotheses testing; and testing, interpretation, and reporting of findings.

PH 6806 Pharmacoeconomic Modeling 3 Credits  
**Grading Scheme:** Letter Grade  
Providing an introduction to methods and techniques for conducting pharmacoeconomic studies, including classifying disease, identifying pharmaceutical products from prescription claims, risk adjustment, practical decision analysis, Markov modeling, and indirect treatment comparisons.  
**Prerequisite:** PHA 6283

PH 6860 Prevention of Pharmaceutical Crimes 3 Credits  
**Grading Scheme:** Letter Grade  
Introduces the student to the current legal environment associated with criminal conduct related to the use of pharmaceutical products and strategies for reducing the risk that pharmaceutical products will be used to intentionally harm a person as the instrumentality of a criminal act, including actions by a health care provider that can be considered criminal and outside the practice of health care.

PH 6891 Introduction to Pharmacoepidemiology 3 Credits  
**Grading Scheme:** Letter Grade  
Explores basic epidemiology principles with a particular focus on how they are applied to pharmaceuticals. Provides a basic understanding of causation, measure disease occurrence and causal effect, biases in study design, data analysis and use of epidemiology in clinical settings.

PH 6892 Practices and Procedures of the IRB 3 Credits  
**Grading Scheme:** Letter Grade  
Describes the nuts and bolts of how Institutional Review Boards operate. Topics discussed include IRB membership, IRB authority, criteria for IRB approval of research or exemption from review, and suspension or termination of IRB approved research. The process of risk/benefit decision making is reviewed. The constituencies served by the IRB are examined. Current issues in IRB practice are discussed. Practical information about the week-to-week management of an IRB is explained.

PH 6893 Research Ethics 3 Credits  
**Grading Scheme:** Letter Grade  
Introduce the student to the ethical issues that must be addressed in clinical research with human subjects. It will include an introduction to the primary theories and methods of ethical reflection and analysis, the conceptual distinctions and continuities between ethical and legal / policy questions, and illustrate the background to current issues with selected cases from the history of human subjects research.

PH 6899 Advanced OB/GYN and Pediatric Pharmacoepidemiology 3 Credits  
**Grading Scheme:** Letter Grade  
Introducing the student to current drug safety issues in OB/GYN and pediatric drug treatment practice. The discussion will focus on methodological consideration specific to observational data research in these special populations, including but not limited to assessing drug exposure, small exposure populations, outcome validation of rare events, biases, confounding, data extraction from electronic health records, and primary source verification as relevant to pediatrics and OB/GYN.

**Prerequisite:** Biostatistics, Epidemiology Methods, and permission of the instructor

PH 6910 Supervised Research 1-5 Credits, Max 5 Credits  
**Grading Scheme:** S/U  
Supervised Research

PH 6935 Selected Topics in Pharmacy 1-4 Credits, Max 12 Credits  
**Grading Scheme:** Letter Grade  
Open to all departments in the College of Pharmacy.

PH 6936 Advanced Topics in Pharmaceutical Sciences 1-2 Credits, Max 4 Credits  
**Grading Scheme:** Letter Grade  
Written and oral presentation of research designs, protocols, papers, and critical appraisals with discussion and critical review of such topics.

**PH 6937 Topics in Pharmaceutical Administration 2 Credits**  
**Grading Scheme:** Letter Grade  
Analysis of special topics and recent developments in pharmaceutical administration, including innovations in the distribution of drugs and health-care services.

**PH 6938 Research Seminar 1 Credit, Max 3 Credits**  
**Grading Scheme:** Letter Grade  
Seminar required of graduate students in the College of Pharmacy.

**PH 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**  
**Grading Scheme:** S/U  
Supervised Teaching

**PH 6971 Research for Master’s Thesis 1-15 Credits**  
**Grading Scheme:** S/U  
Research for Master’s Thesis
PHA 7807 Advanced Pharmacoepidemiology 3 Credits  
**Grading Scheme:** Letter Grade  
Structured as an interactive discussion of selected readings based on topics in contemporary pharmacoepidemiology and the application of advanced pharmacoepidemiology techniques.  
**Prerequisite:** STA 6166 and STA 6167 and PHA 6717 and PHA 6805 and PHA 6268, or equivalents.  
PHA 7979 Advanced Research 1-12 Credits  
**Grading Scheme:** S/U  
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.  
PHA 7980 Research for Doctoral Dissertation  
**Grading Scheme:** S/U  
Research for Doctoral Dissertation  

### Pharmacy—Pharmaceutics

**PHA 6116 In Vivo and In Vitro Stability of Drugs 3 Credits**  
**Grading Scheme:** Letter Grade  
Effects of various disease states, age, genetic differences, stress, nutrition, and drug interactions on drug metabolism. Offered fall term in even-numbered years.  
**PHA 6125 Pharmacokinetics and Biopharmaceutics 3 Credits**  
**Grading Scheme:** Letter Grade  
Compartmental analysis with computers. Offered spring term in even-numbered years.  
**PHA 6131 Pharmacometrics and Systems Pharmacology 3 Credits**  
**Grading Scheme:** Letter Grade  
An advanced pharmacokinetic/pharmacodynamic (PK/PD) course with a two-fold objective: 1) to provide a didactic framework of the Pharmacometrics and Systems Pharmacology approaches used in drug development and regulatory decision making and 2) to apply the acquired knowledge in hands-on software applications to answer clinically relevant questions.  
**PHA 6133 Translational Clinical Pharmacology 3 Credits**  
**Grading Scheme:** Letter Grade  
Provides Pharm.D. and Ph.D. students with an in-depth understanding of experimental, basic and advanced modeling simulation methodologies and their application to optimize patient dosing and rationally develop drugs.  
**Prerequisite:** completion of an intro course on pharmacokinetic or pharmacodynamic principles such as PHA5132 (or equivalent). Documentation of course content (incl. contact hours) should be provided. The final decision will be made by the course director.  
**PHA 6170C Pharmaceutical Product Formulation 3 Credits**  
**Grading Scheme:** Letter Grade  
Rationale and design of pharmaceutical dosage forms. Offered fall term in odd-numbered years.  
**PHA 6183 Pharmaceutical Gene Delivery 3 Credits**  
**Grading Scheme:** Letter Grade  
Designed for graduate students researching gene delivery. Lectures on vector design and construction including review of related molecular biology and cell biology. Lectures on gene delivery systems (both viral and nonviral vectors) and their applications. Recent progress of gene therapy for human diseases including student presentations. Offered in odd-numbered years.  
**PHA 6185 Pharmaceutical Drug Development 3 Credits**  
**Grading Scheme:** Letter Grade  
Drug development from discovery to post-market surveillance. Good manufacturing process (GMP), good clinical practice (GCP), and good laboratory practice (GLP); intellectual property, regulatory agencies, generic approvals, and case studies.  
**Prerequisite:** consent of instructor. Open to graduate students and advanced Pharm.D. students.  
**PHA 6416 Pharmaceutical Analysis I 3 Credits**  
**Grading Scheme:** Letter Grade  
Theory and applications of relevant analytical techniques for analysis of drugs in biological samples. Offered spring term in odd-numbered years.  
**PHA 6418 Applied Translational Systems Pharmacology 3 Credits**  
**Grading Scheme:** Letter Grade  
Prepares students to become experts in systems-level modeling of various diseases and therapeutics. Trainees will learn the effect of drugs on major physiological-systems and how these effects can be beneficial or detrimental. Various computational tools are introduced. Problem-based-learning exercises will enable trainees to design experiments and interpret data quantitatively.  
**Prerequisite:** The ideal prerequisite would be completion of an introductory course in basic pharmacology and or pharmacokinetics and pharmacodynamics. Equivalent courses are acceptable. Courses such as PHA5132 and PHA6125 are recommended but not required.  
**PHA 6449 Pharmacogenomics 3 Credits**  
**Grading Scheme:** Letter Grade  
Contemporary experimental approaches in pharmacogenomics research design.  
**Prerequisite:** biochemistry, PHA 6425, or consent of instructor.  
**PHA 6476 Advanced Combinatorial Chemistry in Drug Discovery 3 Credits**  
**Grading Scheme:** Letter Grade  
Designed to introduce students combinatorial chemical synthesis to fully understand the functions and mechanism of action of biopolymers for medical purpose.  
**Prerequisite:** Students are expected to have previous knowledge on general chemistry and organic synthesis.  
**PHA 6630 Medication Therapy Management: A Hematologic Focus 3 Credits**  
**Grading Scheme:** Letter Grade  
Introducing the student to principles of medication therapy management in patients with hematologic disorders.  
**Prerequisite:** The student must have successfully completed Foundations of MTM I ( PHA 6631 ) and Foundations of MTM II ( PHA 6632 ).  
**PHA 6631 Foundations of Medication Therapy Management I 3 Credits**  
**Grading Scheme:** Letter Grade  
Core elements of medication therapy management (MTM), physical assessment skills, communication techniques, and methods of literature evaluation needed for successful provision of MTM services.  
**Prerequisite:** All students have a prior pharmacy degree.  
**PHA 6632 Foundations of Medication Therapy Management II 3 Credits**  
**Grading Scheme:** Letter Grade  
Business elements of medication therapy management (MTM), MTM practice models, documentation systems, business plan development, and basic financial principles needed for the successful provision of MTM.  
**Prerequisite:** All students have a prior pharmacy degree.
PHA 6633 Medication Therapy Management: A Cardiovascular Focus 3 Credits
Grading Scheme: Letter Grade
Principles of medication therapy management in patients with cardiovascular disorders.
Prerequisite: PHA 6631 and PHA 6632

PHA 6634 Medication Therapy Management: An Endocrine Focus 3 Credits
Grading Scheme: Letter Grade
Principles of medication therapy management in patients with endocrine disorders.
Prerequisite: PHA 6631 and PHA 6632

PHA 6635 Medication Therapy Management: A Renal Focus 3 Credits
Grading Scheme: Letter Grade
Principles of medication therapy management in patients with renal disorders.
Prerequisite: PHA 6631 and PHA 6632

PHA 6636 Medication Therapy Management: A Gastrointestinal Focus 3 Credits
Grading Scheme: Letter Grade
Principles of medication therapy management in patients with gastrointestinal disorders.
Prerequisite: Foundations of MTM I and Foundations of MTM II

PHA 6637 Medication Therapy Management: A Psychiatric Focus 3 Credits
Grading Scheme: Letter Grade
Introducing the student to principles of medication therapy management in patients with psychiatric disorders.
Prerequisite: The student must have successfully completed Foundations of MTM I (PHA 6631) and Foundations of MTM II (PHA 6632)

PHA 6638 Medication Therapy Management: A Neurologic Focus 3 Credits
Grading Scheme: Letter Grade
Introducing the student to principles of medication therapy management in patients with neurologic disorders.
Prerequisite: The student must have successfully completed Foundations of MTM I (PHA 6631) and Foundations of MTM II (PHA 6632)

PHA 6639 Medication Therapy Management: A Respiratory Focus 3 Credits
Grading Scheme: Letter Grade
Introducing the student to principles of medication therapy management in patients with respiratory disorders.
Prerequisite: The student must have successfully completed Foundations of MTM I (PHA 6631) and Foundations of MTM II (PHA 6632)

PHA 6896 Preclinical Drug Evaluation 2 Credits
Grading Scheme: Letter Grade
Introduction to the study of preclinical methods used in the screening of important categories of clinically useful drugs, including direction on writing effective animal protocols for research.
Prerequisite: general Biology (Diversity of Life), Microbiology, General Chemistry, Organic Chemistry Biochemistry, and Physiology, Pharmacology.

PHA 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

PHA 6935 Selected Topics in Pharmacy 1-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Open to all departments in the College of Pharmacy.

PHA 6936 Advanced Topics in Pharmaceutical Sciences 1-2 Credits, Max 4 Credits
Grading Scheme: Letter Grade
Written and oral presentation of research designs, protocols, papers, and critical appraisals with discussion and critical review of such topics.

PHA 6938 Research Seminar 1 Credit, Max 3 Credits
Grading Scheme: S/U
Seminar required of graduate students in the College of Pharmacy.

PH 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

PHA 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

PHA 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PHA 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

Pharmacy—Pharmacodynamics

MCB 5252 Microbiology, Immunology, and Immunotherapeutics 4 Credits
Grading Scheme: Letter Grade
Microbiology and immunology for pharmacy students. Microorganisms and infection, control with antimicrobials, host immune response, immune disorders.
Prerequisite: CHM 2210, 2211, and consent of instructor.

PHA 6476 Advanced Combinatorial Chemistry in Drug Discovery 3 Credits
Grading Scheme: Letter Grade
Designed to introduce students combinatorial chemical synthesis to fully understand the functions and mechanism of action of biopolymers for medical purpose.
Prerequisite: Students are expected to have previous knowledge on general chemistry and organic synthesis.
PHA 6508 Systems Physiology and Pathophysiology I 5 Credits
Grading Scheme: Letter Grade
Systems Physiology and Pathophysiology-I is the first of a two-course sequence that aims to provide graduate students with an integrated knowledge base in the physiological functions of the human body and pathological changes pertinent to the development and progression of various diseases. As an integral component of the Ph. D. curriculum, the two courses will provide students with a solid understanding of human pathophysiology in preparation for their dissertation research.
Prerequisite: Upper level undergraduate Anatomy and Physiology

PHA 6509 Systems Physiology and Pathophysiology II 5 Credits
Grading Scheme: Letter Grade
Systems Physiology and Pathophysiology-I is the second of a two-course sequence that aims to provide graduate students with an integrated knowledge base in the physiological functions of the human body and pathological changes pertinent to the development and progression of various diseases. As an integral component of the Ph. D. curriculum, the two courses will provide students with a solid understanding of human pathophysiology in preparation for their dissertation research.
Prerequisite: Upper level undergraduate Anatomy and Physiology

PHA 6512L Experiential Research Training in Pharmacodynamics 1-4 Credits
Grading Scheme: Letter Grade
Research rotations. Practical overview of hypothesis development and testing, research design and application of statistical analysis.
Prerequisite: PHA 6521C.

PHA 6521C Research Techniques in Pharmacodynamics 1 Credit
Grading Scheme: Letter Grade
Research Techniques in Pharmacodynamics

PHA 6563 Pathophysiology of Diseases I 3 Credits
Grading Scheme: Letter Grade
Provides students with an integrated understanding of pathological changes pertinent to the development and progression of various diseases. The basics of cellular function, cardiovascular system, renal system and respiration system will be discussed in addition to the relevant disease states that caused by Pathophysiological abnormalities.
Prerequisite: Anatomy and Physiology I & II and General Biology I & II.

PHA 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

PHA 6935 Selected Topics in Pharmacy 1-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Open to all departments in the College of Pharmacy.

PHA 6936 Advanced Topics in Pharmaceutical Sciences 1-2 Credits, Max 4 Credits
Grading Scheme: Letter Grade
Written and oral presentation of research designs, protocols, papers, and critical appraisals with discussion and critical review of such topics.

PHA 6938 Research Seminar 1 Credit, Max 3 Credits
Grading Scheme: Letter Grade
Seminar required of graduate students in the College of Pharmacy.

PHA 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

PHA 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

PHA 7939 Journal Colloquy in Pharmacodynamics 1 Credit, Max 8 Credits
Grading Scheme: Letter Grade
Critical presentation and discussion of recent original articles.

PHA 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PHA 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

Pharmacy—Pharmacy Practice

GMS 6951 Teaching Biomedical Science 2 Credits
Grading Scheme: Letter Grade
Acquire the skills necessary for creating and modifying courses through a combination of self-awareness activities and information drawn from the field of curriculum that informs teaching across content areas.
Learning skills to write a teaching philosophy, draft components of their own course syllabus, add these components to their portfolio. Learning platform-online; Canvas

GMS 6952 Curricular Models for Biomedical Science 3 Credits
Grading Scheme: Letter Grade
Students are introduced to various models of teaching and instructional strategies. Models of teaching give instructors the tools they need to build strong learning environments and interactions that accelerate learning. Models provide a blueprint, structure, direction for teaching. Students will learn to develop curriculum, analyze structure and identify the teaching models.

GMS 6953 Art and Science of Mentoring 1 Credit
Grading Scheme: Letter Grade
Learn to mentor other professionals who are in early stages of career development. Develop knowledge and skills through provision of didactic information and experiential learning activities. Complete an individual development plan, identify ethical dilemmas in mentoring and describe strategies to prevent them, and articulate their own mentoring philosophy.

GMS 6954 Assessing Effectiveness of Biomedical Science Teaching and Curricula 3 Credits
Grading Scheme: Letter Grade
Overview of the models of evaluation within contrasting paragims as it relates to biomedical science education. Topics address concerns while adhering to the professional, scholarly and ethical roles the evaluator must uphold. Develop rubrics, select assessments, use peer observations for assessment of teaching methods, products and outcomes in clinics/laboratories, learning environments.

GMS 6951 Teaching Biomedical Science 2 Credits
Grading Scheme: Letter Grade

GMS 6952 Curricular Models for Biomedical Science 3 Credits
Grading Scheme: Letter Grade

GMS 6953 Art and Science of Mentoring 1 Credit
Grading Scheme: Letter Grade

GMS 6954 Assessing Effectiveness of Biomedical Science Teaching and Curricula 3 Credits
Grading Scheme: Letter Grade

GMS 6955 Principles of Community Engagement Research for Health Equity 2 Credits
Grading Scheme: Letter Grade
An introduction to community engagement research (CEnR) to address health disparities. Students will explore the concept of community engagement to identify appropriate partners for, and conducting CEnR through self-learning, active learning, and real life experiences in developing a research objective, study design, recruitment, instrument design, data collection, analysis, and dissemination.
PH A 6134 Foundations in Precision Medicine: Genomic Technologies 1 Credit
Grading Scheme: Letter Grade
Focuses on current developments and emerging trends in genomic testing, clinical and research applications of emerging genomic tests, role of computing and data science, and applications of bioinformatics in genomics.
Prerequisite: Students must have basic knowledge of genetics and molecular biology.

PH A 6135 Clinical Applications of Precision Medicine: Pharmacogenomics 2 Credits
Grading Scheme: Letter Grade
Focuses on how pharmacogenomic and genomic data can be used in patient care. Students can opt to participate in personal genotyping and use their own genetic data for class assignments or work with a de-identified genotype dataset.
Prerequisite: GMS 5224 - Foundations in Precision Medicine: Medical Molecular Genetics & PHA 6134 - Foundations in Precision Medicine: Genomic Technologies & PHC 6598 - Foundations in Precision Medicine: Genetic Epidemiology.

PH A 6136 Clinical Applications of Precision Medicine: Oncology 2 Credits
Grading Scheme: Letter Grade
Provides an overview of the relevant genomic and somatic mutations within each main oncology tumor subtype and explore ways to use genomic and somatic mutation information to improve clinical and therapeutic decision making.
Prerequisite: GMS 5224 - Foundations in Precision Medicine: Medical Molecular Genetics & PHA 6134 - Foundations in Precision Medicine: Genomic Technologies & PHC 6598 - Foundations in Precision Medicine: Genetic Epidemiology.

PH A 6235 Advanced Pharmaceutical Law 2 Credits
Grading Scheme: Letter Grade
Study of the federal Food, Drug, and Cosmetics Act and various state and local laws applicable to drug manufacturers, wholesalers, distributors, and drug-related products, including analyses of recent court decisions.

PH A 6427 Pharmacogenetics of Drug Metabolism 2 Credits
Grading Scheme: Letter Grade
Examination of factors that affect drug disposition and response including genetics, as well as, additional factors such as environment, diet, age, and concurrent drug therapy and health status. Students will acquire an understanding of pharmacogenetics/pharmacogenomics in the context of variability in drug disposition and the application of pharmacogenetics to drug development and drug treatment.

PH A 6449 Pharmacogenomics 3 Credits
Grading Scheme: Letter Grade
Contemporary experimental approaches in pharmacogenomics research design.
Prerequisite: biochemistry, PHA 6425, or consent of instructor.

PH A 6476 Advanced Combinatorial Chemistry in Drug Discovery 3 Credits
Grading Scheme: Letter Grade
Designed to introduce students combinatorial chemical synthesis to fully understand the functions and mechanism of action of biopolymers for medical purpose.
Prerequisite: Students are expected to have previous knowledge on general chemistry and organic synthesis.

PH A 6613 Clinical Applications Precision Medicine: Precision Health 3 Credits
Grading Scheme: Letter Grade
Clinical Applications Precision Medicine: Precision Health
Prerequisite: GMS 5224 - Foundations in Precision Medicine: Medical Molecular Genetics & PHA 6134 - Foundations in Precision Medicine: Genomic Technologies & PHC 6598 - Foundations in Precision Medicine: Genetic Epidemiology.

PH A 6630 Medication Therapy Management: A Hematologic Focus 3 Credits
Grading Scheme: Letter Grade
Introducing the student to principles of medication therapy management in patients with hematologic disorders.
Prerequisite: The student must have successfully completed Foundations of MTM I (PHA 6631) and Foundations of MTM II (PHA 6632).

PH A 6631 Foundations of Medication Therapy Management I 3 Credits
Grading Scheme: Letter Grade
Core elements of medication therapy management (MTM), physical assessment skills, communication techniques, and methods of literature evaluation needed for successful provision of MTM services.
Prerequisite: All students have a prior pharmacy degree.

PH A 6632 Foundations of Medication Therapy Management II 3 Credits
Grading Scheme: Letter Grade
Business elements of medication therapy management (MTM), MTM practice models, documentation systems, business plan development, and basic financial principles needed for the successful provision of MTM.
Prerequisite: All students have a prior pharmacy degree.

PH A 6633 Medication Therapy Management: A Cardiovascular Focus 3 Credits
Grading Scheme: Letter Grade
Principles of medication therapy management in patients with cardiovascular disorders.
Prerequisite: PHA 6631 and PHA 6632

PH A 6634 Medication Therapy Management: An Endocrine Focus 3 Credits
Grading Scheme: Letter Grade
Principles of medication therapy management in patients with endocrine disorders.
Prerequisite: PHA 6631 and PHA 6632

PH A 6635 Medication Therapy Management: A Renal Focus 3 Credits
Grading Scheme: Letter Grade
Principles of medication therapy management in patients with renal disorders.
Prerequisite: PHA 6631 and PHA 6632

PH A 6636 Medication Therapy Management: A Gastrointestinal Focus 3 Credits
Grading Scheme: Letter Grade
Principles of medication therapy management in patients with gastrointestinal disorders.
Prerequisite: Foundations of MTM I and Foundations of MTM II
PH 6637 Medication Therapy Management: A Psychiatric Focus 3 Credits
Grading Scheme: Letter Grade
Introducing the student to principles of medication therapy management in patients with psychiatric disorders.
Prerequisite: The student must have successfully completed Foundations of MTM I (PHA 6631) and Foundations of MTM II (PHA 6632).

PH 6638 Medication Therapy Management: A Neurologic Focus 3 Credits
Grading Scheme: Letter Grade
Introducing the student to principles of medication therapy management in patients with neurologic disorders.
Prerequisite: The student must have successfully completed Foundations of MTM I (PHA 6631) and Foundations of MTM II (PHA 6632).

PH 6639 Medication Therapy Management: A Respiratory Focus 3 Credits
Grading Scheme: Letter Grade
Introducing the student to principles of medication therapy management in patients with respiratory disorders.
Prerequisite: The student must have successfully completed Foundations of MTM I (PHA 6631) and Foundations of MTM II (PHA 6632).

PH 6746 Patient Education and Communication in the Era of Precision Medicine 1 Credit
Grading Scheme: Letter Grade
Focuses on emerging issues in patient education and communication in precision medicine.
Prerequisite: GMS 5224 - Foundations in Precision Medicine: Medical Molecular Genetics & PHA 6134 - Foundations in Precision Medicine: Genomic Technologies & PHC 6598 - Foundations in Precision Medicine: Genetic Epidemiology.

PH 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

PH 6935 Selected Topics in Pharmacy 1-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Open to all departments in the College of Pharmacy.

PH 6936 Advanced Topics in Pharmaceutical Sciences 1-2 Credits, Max 4 Credits
Grading Scheme: Letter Grade
Written and oral presentation of research designs, protocols, papers, and critical appraisals with discussion and critical review of such topics.

PH 6938 Research Seminar 1 Credit, Max 3 Credits
Grading Scheme: Letter Grade
Seminar required of graduate students in the College of Pharmacy.

PH 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

PH 6950 Precision Medicine Conference 1 Credit
Grading Scheme: Letter Grade
Attendance or viewing of proceedings at this conference develops knowledge related to the latest strategies and technologies for bringing genomic medicine and pharmacogenomics into a clinic. Provides opportunity to learn from clinicians, researchers and thought leaders from medicine and pharmacy on implementing genomic medicine and pharmacogenomics in clinic settings.
Prerequisite: GMS 5224 - Foundations in Precision Medicine: Medical Molecular Genetics & PHA 6134 - Foundations in Precision Medicine: Genomic Technologies & PHC 6598 - Foundations in Precision Medicine: Genetic Epidemiology.

PH 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

PH 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PH 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

Physics

PHY 5905 Individual Work 1-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Assigned reading and problems program, special topics, or development of special experimental or theoretical problems. Work selected according to student's needs and interests.
Prerequisite: consent of instructor.

PHY 6246 Classical Mechanics 3 Credits
Grading Scheme: Letter Grade
Review of Lagrangian formulation and special relativity. Hamiltonian mechanics, canonical transforms and Hamilton-Jacobi theories, action angle variables, rigid rotators, normal modes, mechanics of continuous media. Fluid mechanics.

PHY 6346 Electromagnetic Theory I 3 Credits
Grading Scheme: Letter Grade
Electrostatics, special function expansions, magnetostatics, linear media, time dependent Maxwell theory, wave propagation and dispersion, diffraction, scattering, radiation, relativistic covariance, applications.

PHY 6347 Electromagnetic Theory II 3 Credits
Grading Scheme: Letter Grade
Continuation of PHY 6346.
Prerequisite: PHY 6346.

PHY 6536 Statistical Mechanics I 3 Credits
Grading Scheme: Letter Grade
Equilibrium ensembles for classical and quantum systems, fluctuations, applications to normal fluids, phase transitions and critical phenomena, plasmas.
Prerequisite: PHY 6645 and PHY 6246.
PHY 6555C Cryogenics 4 Credits
Grading Scheme: Letter Grade
Production and use of cryogenic fluids; temperature measurement and control; use of cryogenics in science and industry, superconducting magnet and power generator, and electronics. Hands-on experience.
Prerequisite: PHY 3101 and consent of instructor.
PHY 6645 Quantum Mechanics I 3 Credits
Grading Scheme: Letter Grade
Hilbert space, Heisenberg and Schrödinger dynamics, invariance properties and symmetry operations, spin, perturbation, and variational methods.
Prerequisite: MAP 5304, PHY 4605.
PHY 6646 Quantum Mechanics II 3 Credits
Grading Scheme: Letter Grade
Time dependent perturbation theory, scattering theory, identical particles and second quantization, Dirac equation.
Prerequisite: PHY 6645.
PHY 6648 Quantum Field Theory I 3 Credits
Grading Scheme: Letter Grade
The Poincare group; the Dirac equation; quantization of free fields; the scattering matrix; applications.
Prerequisite: PHY 6646.
PHY 6905 Individual Work 1-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Treatment of an experimental or theoretical problem or topic assigned on the basis of student's needs and interests.
PHY 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research
PHY 6920 Departmental Colloquium 1 Credit, Max 14 Credits
Grading Scheme: S/U
Summary presentation of contemporary topics by visiting and local researchers.
PHY 6932 Seminar in Molecular and Computational Physics 1 Credit, Max 10 Credits
Grading Scheme: S/U
Invited speakers on topics of current interest in computation and theory in dynamics, and molecular and solid state physics.
Prerequisite: senior or graduate standing.
PHY 6943 Internship in College Teaching 2-4 Credits
Grading Scheme: Letter Grade
Required for Master of Science in Teaching students, but available for students needing additional practice and direction in college-level teaching.
Prerequisite: graduate standing.
PHY 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis
PHY 7097 Advanced Topics in Theoretical Physics 3 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Special studies in mathematical methods and applications of current interest at the forefront of one or more specialties in theoretical physics.
PHY 7669 Quantum Field Theory II 3 Credits
Grading Scheme: Letter Grade
Path integral quantization; perturbation theory; renormalization; quantization of gauge fields; applications.
Prerequisite: PHY 6648.
PHY 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.
PHY 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation
PHZ 5155C Physical Modeling and Simulation 3 Credits
Grading Scheme: Letter Grade
Principles and applications of physical modeling and computer simulation. Fundamental interactions among particles such as atoms, molecules, condensed matter, and planets. Introduction to variety of simulation techniques in modern research.
PHZ 5354 Introduction to Particle Physics 3 Credits
Grading Scheme: Letter Grade
Descriptive survey of particle and nuclear phenomena and states: conserved quantities and quantum numbers, invariance principles.
Prerequisite: consent of instructor.
PHZ 6355 Elementary Particle Physics I 3 Credits
Grading Scheme: Letter Grade
Dirac and Klein-Gordon equations, Feynman diagrams, scattering amplitudes; the standard model of weak, electromagnetic, and strong interactions; phenomenology of high energy physics.
Prerequisite: PHY 6646.
PHZ 6358 Standard Model of Elementary Particles I 3 Credits
Grading Scheme: Letter Grade
Nonabelian gauge theory, Glashow-Weinberg-Salam model of electromagnetic and weak interactions. Spontaneous symmetry breaking and Higgs mechanism, theory of weak processes focusing on quantum corrections and their physical consequences.
PHZ 6391 Seminar in Astrophysics 1 Credit, Max 12 Credits
Grading Scheme: S/U
Seminar in Astrophysics
PHZ 6392 Seminar in Particle Physics 1 Credit, Max 12 Credits
Grading Scheme: S/U
Seminar in Particle Physics
PHZ 6426 Solid State I 3 Credits
Grading Scheme: Letter Grade
Prerequisite: PHY 6536.
PHZ 6493 Seminar in Condensed Matter Physics 1 Credit, Max 12 Credits
Grading Scheme: S/U
Seminar in Condensed Matter Physics
PHZ 6607 Special and General Relativity 3 Credits
Grading Scheme: Letter Grade
Special relativity, tensor analysis, covariant electromagnetism and hydrodynamics; general relativity, Riemannian geometry, gravity as curvature, exact solutions; relativistic astrophysics, cosmology.
Prerequisite: PHY 6246.

PHZ 7357 Elementary Particle Physics II 3 Credits
Grading Scheme: Letter Grade
Prerequisite: PHZ 6355.

PHZ 7359 Standard Model of Elementary Particles II 3 Credits
Grading Scheme: Letter Grade
Strong interactions, perturbation study of quantum chromodynamics (QCD) of quarks and gluons. Chiral description of long-range QCD, supersymmetric extensions of standard model, grand unification.
Prerequisite: PHZ 6358.

PHZ 7427 Solid State II 3 Credits
Grading Scheme: Letter Grade
Physics of collective phenomena in condensed matter systems: electron-electron and electron-phonon interactions, magnetism, superconductivity, and quantum transport.
Prerequisite: PHZ 6426.

PHZ 7428 Modern Condensed Matter Physics 3 Credits
Grading Scheme: Letter Grade
Green’s functions and many-body perturbation theory, with applications to topics in modern condensed matter physics. Superconductors, quantum magnetism, quantum transport, quantum hall effect. Other modern techniques and numerical methods.
Prerequisite: PHZ 6426.

PHZ 7429 Phases of Condensed Matter 3 Credits
Grading Scheme: Letter Grade
Focus on structural properties, transitions and properties of topological defects in crystalline solids, liquid crystals, incommensurate crystals, quasicrystals, magnetically ordered systems, and random fractals.
Prerequisite: PHZ 6426 or consent of instructor.

PHZ 7608 Special and General Relativity II 3 Credits
Grading Scheme: Letter Grade
Relativistic stars, black holes, gravitational radiation; advanced topics in general relativity and cosmology.
Prerequisite: PHZ 6607.

Plant Pathology

ALS 5932 Special Topics 1-4 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Special Topics

ALS 6925 Integrated Plant Medicine 4 Credits
Grading Scheme: Letter Grade
Review and synthesis of the principles of plant-problem prevention, diagnosis, and management.
Prerequisite: all core courses for DPM degree.

ALS 6931 Plant Medicine Program Seminar 1 Credit, Max 3 Credits
Grading Scheme: S/U
On-going seminar series involving presentations on plant-health management.
Prerequisite: DPM student or consent of instructor.

PLP 5005C General Plant Pathology 4 Credits
Grading Scheme: Letter Grade
Microorganisms and environmental factors that cause disease in plants. Symptoms and losses caused by plant diseases. Principles of plant disease development, diagnosis, and control. Genetics and epidemiology of plant diseases. Offered fall semester.
Prerequisite: Course in biology or botany.

PLP 5102 Theory and Practice of Plant Disease Control 3 Credits
Grading Scheme: Letter Grade
Theory and Practice of Plant Disease Control
Prerequisite: PLP 3002C/PLP 5005C or equivalent.

PLP 5115C Citrus Pathology 3 Credits
Grading Scheme: Letter Grade
Symptoms, disease cycles, and control measures for major citrus diseases; emphasis on diagnosis using biological, chemical, and biochemical techniques. Offered at CREC, Lake Alfred, fall semester in even-numbered years.
Prerequisite: PLP 3002C/PLP 5005C.

PLP 6105 Applied Plant Disease Management 3 Credits
Grading Scheme: Letter Grade
Summarizes the methods and strategies used to manage plant disease by targeting vulnerable points in the pathogen life cycle and disease epidemic. Students utilize knowledge of organismal biology, epidemiology, management chemistry, and economics to develop strategies for managing plant diseases.

PLP 6223C Viral Pathogens of Plants 3 Credits
Grading Scheme: Letter Grade
Principles of plant virology; symptomatology, transmission, insect vector relationships, properties of viruses, purification, electron microscopy, morphology, serology, and control of viral diseases.
Prerequisite: PLP 3002C/PLP 5005C, BCH 5045, and a course in plant pathology, which may be taken as a corequisite.

PLP 6241C Bacterial Plant Pathogens 3 Credits
Grading Scheme: Letter Grade
Relationships of bacterial plant pathogens and interactions with their hosts. Offered spring semester in even-numbered years.
Prerequisite: PLP 3002C/PLP 5005C, MCB 3020.

PLP 6262C Fungal Plant Pathogens 3 Credits
Grading Scheme: Letter Grade
History, ecology, genetics, physiology, taxonomy, and management of plant pathogenic fungi.
Prerequisite: PLP 3002C/PLP 5005C or PLP 6656C.

PLP 6291 Plant Disease Diagnosis 3 Credits
Grading Scheme: Letter Grade
Methods used in diagnosing plant diseases caused by fungi, bacteria, viruses, and abiotic conditions. Offered fall semester.
Prerequisite: PLP 3002C/PLP 5005C, PLP 6262C.

PLP 6303 Host-Parasite Interactions II 3 Credits
Grading Scheme: Letter Grade
Genetic and molecular interactions of hosts and parasites with emphasis on plant disease resistance. Offered spring semester of even-numbered years.
Prerequisite: PLP 6502.
PLP 6404 Epidemiology of Plant Disease 4 Credits
Grading Scheme: Letter Grade
Principles of ecology of plant diseases with emphasis on the effects of the climatic environment on the development of disease in populations of plants and the implications with regard to the strategy of disease control. Offered spring semester in odd-numbered years.
Prerequisite: PLP 3002C/PLP 5005C.

PLP 6502 Host-Parasite Interactions 3 Credits
Grading Scheme: Letter Grade
Principles of genetics and molecular biology of host-parasite interactions with emphasis on mechanisms of pathogenesis. Offered fall semester in odd-numbered years.
Prerequisite: PLP 3002C/PLP 5005C and one course each in biochemistry and genetics.

PLP 6621C Pop Genetics Microbes 3 Credits
Grading Scheme: Letter Grade
Students will learn to use DNA sequence or marker data to describe population genetic variation and infer evolutionary processes, with emphasis on plant pathogen populations. Topics to be covered include: sampling strategies, marker types, genealogical inference, defining population and geographic structure, and coalescent-based methods for inferring demographic processes.
Prerequisite: PLP 5005C, or SWS 5305C, or PCB 4674 or equivalent, or PCB 3063 or equivalent, or consent of instructor.

PLP 6636 Frontiers in Plant Biotechnology 3 Credits
Grading Scheme: Letter Grade
Focuses on presenting advanced genetic tools that recently have become available for use in the biotechnology field to make new products in plants, improve existing plant characteristics or generate plants with resistance or tolerance to certain pathogens.
Prerequisite: Graduate standing and general knowledge of Genetics, Organic Chemistry and Biochemistry.

PLP 6656C Fungal Biology 4 Credits
Grading Scheme: Letter Grade
Introducing groups of fungi and fungi-like organisms. Discussion of the structure, development, physiology, genetics, ecology and systematics of fungi.
Prerequisite: BSC 2010 and BSC 2011 or PLP 3002C/PLP 5005C.

PLP 6701 Impact through Networks 2 Credits
Grading Scheme: Letter Grade
Focuses on networks and the impact of system changes in agriculture, natural ecosystems, and health care, with an introduction to network science in the R programming environment, and review of applications in biological and social sciences. Students develop projects that apply network analysis to their own study systems.

PLP 6905 Problems in Plant Pathology 1-4 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Study of any field of plant pathology including diseases of all major crop groups.

PLP 6910 Supervised Research 1-5 Credits
Grading Scheme: S/U
Supervised Research

PLP 6921 Colloquium in Principles of Plant Pathology 1 Credit, Max 4 Credits
Grading Scheme: Letter Grade
Colloquium in Principles of Plant Pathology

PLP 6932 Seminar in Plant Pathology 1 Credit, Max 4 Credits
Grading Scheme: S/U
Discussion of the literature, techniques, and research pertaining to plant pathology.

PLP 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

PLP 6942 Professional Internship in Plant Disease Clinic 3 Credits
Grading Scheme: S/U
Practical training, under supervision of faculty member, in diagnosing plant diseases and formulating recommendations for their management or control.
Prerequisite: PLP 6262C and PLP 6291.

PLP 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

PLP 7946 Plant Pathology Internship 1-10 Credits, Max 10 Credits
Grading Scheme: S/U
Off-campus internship.

PLP 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PLP 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

Political Science

CPO 5935 Advanced Topics in Comparative Politics 3 Credits, Max 6
Grading Scheme: Letter Grade
Advanced Topics in Comparative Politics
Prerequisite: departmental approval.

CPO 6077 Social Movements in Comparative Perspective 3 Credits
Grading Scheme: Letter Grade
Examines major classical and contemporary theoretical approaches to the field of collective action and social movements.

CPO 6091 Introduction to Comparative Political Analysis 3 Credits
Grading Scheme: Letter Grade
Introduction to major theoretical and methodological approach to study of comparative politics.

CPO 6096 Comparative Qualitative and Mixed Methods 3 Credits
Grading Scheme: Letter Grade
Critically analyzes comparative and mixed methods from concept formation, qualitative measurement, dimensionality, single, comparative, longitudinal-historical and mixed case study approaches from the perspective of multiple causal ontologies and causal assessment.

CPO 6206 Seminar in African Politics 3 Credits
Grading Scheme: Letter Grade
Study of African politics in comparative perspective.
relationships) shape humans' relationship with the natural environment.

An historical institutionalist approach to the development of the modern Middle East in the move from empire to nation-state, addressing several important themes in 20th and 21st century Middle East politics. Readings include top-down as well as bottom-up analyses.

Addresses gender in "high" and "low" politics, women as subjects and objects of state policies, women as social and political actors, and social constructions of gender around notions of femininity and (to some degree) masculinity in cases around the globe.

Introducing the main approaches to the study of how ethnic and national identities are formed, and how they are activated in politics. Exploration of various forms of ethnic politics: peace, rioting, and the most extreme forms, genocide and secession.

Review of structural, institutional, and cultural dimensions of democratization, with special attention to Latin America, Africa, and Eastern Europe.

Analysis of problems associated with democratic transition and market reform in the post-communist countries of Eastern Europe and the former Soviet Union.

Major issues related to the study of elections and political parties in the comparative context. Specifically, we will discuss the relationship between political parties and electoral institutions in authoritarian, democratic, and transitioning political systems.

Graduate level introduction to the study of the European Union from a comparative perspective. Assuming familiarity with graduate level comparative politics (CPO 6091), but no previous knowledge of the EU is required. The EU is analyzed as a comparative case through an institutionalist perspective.

Explores a variety of social-scientific approaches to the question of how politics (including ideologies, institutions, interests, and power relationships) shape humans' relationship with the natural environment.
PAD 6108 Public Administration Theory 3 Credits
Grading Scheme: Letter Grade
Public administration, with emphasis on the units of analysis and contributions of each approach to general understanding of the field.

PAD 6227 Public Budgeting and Finance 3 Credits
Grading Scheme: Letter Grade
Decision making; budget planning and formulation.

PAD 6434 Leadership and Ethics in Public Agencies 3 Credits
Grading Scheme: Letter Grade
Examing the complexities and the ways in which new demands are changing the way leadership is exercised and others evaluated.

PAD 6946 Internship in Government 3 Credits
Grading Scheme: S/U
Internship in Government
Prerequisite: departmental approval.

POS 5935 Advanced Topics in Political Science 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Advanced Topics in Political Science
Prerequisite: departmental approval.

POS 6045 Seminar in American Politics 3 Credits
Grading Scheme: Letter Grade
Introduction to major conceptual approaches to the American political system and to the history of the study of American politics.

POS 6127 State Government and Politics 3 Credits
Grading Scheme: Letter Grade
The bibliography, methodology, and research topics of American state and local governments.

POS 6146 Urban Politics 3 Credits
Grading Scheme: Letter Grade
Explores processes, actors, and institutions in local U.S. politics. Briefly examines significant issue areas including fiscal crisis, racial conflict, and education.

POS 6157 Community Analysis 3 Credits
Grading Scheme: Letter Grade
Development of social, economic, and political profiles in understanding trends, projections, and public policy alternatives.

POS 6196 Patrons, Clients, Corruption, and Accountability 3 Credits
Grading Scheme: Letter Grade
Examining how communities, associations, organizations, political parties, or states are governed.
Prerequisite: CPO 2001

POS 6207 Political Behavior 3 Credits
Grading Scheme: Letter Grade
Examines participation, political culture, and public opinion including classic and current research.

POS 6274 Political Campaigning 3 Credits
Grading Scheme: Letter Grade
Overview of tasks and challenges, including strategy, uses of campaign polls, organization, management, communication, and mobilization.

POS 6278 Advanced Campaign Strategy 3 Credits
Grading Scheme: Letter Grade
Strategy implications of media production on campaigns, party management, direct mail, polling, and fundraising.
Prerequisite: POS 6274.

POS 6279 The Politics of Direct Democracy 3 Credits
Grading Scheme: Letter Grade
Theory and practice of direct democracy in American states, including processes of initiative, referendum, and recall.

POS 6292 Religion and Politics 3 Credits
Grading Scheme: Letter Grade
Interplay between religion and politics from the perspective of relevant social science approaches.

POS 6427 Legislative Process 3 Credits
Grading Scheme: Letter Grade
Examines the role of legislative institutions in American government.

POS 6455 Political Parties and Interest Groups 3 Credits
Grading Scheme: Letter Grade
Examines the structure and functions of political parties and interest groups in the United States.

POS 6476 Bureaucratic Politics in the U.S. 3 Credits
Grading Scheme: Letter Grade
Examining how public bureaucracies in the U.S. relate to one another and their political environments. Topics include the growth of the administrative sector, regulatory federalism, representative bureaucracy, and political control of the bureaucracy.

POS 6707 Qualitative Research Methods for Political Science 3 Credits
Grading Scheme: Letter Grade
Survey of methods focusing on concept formation, case selection, and data collection suitable for research designs based on small number of case studies.

POS 6716 Scope and Epistemologies of Political Science 3 Credits
Grading Scheme: Letter Grade
Overview of development of political science as discipline and pluralistic introduction to epistemological perspectives that characterize field.

POS 6736 The Conduct of Inquiry 3 Credits
Grading Scheme: Letter Grade
Empirical research methodology in political science.

POS 6737 Political Data Analysis 3 Credits
Grading Scheme: Letter Grade
Introduction to quantitative methods and techniques.

POS 6747 Topics in Political Research Methodology 3 Credits
Grading Scheme: Letter Grade
Review of recent applications of advanced research methods to different types of political science data.

POS 6757 Survey Research 3 Credits
Grading Scheme: Letter Grade
Methods of survey research in context of field investigation: formulating research hypotheses, constructing measurement instruments, and collecting and analyzing data.

POS 6909 Individual Work 1-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Individual Work

POS 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

POS 6933 Special Topics 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Special Topics
PO 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

PO 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

PO 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PO 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

PB 6016 Ancient Political Thought 3 Credits
Grading Scheme: Letter Grade
Intensive exploration of Classical Greek and Roman thinkers and texts.

PB 6056 Modern Political Thought 3 Credits
Grading Scheme: Letter Grade
Close reading of political theorists and themes from the Renaissance through the 19th century. Emphasizes thinkers regarded as central to the development of republicanism, absolutism, liberalism, democracy, conservatism, and feminism.

PB 6067 Contemporary Political Theory 3 Credits
Grading Scheme: Letter Grade
Close reading of one or more twentieth-century contemporary political philosophers whose works have made major impacts on field (e.g. Arendt, Foucault, Habermas).

PB 6306 Liberalism and Its Critics 3 Credits
Grading Scheme: Letter Grade
Close reading of selected texts by leading defenders of liberalism and influential theoretical standpoints questioning liberal orthodoxy. Communitarianism, multiculturalism, Marxism, democratic theory, feminism, and critical race theory.

PB 6315 Democratic Theory 3 Credits
Grading Scheme: Letter Grade
Brief look at some classical theorists and critics of democracy (Plato, Rousseau, Tocqueville, Marx). Focus on contemporary debates in democratic theory. Participation, deliberation, representation, and multiculturalism.

PB 6505 Politics and Theory 3 Credits
Grading Scheme: Letter Grade
Investigation of the nature of political theory and normative issues in politics.

PB 6006 Policy Evaluation 3 Credits
Grading Scheme: Letter Grade
Examines methodologies appropriate for analyzing public policies.

PB 6007 Policy Process 3 Credits
Grading Scheme: Letter Grade
General examination of public policy formulation and implementation. Special emphasis upon political and economic determinants and relationship to social theory.

PB 6009 Public Policy Analysis 3 Credits
Grading Scheme: Letter Grade
Analytic approach to understanding economic and political tools used to formulate solutions to public problems such as environmental quality, business regulation, public education, health care, and welfare.

PB 6315 Race, Gender, and Politics 3 Credits
Grading Scheme: Letter Grade
Politics and cultural discrimination, political power, political behavior, and public policy.

Portuguese

PO 5132 Graduate Introduction to Portuguese and Brazilian Culture 3 Credits
Grading Scheme: Letter Grade
An accelerated complete introduction to the Portuguese language and Brazilian culture for graduate students. Preparation for graduate level coursework in Portuguese and/or field work in Brazil.

PO 6276 Twentieth-Century Brazilian Novel 3 Credits
Grading Scheme: Letter Grade
Readings in narrative from 1920s avant-garde and 1930s neoregionalism to 1950s and 1960s instrumentalism. Various manifestations of late-20th century prose fiction.

PO 6385 Brazilian Lyric 3 Credits
Grading Scheme: Letter Grade
Theory and practice of poetry including Modernist legacy, experimental trends, political verse, song, youth movements, and contemporary phenomena.

PO 6386 Brazilian Drama 3 Credits
Grading Scheme: Letter Grade
Theory of dramatic literature and theatre, from its origins in the 19th century through Modernism and contemporary practices.

PO 6905 Individual Work 1-3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Available only by special arrangement with program coordinator or graduate adviser.

PO 6930 Rotating Topics in Brazilian or Portuguese Literature 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Diverse themes of the Lusophone world, including Portuguese Modernism, Brazilian northeast, Afro-Brazilian world, culture of dictatorship, popular music, science fiction, postmodernism, or focus on major authors (Machado de Assis, Guimaraes Rosa, Clarice Lispector).

Psychology

CBH 6056 Comparative Psychology 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Survey of literature.
Prerequisite: consent of instructor.

CP 6169 Seminar: Psychology and Deviant Behavior 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Analysis of specific deviant behaviors, with emphasis on theory and research related to diagnosis and clinical management.

DEP 6057 Advanced Developmental Psychology 1 3 Credits
Grading Scheme: Letter Grade
Surveys research literature on developmental changes during infancy and cognitive development during childhood.
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Prerequisite</th>
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</thead>
<tbody>
<tr>
<td>DEP 6058 Advanced Developmental Psychology II</td>
<td>3</td>
<td>Theories and current literature in social development, focusing on the period of infancy through adolescence.</td>
</tr>
<tr>
<td>DEP 6059 Seminar: Special Topics in Developmental Psychology</td>
<td>1-3</td>
<td>Prerequisite: admission to graduate status or consent of instructor.</td>
</tr>
<tr>
<td>DEP 6099 Survey of Developmental Psychology</td>
<td>2-3</td>
<td>Prerequisite: consent of instructor.</td>
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<tr>
<td>DEP 6099 Seminar: Adult Development and Aging</td>
<td>3</td>
<td>Prerequisite: consent of instructor.</td>
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<tr>
<td>DEP 6099 Current Research Methods in Developmental Psychology</td>
<td>3</td>
<td>Prerequisite: consent of instructor.</td>
</tr>
<tr>
<td>DEP 7608 Theories of Developmental Psychology</td>
<td>3</td>
<td>Prerequisite: consent of instructor.</td>
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<tr>
<td>EAB 6099 Survey of Behavior Analysis 2-3</td>
<td>2-3</td>
<td>Prerequisite: consent of instructor.</td>
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<tr>
<td>EAB 6118 Theoretical Foundations of Behavior Analysis 3</td>
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<td>Prerequisite: consent of instructor.</td>
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<td>EAB 6707 Applied Behavior I 3</td>
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<td>Prerequisite: consent of instructor.</td>
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<tr>
<td>EAB 6712 Experimental Psychopathology 3</td>
<td>3</td>
<td>Prerequisite: consent of instructor.</td>
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<tr>
<td>EAB 6716 Behavior Analysis in Developmental Disabilities 3</td>
<td>3</td>
<td>Behavioral approaches to study and treatment of mental retardation and developmental disabilities. Acquisition techniques, assessment, and treatment of behavior disorders, program evaluation, and management.</td>
</tr>
<tr>
<td>EAB 6750 Quantitative Methods 3</td>
<td>3</td>
<td>Introduction to quantitative methods in single-case research.</td>
</tr>
<tr>
<td>EAB 6780 Ethics and Professional Issues 1-3</td>
<td>3</td>
<td>Examines ethical decision making and regulatory standards in applied behavior analysis, ethics in research and publication, and professional issues arising in various settings.</td>
</tr>
<tr>
<td>EAB 6937C Seminar: Special Topics in Experimental Analysis of Behavior 1-4</td>
<td>1-4</td>
<td>Current research, theory, and instructional techniques.</td>
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<tr>
<td>EAB 6939 Seminar: Special Topics in Applied Behavior Analysis 1-3</td>
<td>1-3</td>
<td>Prerequisite: EAB 6099.</td>
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<tr>
<td>EAB 7089 Advanced Seminar: Experimental Analysis of Behavior 3</td>
<td>3</td>
<td>Current empirical and theoretical issues relevant to functional analysis of verbal behavior.</td>
</tr>
<tr>
<td>EXP 6667 Methods and Research in Cognitive Neuroscience</td>
<td>3</td>
<td>Material covers contemporary theory and knowledge about brain systems and mechanisms underlying higher level human brain functions such as perception and attention, and their change across the lifespan.</td>
</tr>
<tr>
<td>EXP 6939 Seminar: Current Issues in Cognition and Sensory Processes</td>
<td>3</td>
<td>Seminar: Current Issues in Cognition and Sensory Processes</td>
</tr>
<tr>
<td>GEY 6905 Independent Study in Gerontology</td>
<td>1-3</td>
<td>Independent Study in Gerontology</td>
</tr>
</tbody>
</table>
PCO 6057 Psychology of Counseling I 3 Credits
Grading Scheme: Letter Grade
Theory, research, and skills in therapeutic approaches to counseling psychology.
Prerequisite: Graduate status in the counseling psychology program.

PCO 6278 Diversity and Multiculturalism in Counseling Psychology 3 Credits
Grading Scheme: Letter Grade
Overview of development of multicultural counseling theory, research, and practice. Historical background, multicultural counseling competencies, cultural identity development and worldview, spiritual issues, understanding oppression (e.g., racism, sexism, heterosexism, able-ism), case conceptualization, MCC organizational development, ethical guidelines for working with diverse populations, and MCC skills development.

PCO 6316C Psychological Assessment I 3 Credits
Grading Scheme: Letter Grade
Consideration of basic assessment theory and of fundamental theories of intelligence and intellectual assessment, including practicum-type administration of intelligence tests.
Prerequisite: Consent of instructor.

PCO 6317C Psychological Assessment II 3 Credits
Grading Scheme: Letter Grade
Fundamental theories of personality and individual assessment of personality, including practicum-type administration of personality tests.
Prerequisite: Consent of instructor.

PCO 6931 History and Contemporary Issues in Counseling Psychology 3 Credits
Grading Scheme: Letter Grade
Introduction to foundations of counseling psychology and its research. Contemporary literature of discipline.

PCO 6939 Seminar: Current Topics in Counseling Psychology 3 Credits, Max 15 Credits
Grading Scheme: Letter Grade
Emphasis on theoretical background and implications for applied work.
Prerequisite: MHS 6401 or consent of instructor.

PCO 7217 Professional Ethics and Skills in Counseling Psychology 3 Credits
Grading Scheme: Letter Grade
Professional issues, ethics, relationships, and skills pertaining to practice of counseling psychology.
Prerequisite: Graduate student status in counseling psychology or consent of instructor.

PCO 7537 Vocational Psychology 3 Credits
Grading Scheme: Letter Grade
Examines major theories and research. Emphasizes vocational assessment.
Prerequisite: Graduate student status and consent of instructor.

PCO 7944 Practicum in Counseling Psychology 1 Credit, Max 12 Credits
Grading Scheme: Letter Grade
For second-year doctoral students in counseling psychology, 12 hours per week of on-site clinical work plus individual and group supervision.
Prerequisite: PCO 7217.

PCO 7945 Advanced Practicum in Counseling Psychology 1 Credit, Max 4 Credits
Grading Scheme: Letter Grade
For advanced students in counseling psychology. On-site clinical work at approved mental health agencies: 12 to 15 hours per week of work including individual and group supervision.
Prerequisite: PCO 7217, 7947.

PCO 7949 Internship in Counseling Psychology 1 Credit, Max 12 Credits
Grading Scheme: Letter Grade
Full-time or equivalent work in a university or community agency where counseling functions are carried out under supervision. Open only to students in the counseling psychology program.
Prerequisite: Written application to the Counseling Psychology Internship Coordinator.

PSB 5445 Drug Use and Abuse 3 Credits
Grading Scheme: Letter Grade
Objective, informational approach to the commonly used and abused drugs. Psychological, physiological, social, medical, legal, and historical aspects.
Prerequisite: 6 hours of psychology.

PSB 6076 Nobel Prizewinners in Neuroscience 1 Credit
Grading Scheme: Letter Grade
Examination of biographies and select publications of Nobel Prize winners whose work encompassed brain function or behavior, providing an historical perspective of major advances in the field over the last century.
Prerequisite: PSB6087 or equivalent.

PSB 6087 Behavioral and Cognitive Neuroscience I 3 Credits
Grading Scheme: Letter Grade
Advanced training in the neurobiological basis of behavior, emphasizing cellular and molecular neurobiology, neuroanatomy, neurophysiology, neurotransmission, neuroplasticity, and development of the nervous system.

PSB 6088 Behavioral and Cognitive Neuroscience II 3 Credits
Grading Scheme: Letter Grade
Advanced training in the neurobiological basis of behavior, emphasizing sensory systems, neuromuscular organization and function, regulatory systems and homeostasis, autonomic function, emotions and feelings, and cognition.
Prerequisite: PSB 6087.

PSB 6099 Survey of Physiological and Comparative Psychology 2-3 Credits, Max 3 Credits
Grading Scheme: Letter Grade
Empirical and theoretical foundations of physiological and comparative psychology.
Prerequisite: Graduate status.

PSB 7248 Neurobehavioral Relations 3 Credits
Grading Scheme: Letter Grade
Theories and data on the central nervous system basis for higher order function. Emphasis will be on arousal, purposeful behavior, and learning.
Prerequisite: PSB 6087.

PSB 7249 Seminar in Neural Mechanisms and Behavior 3 Credits
Grading Scheme: Letter Grade
Recent and specialized topics in brain-behavior relations.
Prerequisite: PSB 6087.

PSY 6608 History of Psychology 2-3 Credits, Max 3 Credits
Grading Scheme: Letter Grade
History of Psychology
PSY 6826 Psychology of Eating and Obesity 3 Credits
Grading Scheme: Letter Grade
A comprehensive examination of theory and application of psychological and brain science principles to understanding eating behavior and the contemporary problem of overweight and obesity.
Prerequisite: Graduate status.

PSY 6905 Individual Work 1-3 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Reading or research areas in psychology.

PSY 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

PSY 6930 Topics in Psychology 1-3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Topics in Psychology

PSY 6939 Seminar: The Teaching of Psychology 1-3 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Examination of general techniques of teaching with emphasis on interpersonal nature of teaching, course planning, textbooks, testing and evaluation, and lecturing within the framework of general introductory psychology course. Videotaped lecturers.
Prerequisite: consent of instructor.

PSY 6940 Supervised Teaching 0-3 Credits, Max 5 Credits
Grading Scheme: S/U
Instruction in the teaching of psychology undergraduate courses while teaching a course. Information on test construction, effective teaching techniques, syllabi development, and feedback on teaching.

PSY 6971 Research for Master’s Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master’s Thesis

PSY 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PSY 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

SOP 6099 Survey of Social Psychology 2-3 Credits, Max 3 Credits
Grading Scheme: Letter Grade
Empirical and theoretical foundations of social psychology.
Prerequisite: graduate status.

SOP 6219C Advanced Research Techniques in Social-Personality Psychology 3 Credits
Grading Scheme: Letter Grade
Advanced Research Techniques in Social-Personality Psychology
Prerequisite: consent of instructor.

SOP 6409 Seminar: Current Topics in Social-Personality Psychology 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Seminar: Current Topics in Social-Personality Psychology

SOP 6419 Seminar: Attitudes and Social Cognition 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Seminar addressing topics such as attitude change, attribution, social perception, social cognition, etc.
Prerequisite: graduate status.

SOP 6929 Colloquium on Research in Social-Personality Psychology 1-3 Credits, Max 8 Credits
Grading Scheme: Letter Grade
On-going colloquium series intended for graduate students in social-personality psychology. Provides the opportunity for the presentation and discussion of research initiatives. Credit is variable and depends on the amount of supervised research and project preparation planned by the student and approved by the instructor.
Prerequisite: Graduate status & PSY Major.

Public Relations

PUR 6608 International Public Relations 3 Credits
Grading Scheme: Letter Grade
Factors to assist conceptualization and execution of international public relations activities. Explores the relationship between environmental variables and international public relations practices. Review of empirical evidence about public relations practices in other countries and methodological issues pertaining to conducting research.

Religion

REL 6038 Religion and Fieldwork 3 Credits
Grading Scheme: Letter Grade
Combining classroom based learning with supervised field research, this class will introduce students to the theoretical and practical issues of religion and fieldwork and will focus on the nuts and bolts of fieldwork. We will read both classic and newer works that showcase issues and questions in religion and fieldwork.

REL 6347 American Buddhism 3 Credits
Grading Scheme: Letter Grade
Exploration of relationship between Buddhism and American culture.

RLG 5143 Religion and Social Change 3 Credits
Grading Scheme: Letter Grade
Religion’s role in social movements and other forms of cultural, economic, and political transformation.

RLG 5195 Topics in Religion and Society 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Examines the interaction between religious bodies and the structures of the societies in which they function, with particular attention to the United States.

RLG 5199 Religion and Nature in North America 3 Credits
Grading Scheme: Letter Grade
Investigation of ways that concepts of religion and nature have evolved and influenced one another during cultural, political and environmental history of North America since European contact.

RLG 5297 Topics in Biblical Studies 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Examines methods of interpreting particular texts or themes chosen from Hebrew scriptures or the Christian New Testament.
RLG 5338 Topics in Asian Religions 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Examines religious traditions that are indigenous to India, China, or Japan.

RLG 5345 Buddhism Across Borders 3 Credits
Grading Scheme: Letter Grade
Buddhism Across Borders

RLG 5361 Global Islam 3 Credits
Grading Scheme: Letter Grade
Promotes a deeper understanding of the diversity of Muslim cultures and societies in the contemporary global context through an interdisciplinary approach that is both topical and geographical, drawing from perspectives from the social sciences and the humanities
Prerequisite: Currently enrolled UF graduate students may enroll in the course. Non-degree seeking students may enroll pending upon the approval of the Department of Religion.

RLG 5365 Studies in Islam 3 Credits
Grading Scheme: Letter Grade
Historical study of development of selected doctrines, institutions, and practices, using primary and interpretive material.

RLG 5396 Religion and Animals 3 Credits
Grading Scheme: Letter Grade
Examines the place of animals in the cosmologies and ethical systems of the world's diverse religions.

RLG 5495 Topics in Religious Thought 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Investigation of particular themes in a religious tradition or the comparative approach to intellectual dimensions of religious communities.

RLG 5549 Studies in Christianity 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Historical study of the development of selected Christian practices, doctrines, and institutions, using primary sources and interpretative material.

RLG 5696 Religion and Animals 3 Credits
Grading Scheme: Letter Grade
Examines the place of animals in the cosmologies and ethical systems of the world's diverse religions.

RLG 5906 Individual Work 1-5 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Study of chosen materials under the individual direction of a member of the Graduate Faculty. Plan of study and method of evaluation must be pre-approved by the supervisory committee.

RLG 5937 Topics in Religious Studies 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Issues and methods in the study of religion. Generally more than one religious tradition is studied.

RLG 6035 Method and Theory I 3 Credits
Grading Scheme: Letter Grade
Examines classical formulations of approaches to studying religion and to developing religious studies as an academic discipline.
Prerequisite: graduate standing. Required of all religion graduate students.

RLG 6036 Method and Theory II 3 Credits
Grading Scheme: Letter Grade
Study of religion in light of recent challenges in the humanities and social sciences. Special attention to the concept of religion and its origins in Christian culture of Western Europe; and to the engagement of religion in colonial culture.
Prerequisite: RLG 6035 and graduate standing. Required of all religion graduate students.

RLG 6038 Religion and Fieldwork 3 Credits
Grading Scheme: Letter Grade
Combining classroom based learning with supervised field research, this class will introduce students to the theoretical and practical issues of religion and fieldwork and will focus on the nuts and bolts of fieldwork. We will read both classic and newer works that showcase issues and questions in religion and fieldwork.
Prerequisite: Graduate status.

RLG 6095 Utopias and Dystopias 3 Credits
Grading Scheme: Letter Grade
Ideal societies and their roles in religious movements, ideologies, and communities.

RLG 6107 Core Seminar in Religion and Nature 3 Credits
Grading Scheme: Letter Grade
Religious dimensions of relationships between what humans call "nature" and "culture."

RLG 6125 Religion and Politics in the Americas 3 Credits
Grading Scheme: Letter Grade
Relationship between socio-political change and religion in the Americas from the pre-colonial period to the present.

RLG 6126 Religion in the Americas 3 Credits
Grading Scheme: Letter Grade
Origins and interactions of religions in the Americas.

RLG 6129 Hindu Traditions in America 3 Credits
Grading Scheme: Letter Grade
Exploration of cultural, religious, and social issues.

RLG 6137 Religion in North America 3 Credits
Grading Scheme: Letter Grade
Examines religious bodies in the United States, from historical, sociological, and theological perspectives.

RLG 6138 New Religious Movements 3 Credits
Grading Scheme: Letter Grade
New, emerging, or alternative religious groups likely to receive the pejorative label of cult; types of leadership, organization, ritual, and ideology of such groups.

RLG 6164 Radical Environmentalism 3 Credits
Grading Scheme: Letter Grade
Critically examines the emergence and social impact of radical environmental groups.

RLG 6181 Ethics and the Natural Sciences 3 Credits
Grading Scheme: Letter Grade
Perspectives on the intersection of ethics and natural sciences, focusing on bioethics and health care, evolution, ecology, and ethology.

RLG 6183 Religion and Environmental Ethics 3 Credits
Grading Scheme: Letter Grade
Explorations in classic and contemporary theories and applications of environmental ethics, with special attention to religion.
RLG 6185 Religion, Nature, and Society 3 Credits
Grading Scheme: Letter Grade
Explores relationships between religion, nature and society both in the context of religious traditions and as a means to understand how these relationships reflect and shape social relations among people. Covers approaches to studying the relationships between different societies and nonhuman nature.
Prerequisite: Graduate status.

RLG 6186 Nature in Western Traditions 3 Credits
Grading Scheme: Letter Grade
Introduction to major issues and approaches in relations between humans and nature in western religious traditions.

RLG 6187 Nature in Asian Religions 3 Credits
Grading Scheme: Letter Grade
Explores themes such as interconnectedness and interdependence, nonexclusivity, and biocentrism in ethical systems of religious traditions of Asia.

RLG 6196 Globalizing the Sacred 3 Credits
Grading Scheme: Letter Grade
Examines the ways that religion shapes the current multifaceted episode of globalization.

RLG 6310 Religion and Nature in South Asia 3 Credits
Grading Scheme: Letter Grade
Examines how the different religious traditions of South Asia understand the natural world and how these traditions respond to contemporary environmental issues.

RLG 6319 Interpreting Asian Religions 3 Credits
Grading Scheme: Letter Grade
Critical assessment of the world-religions model for interpreting Asian religions.

RLG 6339 Women in the Hindu Tradition 3 Credits
Grading Scheme: Letter Grade
Classical Hindu typologies of womanhood compared to alternative modern and contemporary models.

RLG 6346 Buddhist Traditions 3 Credits
Grading Scheme: Letter Grade
Comprehensive survey of main traditions.

RLG 6383 Relgn/Natr in Latin Am 3 Credits
Grading Scheme: Letter Grade
Relgn/Natr in Latin Am

RLG 6385 Native Religions in the Americas 3 Credits
Grading Scheme: Letter Grade
Indigenous religious communities and traditions in North, Central, and South America.

RLG 6386 Religion and the Latin American Diaspora 3 Credits
Grading Scheme: Letter Grade
Exploration of how transnationalism interacts with religion to produce new forms of identity and community life among Latinos.

RLG 6387 Religions in Latin America 3 Credits
Grading Scheme: Letter Grade
Important historical developments and contemporary expressions of religions in Latin America.

RLG 6709 Islam in Africa 3 Credits
Grading Scheme: Letter Grade
The course examines processes of Islamization and the emergence of local Muslim cultures. It exposes students to the diversity of Islam in Africa. You will become familiar with contemporary African Islam, and understand how it interacts with broader political dynamics. You will acquire skills to assess issues with broad relevance.

RLG 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

RLG 6936 Seminar Relig Studies 3 Credits
Grading Scheme: Letter Grade
Seminar Relig Studies

RLG 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

RLG 6957 Overseas Studies in Religion 1-3 Credits, Max 9 Credits
Grading Scheme: S/U
Overseas Studies in Religion

RLG 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Required of all candidates for the M.A. degree.

RLG 7979 Advanced Research 1-15 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been admitted to a doctoral program. Not appropriate for students who have been admitted to candidacy.
Prerequisite: consent of graduate coordinator.

RLG 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

SRK 6905 Individual Study in Sanskrit 1-4 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Graduate reading in Sanskrit language and literature.
Prerequisite: consent of instructor.

Soil and Water Sciences

AGG 5607 Communicating in Academia 3 Credits
Grading Scheme: Letter Grade
Teaching graduate students about academic writing, specifically focused on research proposals, theses, dissertations, manuscripts, grant proposals, and CVs. Also teaching students about aspects of academic writing that are not normally part of graduate curriculum but are necessary to succeed.

AGG 6503 Nanotechnology in Food, Agriculture, and Environment 3 Credits
Grading Scheme: Letter Grade
Application of nanotechnology in crop production, food processing and preservation, and environmental remediation; behavior of engineered nanoparticles in plant, soil and the environment, and environmental toxicology and regulations of engineered nanoparticles.
ALS 5027 Reusable Learning Objects 1 Credit, Max 2 Credits  
**Grading Scheme:** Letter Grade  
Developing online learning material using a variety of modern digital media, including audio recordings, videos, photographs, and graphics. Gain knowledge on how to organize material, present and describe learning content, and formulate effective assessment questions which reinforce learning.  
**Prerequisite:** Department approval is required to ensure students have basic knowledge in Windows OS; web browsing; Power Point; a robust/ high-speed Internet connection; and basic knowledge in environmental sciences or agriculture and life sciences.

ALS 5155 Global Agroecosystems 3 Credits  
**Grading Scheme:** Letter Grade  
Focusing on the principles of agroecology and presentation of topics that integrate ecological with agricultural principles to optimize resource conservation, productivity, societal benefit, and profitability.  
**Prerequisite:** SWS 3022 or SWS 5050 & ALS 3153 & AGR 4214C or equivalents.

CWR 6537 Contaminant Subsurface Hydrology 3 Credits  
**Grading Scheme:** Letter Grade  
Physical-chemical-biological concepts and modeling of retention and transport of water and solutes in unsaturated and saturated media. Applications of environmental aspects of soil and groundwater contamination.  
**Prerequisite:** None.

SWS 5050 Soils for Environmental Professionals 3 Credits  
**Grading Scheme:** Letter Grade  
Fundamentals of soil properties and processes that explain the central role soils play in the environment. Geared to environmental professionals with little knowledge of soil science. Also offered as a distance education course.

SWS 5050L Soils for Environmental Professionals Laboratory 1 Credit  
**Grading Scheme:** Letter Grade  
Hands-on laboratory experience with many tools and techniques used in soil and water science, in relation to the environment.  
**Corequisite:** SWS 5050: Soils for Environmental Professionals or consent of instructor.

SWS 5115 Environmental Nutrient Management 3 Credits  
**Grading Scheme:** Letter Grade  
Consumption, manufacture, properties, and reserves of fertilizer materials. Methods of application, effects on soil reaction, and plant requirements of fertilizer nutrients. Understanding specific fertilizer reactions. Also offered as a distance education course.  
**Prerequisite:** SWS 3022 or SWS 5050: Soils for Environmental Professionals.

SWS 5132 Tropical Soil Management 3 Credits  
**Grading Scheme:** Letter Grade  
Characteristics and management of tropical soils. Technologies that minimize industrial inputs.  
**Prerequisite:** SWS 3022 or SWS 5050.

SWS 5182 Earth System Analysis 3 Credits  
**Grading Scheme:** Letter Grade  
Analysis of global-scale interdependences between climate, biogeochemical cycles and humans using a systems approach.  
**Prerequisite:** None MAC 2233, PHY 2048, or Similar Would Be Useful But Not A Requirement.

SWS 5208 Sustainable Agricultural and Urban Land Management 3 Credits  
**Grading Scheme:** Letter Grade  
Studying agricultural and urban water quality issues in Florida, their bases, land and nutrient management strategies, and the science and policy behind Best Management Practices (BMPs). Students will learn to evaluate BMP research and analyze its role in determining practices and policies that protect water quality.  
**Prerequisite:** SWS 3022 or equivalent course or with instructor approval.

SWS 5224 Environmental Biogeochemistry 3 Credits  
**Grading Scheme:** Letter Grade  
Overviewing of the biogeochemical processes affecting elemental cycling (carbon, nitrogen, phosphorus, sulfur) in global environmental systems.  
**Prerequisite:** BSC 2009 and BSC 2009L or equivalent courses, OR BSC 2010 and BSC 2010L or equivalent courses, OR CHM 2045 and CHM 2045L or equivalent courses.

SWS 5234 Environmental Soil, Water, and Land Use 3 Credits  
**Grading Scheme:** Letter Grade  
Suitability of soils for different uses. Proper use of soil survey reports, topographic maps, and related information. Relationships between land uses and water behavior in soils and landscapes. Water use and allocation. Also offered as a distance education course.

SWS 5235 South Florida Ecosystems 3 Credits  
**Grading Scheme:** Letter Grade  
Five modules address major disciplines of science and interest. Modules focus on broad subject areas critical to understanding this framework and man's interaction with South Florida ecosystems.

SWS 5246 Water Resource Sustainability 3 Credits  
**Grading Scheme:** Letter Grade  
Quantitative description of human impacts on hydrologic ecosystems (aquifers, watersheds, coastal zones, lakes, and wetlands). Case studies show the detrimental effects of unsustainable resource use and beneficial management strategies. Also offered as a distance education course.

SWS 5247 Hydric Soils 2 Credits  
**Grading Scheme:** Letter Grade  
Concepts, field identification, and delineation of hydric soils. Instruction in accordance with the National Technical Committee for Hydric Soils and with regulatory agencies. Also offered as a distance education course.

SWS 5248 Wetlands and Water Quality 3 Credits  
**Grading Scheme:** Letter Grade  
Introduction to natural and constructed wetland ecosystems. Problems associated with eutrophication and water quality. Hydrology, soils, and biogeochemistry. Also offered as a distance education course.  
**Prerequisite:** CHM 2040.

SWS 5305C Soil Microbial Ecology 3 Credits  
**Grading Scheme:** Letter Grade  
Occurrence and activities of soil microorganisms and their influence on soil productivity and environmental quality. Also offered as a distance education course.  
**Prerequisite:** SWS 3022 or SWS 5050, MCB 2000C.

SWS 5308 Ecology of Waterborne Pathogens 3 Credits  
**Grading Scheme:** Letter Grade  
**Prerequisite:** MCB 3020, or MCB 3023, or MCB 4203, or equivalent.
SWS 5406 Soil and Water Chemistry 3 Credits
Grading Scheme: Letter Grade
Theoretical background and current approaches to agricultural and environmental problems. Also offered as a distance education course.
Prerequisite: SWS 3022 or SWS 5050; CHM 3120.

SWS 5424C Soil Chemical Analysis 3 Credits
Grading Scheme: Letter Grade
Practical and theoretical aspects of instrumentation and techniques commonly used in analyzing soils and plants.
Prerequisite: CHM 3120.

SWS 5551 Soils, Water, and Public Health 3 Credits
Grading Scheme: Letter Grade
Highlights important instances where soil and water science and public health overlap. Develops skills required for competency in both disciplines.
Corequisite: Graduate status.

SWS 5605C Environmental Soil Physics 3 Credits
Grading Scheme: Letter Grade
Transport processes for water, solutes, gases, and heat in the root zone. Important soil properties (physical, chemical, and biological) that influence the transfer processes characterized in the field and laboratory. Also offered as a distance education course.
Prerequisite: CHM 2040, MAC 2312, PHY 2004, SWS 5050.

SWS 5716C Environmental Pedology 4 Credits
Grading Scheme: Letter Grade
Soils in the environment. Heavily oriented toward field applications of pedological principles and processes. Also offered as a distance education course.
Prerequisite: SWS 3022, SWS 5050, or consent of instructor.

SWS 5721C GIS in Land Resource Management 3 Credits
Grading Scheme: Letter Grade
Introduction to basic concepts and use of "Arc GIS" to address land resource management issues. Also offered as a distance education course.

SWS 5805 Environmental Soil and Water Monitoring Techniques 3 Credits
Grading Scheme: Letter Grade
Introducing students to the principles, objectives, and practices in environmental monitoring. Students will learn the proper techniques in planning for monitoring projects, sampling design, sample collection, basic principles of laboratory analysis, and basic data analysis. Quality assurance and quality control requirements are introduced and emphasized.
Prerequisite: BSC 2010 & BSC 2010L; CHM 2045 & CHM 2045L

SWS 6134 Soil Quality 3 Credits
Grading Scheme: Letter Grade
State-of-the-art studies/knowledge on soil quality. Principle assessment of soil quality with respect to biological production, plant and animal health, food security, and environmental quality. Also offered as a distance education course.
Prerequisite: SWS 5050 or consent of instructor.

SWS 6136 Soil Fertility 3 Credits
Grading Scheme: Letter Grade
Principles of advanced soil fertility, including soil chemical properties, crop management practices, plant nutritional requirements, soil fertility amendments, and physiological aspects of plant growth.
Prerequisite: SWS 4116, 4213C, SWS 5050 or SWS 5406 or EES 4201.

SWS 6209 Urban Soil and Water Systems 3 Credits
Grading Scheme: Letter Grade
Issues and opportunities related to soil and water quality in urban systems. Students will learn and discuss consequences of human population growth on soil and water systems in urban areas.
Prerequisite: SWS 5050

SWS 6262 Soil Contamination and Remediation 3 Credits
Grading Scheme: Letter Grade
Interdisciplinary study on current topics of soil contamination (types, sources, pathways, impacts, and fates) and soil remediation technologies (chemical, physical, biological, and thermal). Also offered as distance education course.
Prerequisite: SWS 4213C or equivalent.

SWS 6323 Advanced Microbial Ecology 3 Credits
Grading Scheme: Letter Grade
Phylogeny and evolution; diversity of habitat; genetic exchange.
Prerequisite: SWS 5305C or consent of instructor.

SWS 6366 Biodegradation and Bioremediation 3 Credits
Grading Scheme: Letter Grade
Principles of biodegradation of toxic organic chemical; practices in conducting biodegradation studies in soils and water, and in microbial aspects of bioremediation of contaminated soils and water.

SWS 6448 Biogeochemistry of Wetlands and Aquatic Systems 3 Credits
Grading Scheme: Letter Grade
Biogeochemical cycles of carbon, nitrogen, phosphorus, sulfur, and redox cations in wetland soils and sediments, as related to their agronomic, ecological, and environmental significance. Also offered as distance education course.

SWS 6454 Advanced Soil and Water Chemistry 3 Credits
Grading Scheme: Letter Grade
Fundamental principles of surface chemistry as applied to soil and subsurface materials in natural waters. Chemical equilibria in natural systems, aqueous geochemistry, interfacial properties of soil and sedimentary colloids, and sorption of pollutants.
Prerequisite: CHM 3400, or equivalent.

SWS 6456 Advanced Biogeochemistry 3 Credits
Grading Scheme: Letter Grade
Global elemental cycles in terrestrial, wetland, and aquatic systems as related to water quality, carbon sequestration, and climate change.

SWS 6722 Soil-Landscape Modeling 3 Credits
Grading Scheme: Letter Grade
Various concepts and quantitative methods to model and understand spatial distribution of soil properties.
Prerequisite: SWS 5721C, STA 6166, SWS 5716C, or equivalent, or consent of instructor.

SWS 6813C Modeling Land Biogeochemistry 3 Credits
Grading Scheme: Letter Grade
Modeling the flow of water, carbon and nutrients from an Earth system perspective.
Prerequisite: BSC 3307C or COP 3272 or MAC 2233 or PHY 2048 or SWS 4180 or ABE 5643C or PCB 5358 or SWS 5182 or SWS 5224.

SWS 6905 Special Problems 1-4 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Laboratory, library, and/or field study and research in a particular aspect of soils. Also offered as a distance education course.
Prerequisite: 15 credits of soil science.
SWS 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Also offered as a distance education course.

SWS 6920 Journal Colloquium in Environmental Science 1 Credit
Grading Scheme: Letter Grade
A discussion-based course to help graduate students in environmental science fields develop skills for critical analysis of literature while exploring current literature topics.
Prerequisite: Environmental science/earth system science course or consent of the instructor.

SWS 6931 Seminar 1 Credit, Max 3 Credits
Grading Scheme: Letter Grade
Presentation of literature, methods of proposed thesis research, and selected topics.

SWS 6932 Topics in Soils 1-4 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Also offered as a distance education course.
Prerequisite: SWS 3022.

SWS 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Also offered as a distance education course.

SWS 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Also offered as a distance education course.

SWS 6992 Aquatic Toxicology: Science and Applications 3 Credits
Grading Scheme: Letter Grade
Introduces foundational knowledge and concepts of the field of aquatic toxicology. Examines how environmental and chemical properties influence the fate and bioavailability of contaminants in aquatic environments; introduces principles of toxicology and methods used to study aquatic toxicology, as well as applications of knowledge gained from aquatic toxicology studies.
Prerequisite: [(BSC 2005 and BSC 2005L) or (BSC 2010 and BSC 2010L)] and [(CHM 2045 and CHM 2045L) or (CHM 2046 and CHM 2046L)].

SWS 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy. Also offered as a distance education course.

SWS 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Also offered as a distance education course.

Spanish

FOL 6326 Technology in Foreign Language Education 3 Credits
Grading Scheme: Letter Grade
Technology in classrooms. The interface between pedagogy and technology.
Prerequisite: FOL 6943, FRE 6943, or equivalent.

FOL 6943 Romance Language Teaching Methods 3 Credits
Grading Scheme: Letter Grade
Required of all graduate students who will be involved in teaching and have not had a similar course elsewhere.
Prerequisite: graduate standing.

SPN 6060 Spanish for Functional Reading and Translation 3 Credits
Grading Scheme: Letter Grade
Designed for graduate students who need to develop reading knowledge of Spanish for research or other programmatic reasons. Provides students with the necessary tools to read literary and scholarly texts in Spanish. Class activities include discussions, grammar exercises, translations and textual analyses.

SPN 6166 Teaching Spanish for the Professions 3 Credits
Grading Scheme: Letter Grade
Practical training and orientation for graduate students. Business Spanish. Issues of Spanish for health care and other professions. Languages across the curriculum. Professional development: technology in the classroom, scholarly networking, and job search.

SPN 6425 Writing for the Profession 3 Credits
Grading Scheme: Letter Grade
Develop or perfect skills in the writing of academic Spanish. Class hours are divided between theory/practice of the genres and review/practice of advanced rhetorical strategies in Spanish.
Prerequisite: Current enrollment in graduate program; advanced command of Spanish.

SPN 6480 Spanish Phonetics and Phonology 3 Credits
Grading Scheme: Letter Grade
Explores the Spanish phonological system from the perspectives of linear and non-linear generative phonology, comparing and contrasting the most popular models and theories used in literature today. Theories are subsequently applied towards broader issues of language acquisition, use and maintenance.

SPN 6705 Foundations of Hispanic Linguistics 3 Credits
Grading Scheme: Letter Grade
Introducing the theoretical linguistics, exploring research methods employed in the field, and showcasing the research areas represented in the department. The course is divided in three main units: introduction to theoretical linguistics; introduction to research methods; current research. Taught in Spanish.

SPN 6735 Special Study in Spanish Linguistics 3 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Varying topics of Spanish linguistics relevant to second language acquisition, sociolinguistics, and historical linguistics.

SPN 6785 Advanced Spanish Phonetics 3 Credits
Grading Scheme: Letter Grade
Precise description of Spanish pronunciation. Dialect features and contrastive English phonetics.

SPN 6806 Psycholinguistics of Spanish Bilingualism 3 Credits
Grading Scheme: Letter Grade
Introduces the core themes of psycholinguistics by using Spanish multilingual speakers as the case study. Explores the acquisition of various lexical components, examining production and comprehension throughout. Addresses cognitive neural consequences of bilingualism on general cognition. Familiarizes students with experimental methods used in psycholinguistic research.

SPN 6827 Sociolinguistics of the Spanish-Speaking World 3 Credits
Grading Scheme: Letter Grade
Overview of issues in the contemporary Spanish-speaking world: language variation, language contact, discourse analysis, language attitudes, policy and planning, and social factors in language acquisition and use.
Prerequisite: SPN 6785.
SPN 6835 Spanish and Spanish-American Dialectology 3 Credits
Grading Scheme: Letter Grade
Principles and methods applied to study of regional varieties of Spanish in Spain and Spanish America.
Prerequisite: SPN 6785.

SPN 6845 History of the Spanish Language 3 Credits
Grading Scheme: Letter Grade
Phonological, morphological, syntactic, and lexical evolution of Spanish language from Latin.
Prerequisite: SPN 6785

SPN 6855 Structure of Spanish 3 Credits
Grading Scheme: Letter Grade
Morphological, syntactic, and semantic aspects of the Spanish language.

SPN 6856 Spanish in Contact: Issues in Bilingualism 3 Credits
Grading Scheme: Letter Grade
Structural and sociocultural analysis of the Spanish language in contact with other major languages: Quechua, Aymara, Guarani, Basque, Catalan, English, Portuguese, and African languages.

SPN 6900 Directed Readings in Spanish 3 Credits, Max 6 Credits
Grading Scheme: S/U
Individualized readings in preparation for Master of Arts comprehensive examinations.

SPN 6940 Supervised Teaching 0-5 Credits, Max 5 Credits
Grading Scheme: S/U
Required for all graduate teaching assistants in Spanish. Practical training in teaching elementary Spanish courses.

SPN 6945 Practicum in Advanced College Teaching 2 Credits, Max 6 Credits
Grading Scheme: S/U
Practical training and orientation for advanced doctoral students in teaching upper-division courses. Gain upper-level teaching experience by working closely with a mentor in all areas of the teaching process.

SPW 6209 Colonial Spanish-American Literature 3 Credits
Grading Scheme: Letter Grade
Readings, research, and discussion. Literary, historical, and legal 16th-, 17th-, and 18th-century texts in Spanish: Colonial Latin America and dealing with contact among European, neo-European, and Native American cultures.

SPW 6216 Spanish Prose Fiction of the Golden Age 3 Credits
Grading Scheme: Letter Grade
The literary landscape of rampant generic diversity, before novelistic forms solidified. While shepherds in rarified meadows disputed fine points of neo-Platonic love, thieves, prostitutes, and picaros inveighed their way into carriages, salons, and homes of aristocracy. Fiction provided an outlet for political satire, religious allegory, utopian dreaming, and sheer escapism. Readings and lectures in Spanish.

SPW 6259 Spanish Novel of the Nineteenth Century 3 Credits
Grading Scheme: Letter Grade
Survey of Spanish narrative beginning with romantic cuadros de costumbres and folletin. Emergence of realist and naturalist narrative from 1870s to 1890s. Emphasizes Valera, Galdos, Clarin, and Pardo Bazan.

SPW 6278 Postwar Spanish Fiction 3 Credits
Grading Scheme: Letter Grade
Contextualized approach to representative works and significant authors of fiction published in Spain after 1939. Critical and historical readings and textual analysis.

SPW 6285 Contemporary Spanish-American Narrative I 3 Credits
Grading Scheme: Letter Grade
Textual production of the 1940s and 1950s including broader cultural characteristics of modernization, development of new narrative modes, and theories of understanding Latin America and literature of this period.

SPW 6286 Contemporary Spanish-American Narrative II 3 Credits
Grading Scheme: Letter Grade
Fiction in the 1960s and after, including the New narrative, the Boom, and the Post-Boom. Broader cultural characteristics. Theories of understanding the area and the literature of the period.

SPW 6345 Twentieth-Century Spanish Poetry 3 Credits
Grading Scheme: Letter Grade
Introduction to major poets. Topics include gender, periodization, aesthetics, historicity, and the relationship of poetry to politics. Close reading of texts in the context of contemporary literary theory.

SPW 6356 Spanish-American Poetry from Romanticism to Vanguardismo 3 Credits
Grading Scheme: Letter Grade
Major movements from the mid-19th century to the 1930s, especially from Modernismo to the present. Seminal works of poets such as Martí, Casal, Cario, Lugones, Mistral, Storni, Huidobro, and Vallejo.

SPW 6357 Contemporary Spanish-American Poetry 3 Credits
Grading Scheme: Letter Grade
Central aspects of Spanish-American poetry from Vanguardismo to the present. Organized around a specific theme, genre, country, region, theoretical problem, or subperiod.

SPW 6366 Spanish-American Essay 3 Credits
Grading Scheme: Letter Grade
Close reading and critical analysis of texts by major twentieth-century essayists. Themes include affirmation of identity, gender roles, and the definition of ethnic, racial, social, and class categories.

SPW 6545 Spanish Romanticism 3 Credits
Grading Scheme: Letter Grade
Analyzes literary works of Spanish Neoclassical and Romantic periods in light of their social, historical and ideological contexts.

SPW 6606 Cervantes 3 Credits
Grading Scheme: Letter Grade
Situates Don Quijote I, II in the cultural nexus of early modern Spain. Surveys contemporary currents in Cervantine criticism.

SPW 6729 The Generation of 1898 3 Credits
Grading Scheme: Letter Grade

SPW 6806 Introduction to Graduate Study and Research 3 Credits
Grading Scheme: Letter Grade
Tools, problems, and methods of literary research.

SPW 6902 Special Study in Spanish or Spanish-American Literature 3 Credits, Max 15 Credits
Grading Scheme: Letter Grade
Selected topic or problem (varied each semester).

SPW 6905 Individual Work 1-3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Available only by special arrangement with graduate adviser.

SPW 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research
Speech, Language and Hearing Sciences

LIN 5741 Applied English Grammar 3 Credits
Grading Scheme: Letter Grade
Survey of English grammar based on the principles of second language acquisition and social interaction, with implications for teachers.

LIN 6720 Second Language Acquisition 3 Credits
Grading Scheme: Letter Grade
Neurolinguistic, psycholinguistic, and sociolinguistic bases of second language acquisition in childhood and adulthood.

SPA 5051 Clinical Observation in Audiology 1 Credit
Grading Scheme: Letter Grade
Opportunity to observe various phases of audiological practice and to accumulate a minimum of 15 hours of observation experience.
Prerequisite: for beginning graduate students in audiology.

SPA 5102 Auditory Anatomy and Physiology 2 Credits
Grading Scheme: Letter Grade
In-depth coverage of anatomy and physiology of auditory system to support understanding of auditory function in persons with healthy auditory mechanisms and those with specific disorders.

SPA 5204 Phonological Disorders 3 Credits
Grading Scheme: Letter Grade
Advanced principles of diagnosis and remediation.

SPA 5211 Voice Disorders 3 Credits
Grading Scheme: Letter Grade
Advanced theory and techniques of diagnosis and remediation.

SPA 5225 Principles of Speech Pathology: Stuttering 3 Credits
Grading Scheme: Letter Grade
Advanced theories and techniques of diagnosis and therapy.

SPA 5254 Neurocognitive Language Disorders 3 Credits
Grading Scheme: Letter Grade
Neurocognitive deficits of language in dementia, traumatic brain injury, and right hemisphere damage.
Prerequisite: introductory neuroanatomy.

SPA 5304 Principles of Audiological Evaluation 3 Credits
Grading Scheme: Letter Grade
Advanced procedures in speech audiometry, masking, and audiogram interpretation.

SPA 5315 Peripheral and Central Auditory Disorders 2 Credits
Grading Scheme: Letter Grade
Understanding (1) anatomy and physiology of peripheral and central auditory mechanism, (2) etiology and pathology of peripheral and central hearing loss, and (3) audiological and otologic diagnosis/treatment of hearing loss.

SPA 5401 Speech Pathology Language Disorder 3 Credits
Grading Scheme: Letter Grade
Advanced theory and techniques of diagnosis and remediation of language disorders in infants and preschoolers.

SPA 6133L Hearing Aid Analysis Laboratory 1 Credit
Grading Scheme: Letter Grade
Advanced analysis and description of the electroacoustical properties of hearing aids.
Corequisite: SPA 6345.

SPA 6211 Applied Voice Disorders: Diagnosis and Treatment 3 Credits
Grading Scheme: Letter Grade
Seminar and practicum.
Prerequisite: majors only.

SPA 6233 Speech Motor Control Disorders 3 Credits
Grading Scheme: Letter Grade
Developmental and acquired neurogenic speech disorders and their associated neuropathology, etiology, characteristics, assessment practices, and treatment strategies.

SPA 6270 Auditory Processing Disorders 3 Credits
Grading Scheme: Letter Grade
Anatomy and physiology of the central auditory nervous system, and disorders of auditory processing that occur in humans. Focuses on evaluation and treatment of auditory processing disorders.
Prerequisite: SPA 5304, SPA 5102.

SPA 6305 Pediatric Audiology 3 Credits
Grading Scheme: Letter Grade
Pediatric Audiology
Prerequisite: SPA 6313.

SPA 6311 Medical Audiology 3 Credits
Grading Scheme: Letter Grade
Differential diagnosis of hearing impairment.

SPA 6316 CI Auditory Electroph 3 Credits
Grading Scheme: Letter Grade
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SPA 6317 Vestibular Disorders 2 Credits
Grading Scheme: Letter Grade
Mechanics and physiology of human balance, contribution of inner ear to balance, disorders of balance, and approaches to diagnostic assessment and rehabilitation.
Prerequisite: graduate status.

SPA 6323 Audiologic Rehabilitation for Adults 2 Credits
Grading Scheme: Letter Grade
Explores theoretical and clinical literature. Describes assessment and management strategies.

SPA 6324 Audiologic Rehabilitation for Children 2 Credits
Grading Scheme: Letter Grade
Explores theoretical and clinical literature. Assessment and therapy techniques for children.

SPA 6340 Amplification I 2 Credits
Grading Scheme: Letter Grade
Theoretical and applied understanding of current technology in amplification systems for the hearing impaired. Seminar format (2/3) and clinical laboratory activities (1/3).

SPA 6341 Amplification II 2 Credits
Grading Scheme: Letter Grade
Digital and programmable technology in hearing aids.
Prerequisite: SPA 6340.

SPA 6390 Proseminar: Speech-Language Pathology and Audiology 3 Credits
Grading Scheme: Letter Grade
Current professional issues including federal and state regulations, audiologic jurisprudence, audiological management, and interfacing with other professionals.

SPA 6410 Adult Language Disorders 3 Credits
Grading Scheme: Letter Grade

SPA 6416 Applied Neurogenic Disorders: Diagnosis and Treatment 3 Credits
Grading Scheme: Letter Grade
Seminar and practicum.
Prerequisite: majors only.

SPA 6430 Applied Developmental Disorders: Diagnosis and Treatment in Speech and Language 3 Credits
Grading Scheme: Letter Grade
Seminar and practicum.
Prerequisite: majors only.

SPA 6506 Clinical Clerkship in Audiology 1 Credit, Max 3 Credits
Grading Scheme: Letter Grade
Beginning-level audiologic practicum.

SPA 6524 Practicum in Speech-Language Therapy: UFSHC 1-6 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Practicum in Speech-Language Therapy: UFSHC

SPA 6531 Clinical Practice in Hearing Assessment 1-6 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Clinical Practice in Hearing Assessment

SPA 6564 Communication and Aging 3 Credits
Grading Scheme: Letter Grade
Characteristics of, and management approaches for, communication disorders found with some frequency in the elderly. Focuses on enhancing communication.

SPA 6581 Special Clinical 1-9 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Advanced study in specific areas of clinical process.

SPA 6805 Introduction to Graduate Research 3 Credits
Grading Scheme: Letter Grade
Introduction to Graduate Research
Prerequisite: required of all graduate students specializing in speech-language pathology or audiology.

SPA 6905 Individual Study 1-3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Supervised study of specialized topic or research project.
Prerequisite: consent of instructor.

SPA 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research
Prerequisite: SPA 6805, and consent of instructor.

SPA 6930 Proseminar in Speech-Language Pathology and Audiology 1 Credit, Max 6 Credits
Grading Scheme: S/U
Faculty and graduate student research in speech-language pathology, audiology, and related disciplines.

SPA 6935 Applied Reading Disabilities: Diagnosis and Treatment 3 Credits
Grading Scheme: Letter Grade
Seminar and practicum in diagnosis and treatment of developmental reading disabilities.
Prerequisite: majors only.

SPA 6936 Special Topics 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Theory and research in communication.
Prerequisite: consent of instructor.

SPA 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

SPA 6942 Externship in Speech-Language Pathology 7-12 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Full-time supervised clinical experience in speech-language pathology. Students provide diagnostic and therapeutic services in clinical setting.

SPA 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

SPA 7306 Audiologic Assessment in a Medical Setting 5 Credits
Grading Scheme: Letter Grade
Audiologic and medically related aspects of hearing disorders.
Prerequisite: open only to students in the distance learning Au.D. program.
SPA 7318 Clinical Auditory Electrophysiology 5 Credits
Grading Scheme: Letter Grade
Understanding clinical auditory physiological measures, including auditory-evoked and event-related potentials, otoacoustic emissions, and common clinical protocols applied to auditory disorders.
Prerequisite: open only to students in the distance learning Au.D. program.

SPA 7319 Balance Disorders: Evaluation and Treatment 5 Credits
Grading Scheme: Letter Grade
Understanding how humans maintain balance, the contribution of the inner ear to balance, disorders of balance, and approaches to rehabilitation of these disorders.
Prerequisite: open only to students in the distance learning Au.D. program.

SPA 7325 Audiologic Rehabilitation 5 Credits
Grading Scheme: Letter Grade
State-of-the-art information on current philosophies and practice patterns for audiology habilitation and rehabilitation.
Prerequisite: open to students in the distance learning Au.D. program.

SPA 7343 Cochlear Implants and Assistive Devices 5 Credits
Grading Scheme: Letter Grade
Fitting practices and future directions.
Prerequisite: open only to students in the distance learning Au.D. program.

SPA 7348 Principles of Amplification 5 Credits
Grading Scheme: Letter Grade
Recent information regarding amplification systems.
Prerequisite: open only to students in the distance learning Au.D. program.

SPA 7353 Environmental Hearing Conservation 5 Credits
Grading Scheme: Letter Grade
Recent information regarding the causes of hearing loss, prevention strategies, and basic mechanisms underlying noise-induced hearing loss.
Prerequisite: open only to students in the distance learning Au.D. program.

SPA 7354 Seminar in Audiology: Hearing Conservation and Noise Control 3 Credits
Grading Scheme: Letter Grade
Seminar in Audiology: Hearing Conservation and Noise Control

SPA 7391 Business and Professional Issues in Audiology 5 Credits
Grading Scheme: Letter Grade
Overview of the healthcare system, the place of audiology in the system, current issues facing the profession, ethics of audiologic practice, providing reimbursement for services, and personnel management.
Prerequisite: open only to students in the distance learning Au.D. program.

SPA 7500 Public School Practicum 1-3 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Experience in partial fulfillment of department's clinical requirements.
Prerequisite: majority of preprofessional courses.

SPA 7523 Practicum in Speech Pathology in a Medical/Dental Setting 1-6 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Practicum in Speech Pathology in a Medical/Dental Setting
Prerequisite: SPA 6521, SPA 6524, and consent of department.

SPA 7540 Diagnosis and Treatment of Language and Language-Based Literacy Disorders 3 Credits
Grading Scheme: Letter Grade
Clinical aspects of intervention for children and adults who have language disabilities, focusing on identification, diagnosis, and treatment of emergent literacy and language disorders.
Prerequisite: graduate-level reading course.

SPA 7566 Counseling Individuals with Hearing Losses 5 Credits
Grading Scheme: Letter Grade
Recent information about counseling.
Prerequisite: open only to students in the distance learning Au.D. program.

SPA 7833 Audiology Research Project 3-6 Credits, Max 6 Credits
Grading Scheme: S/U
Audiology Research Project

SPA 7945 Graduate Practicum in Audiology 3-6 Credits, Max 15 Credits
Grading Scheme: Letter Grade

SPA 7958 Clinical Externship 3-12 Credits, Max 36 Credits
Grading Scheme: Letter Grade
Clinical Externship
Prerequisite: 12 hours of SPA 7945.

SPA 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

SPA 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

Statistics

STA 5223 Applied Sample Survey Methods 3 Credits
Grading Scheme: Letter Grade
Designing and analyzing sample surveys. Sources of error. Questionnaire design. Simple random, stratified, systematic, and cluster sampling. Practical application of concepts.
Prerequisite: STA 2023, 4322, STA 6126, or STA 6166.

STA 5325 Fundamentals of Probability 3 Credits
Grading Scheme: Letter Grade
Topics in probability and statistics, particularly discrete and continuous random variables, sampling distributions, estimation, and hypothesis testing. Applications to engineering and natural science.
Prerequisite: grade of C or better in MAC 2313 and STA 3032 or equivalent.

STA 5328 Fundamentals of Statistical Theory 3 Credits
Grading Scheme: Letter Grade
Direct continuation of STA 4321/STA 5325. Basic material for distribution theory, sampling distributions, properties of estimators, hypothesis testing, linear regression analysis, and analysis of variance. A good knowledge of calculus is helpful.
Prerequisite: STA 4321 or equivalent.
STA 5503 Categorical Data Methods 3 Credits
Grading Scheme: Letter Grade
Description and inference using proportions and odds ratios, multi-way contingency tables, logistic regression and other generalized linear models, and loglinear models applications.
Prerequisite: STA 3024, 3032, 4210, 4322, STA 6127, or STA 6167. Intended for graduate students not majoring in statistics.

STA 5507 Applied Nonparametric Methods 3 Credits
Grading Scheme: Letter Grade
Introduction to nonparametric statistics. Includes one- and two-sample testing and estimation methods, one- and two-way layout models, and correlation and regression models.
Prerequisite: STA 2023, 3032, 4210, 4322, STA 6126, STA 6166. Intended for graduate students not majoring in statistics.

STA 5701 Applied Multivariate Methods 3 Credits
Grading Scheme: Letter Grade
Review of matrix theory, univariate normal, t, chi-squared and F distributions, and multivariate normal distributions. Inference about multivariate means, Hotelling’s T2 multivariate analysis of variance, multivariate regression, and multivariate repeated measures. Inference about covariance structure, principal components, factor analysis, and canonical correlation. Multivariate classification techniques, discriminant and cluster analysis. Additional topics at the discretion of the instructor, time permitting.
Prerequisite: STA 3024, STA 6127, STA 6167, or 4211. Intended for graduate students not majoring in statistics.

STA 5856 Applied Time Series Methods 3 Credits
Grading Scheme: Letter Grade
Stationarity, autocorrelation, ARMA models, non-stationary processes, ARIMA models, regression with ARMA errors, model-based forecasting, forecasting algorithms.
Corequisite: STA 4322 or STA 5328.

STA 6092 Applied Statistical Practice 3 Credits
Grading Scheme: Letter Grade
Communication, management, and the organizational, computational, and statistical thinking skills needed for consulting in statistics. Integrating graphic and numeric computing tools, research design concepts, data summary, and statistical inference methods.
Prerequisite: STA 6208

STA 6126 Statistical Methods in Social Research I 3 Credits
Grading Scheme: Letter Grade
Descriptive statistics, estimation, significance tests, two-sample comparisons, methods for nominal and ordinal data, regression and correlation, introduction to multiple regression.

STA 6127 Statistical Methods in Social Research II 3 Credits
Grading Scheme: Letter Grade
Further topics in multiple regression, model building, analysis of variance, analysis of covariance, multivariate analysis of categorical data.
Prerequisite: STA 6126.

STA 6166 Statistical Methods in Research I 3 Credits
Grading Scheme: Letter Grade
Statistical methods based on t, F, and Chi2 tests. Analysis of variance for basic experimental designs. Factorial experiments. Regression analysis and analysis of covariance.
Prerequisite: STA 2023 or equivalent.

STA 6167 Statistical Methods in Research II 3 Credits
Grading Scheme: Letter Grade
Analysis of covariance and general linear model. Factorial, nested, split-plot, and incomplete block designs. Analysis of count data.
Prerequisite: STA 6166.

STA 6177 Applied Survival Analysis 3 Credits
Grading Scheme: Letter Grade
Focusing on survival analysis, Kaplan-Meier estimates, proportional hazards model, related tests, phase I, II, and III clinical trials, designs and protocols.
Prerequisite: STA 6327

STA 6207 Regression Analysis 3 Credits
Grading Scheme: Letter Grade
Focusing on simple linear regression; multiple regression; model selection residual analysis; influence diagnostics’ multicollinearity; anova and regression; generalized linear models; nonlinear regression.
Prerequisite: STA 4322

STA 6208 Basic Design and Analysis of Experiments 3 Credits
Grading Scheme: Letter Grade
Focusing on the principles of experimental design, completely randomized design (analysis, contrasts, diagnostics), random effects models, factorial experiments (fixed, random, and mixed effect), block designs, Latin squares, split plots, and full and fractional factorial experiments.
Prerequisite: STA 6207

STA 6246 Theory of Linear Models 3 Credits
Grading Scheme: Letter Grade
Theory of Linear Models
Prerequisite: STA 6208, STA 6327, STA 6329.

STA 6326 Introduction to Theoretical Statistics I 3 Credits
Grading Scheme: Letter Grade
Prerequisite: MAC 2313.

STA 6327 Introduction to Theoretical Statistics II 3 Credits
Grading Scheme: Letter Grade
Estimation and hypothesis testing. Sufficiency, information, estimation, maximum likelihood, confidence intervals, uniformly most powerful tests, likelihood ratio tests, sequential testing, univariate normal inference, decision theory, analysis of categorical data.
Prerequisite: STA 6326.

STA 6329 Matrix Algebra and Statistical Computing 3 Credits
Grading Scheme: Letter Grade
Basic theory of determinants, inverses and generalized inverses, eigenvalues and eigenvectors; applications of partitioned matrices; diagonalization and decomposition theorems; applications in least squares.
Prerequisite: MAC 3313.

STA 6505 Analysis of Categorical Data 3 Credits
Grading Scheme: Letter Grade
Prerequisite: STA 6327 and STA 6208 or consent of instructor.
STA 6707 Analysis of Multivariate Data 3 Credits
Grading Scheme: Letter Grade
Techniques for analyzing multivariate data. Emphasis on MANOVA and tests on the structure of the dispersion matrix. Topics will include discriminant, factor, profile, and cluster analyses.
Prerequisite: STA 6208 and facility in a computer language.

STA 6866 Monte Carlo Statistical Methods 3 Credits
Grading Scheme: Letter Grade
Introduction to Monte Carlo statistics.
Prerequisite: STA 6327 and STA 6208, or consent of instructor.

STA 6905 Individual Work 1-5 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Special topics designed to meet the needs and interests of individual students.
Prerequisite: departmental approval.

STA 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

STA 6934 Special Topics in Statistics 1-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Special Topics in Statistics
Prerequisite: permission of graduate adviser.

STA 6938 Seminar 1 Credit, Max 15 Credits
Grading Scheme: S/U
Special topics of an advanced nature suitable for seminar treatment but not given in regular courses.
Prerequisite: departmental approval.

STA 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

STA 6942 Internship 1-3 Credits, Max 3 Credits
Grading Scheme: S/U
Supervised statistical consulting involving planning and/or analyzing research data. Whenever possible, student meets with researcher. Supervision by faculty member or delegated authority and post-internship report.
Prerequisite: STA 6208 or equivalent and consent of graduate coordinator.

STA 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

STA 7179 Survival Analysis 3 Credits
Grading Scheme: Letter Grade
Theoretical introduction to statistical inferential procedures useful for analyzing randomly right censored failure time data.
Prerequisite: STA 6177.

STA 7249 Generalized Linear Models 3 Credits
Grading Scheme: Letter Grade
Fitting of generalized linear models, diagnostics, asymptotic theory, overdispersion, estimating equations, mixed models, generalized additive models, smoothing.
Prerequisite: STA 6208, 6208, STA 6327, STA 6246.

STA 7334 Limit Theory 3 Credits
Grading Scheme: Letter Grade
Prerequisite: STA 6467.

STA 7346 Statistical Inference 3 Credits
Grading Scheme: Letter Grade
Decision rules and risk functions. Sufficiency, Minimax, and Bayes rules for estimating location and scale parameters.
Prerequisite: STA 6327.

STA 7347 Advanced Inference 3 Credits
Grading Scheme: Letter Grade
Bayesian statistical inference. Inference using large samples. Relative efficiencies of tests and estimates with special reference to Pitman and Bahadur efficiencies.
Prerequisite: STA 7346.

STA 7348 Bayesian Theory 3 Credits
Grading Scheme: Letter Grade
Theory underlying the Bayesian paradigm. Issues related to selection of priors, Bayesian inference, both exact and asymptotic, Bayesian model selection, high-dimensional problems; and Bayesian robustness.
Prerequisite: STA 7346

STA 7466 Probability Theory I 3 Credits
Grading Scheme: Letter Grade
Prerequisite: MAA 5228, MAA 6236, or equivalent.

STA 7467 Probability Theory II 3 Credits
Grading Scheme: Letter Grade
Prerequisite: STA 7466

STA 7828 Topics in Stochastic Processes 3 Credits
Grading Scheme: Letter Grade
Branching processes, Brownian motion, continuous state space Markov chains, diffusion processes, Markov chain Monte Carlo, martingales, point processes, renewal processes, stationary processes, stochastic calculus, stochastic differential equations.
Prerequisite: STA 6466 and STA 6467.

STA 7934 Special Topics in Statistics 1-9 Credits, Max 15 Credits
Grading Scheme: Letter Grade
Possible Topics: Smoothing Methods, Analysis of Longitudinal Data, Data Mining and Statistical Learning, Mixed Models, Theory and Methods, Resampling Methods, Functional Data Analysis.
Prerequisite: Permission of Graduate Coordinator.
STA 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

STA 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation

Theatre And Dance

DAA 6757 Pilates Technique for the Dancer 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Systematic achievement of strength, tone, flexibility, and posture for optimal physical performance in dance.
Prerequisite: consent of instructor.

DAA 6905 Graduate Dance Project 1-3 Credits
Grading Scheme: Letter Grade
Dance to enhance and develop skills in a specific style of dance or movement study.

DAN 6436 Laban Movement Analysis 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Experiential examination of movement from the integrated theoretical framework of body, effort, shape, and space.
Prerequisite: consent of instructor.

DAN 6949 Dance Clinical Practice 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Clinical experience in using movement to enhance healing in a hospital or community setting. Student works through Shands Arts in Medicine or a comparable program, in individually contracted situations.
Prerequisite: DAN 3775 and consent of instructor.

THE 5287 History of Decor and Architecture for the Stage 3 Credits
Grading Scheme: Letter Grade
Architecture and decor from prehistory to the 19th century as they reflect time and spirit in preparation for play production.

THE 6265 Costume History 3 Credits
Grading Scheme: Letter Grade
Examines the history of fashion and costume, and its relation to the general intellectual, moral, and cultural climate of an era; and how the theatrical designer applies this analysis.
Prerequisite: admission to MFA.

THE 6525 History, Literature, and Criticism I 3 Credits
Grading Scheme: Letter Grade
Readings and discussions of Western and Japanese dramatic literature and criticism from their beginnings to the 18th century.

THE 6526 History, Literature, and Criticism II 3 Credits
Grading Scheme: Letter Grade
Discussions of dramatic literature, performance theory, and stage practice from the 19th century to the modern and postmodern of Western, Indian, Chinese, and African cultures.

THE 6565 Seminar in Creative Process 3 Credits
Grading Scheme: Letter Grade
Specialists in all areas of theatre explore the similarities in their creative thinking and methods.

THE 6905 Individual Study 1-9 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Reading, research, or performance project.
Prerequisite: consent of instructor.

THE 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

THE 6941 Internship 1-9 Credits, Max 9 Credits
Grading Scheme: S/U
Practical experience in residence with a professional theatre or equivalent.

THE 6948 Arts and Public Health Practicum 3 Credits
Grading Scheme: Letter Grade
Engages the student in focused professional-level practice using arts strategies for promoting public health. The student will undertake 130 hours of work over 16 weeks, including project planning, implementation, and evaluation, in an approved healthcare or community program setting.
Prerequisite: HUM 5357 and HUM 5595

THE 6950 Applied Theatre 1-3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Specialized practical experience achieved through participation in realized productions.

THE 6955 Summer Repertory Theatre 3-9 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Practical experience in repertory theatre, directly applying skills in all areas of theatre production.
Prerequisite: consent of instructor.

THE 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

THE 6973C Project in Lieu of Thesis 1-9 Credits
Grading Scheme: S/U
Creative project in lieu of traditional written thesis.
Prerequisite: admission to candidacy.

TPA 5025 Lighting Design I 3 Credits
Grading Scheme: Letter Grade
Advanced applications. In-depth practice of design concept formulation, use of advanced equipment, and complex scenographic documentation. Introduction to CAD for the lighting designer.
Prerequisite: admission to MFA or consent of instructor.

TPA 5047 Costume Design I 3 Credits
Grading Scheme: Letter Grade
Emphasizes character and play analysis for the costume designer.
Prerequisite: admission to MFA. Development of skills required for costume design.

TPA 5066 Lighting Design II 3 Credits
Grading Scheme: Letter Grade
Study and practice of the scenic design process. Developing scenic design techniques for theatre and dance. Emphasizes script analysis for the scenic designer.
Prerequisite: TPA 4066; admission to MFA or consent of instructor.

TPA 5079 Graduate Scene Painting 3 Credits
Grading Scheme: Letter Grade
Advanced techniques in scene painting. Developing textural illusion, and enhancing volume through light and shadow.
Prerequisite: TPA 2075 or admission to MFA.
TPA 5082 Advanced Theatre Graphics 3 Credits
Grading Scheme: Letter Grade
Rendering for theatrical design. Traditional techniques, computer aided applications, and model building.
Prerequisite: TPA 4066; admission to MFA.

TPA 5236 Costume Technologies Workshop 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Costume crafts work through realized projects. Possible topics: millinery, stage jewelry, masks, prosthetics, wigs, puppetry, footwear, and dyeing.
Prerequisite: consent of instructor.

TPA 6009 Design Studio 3 Credits
Grading Scheme: Letter Grade
Investigation of design theory, research, concept, and presentation used in production of theatre and dance.
Prerequisite: admission to MFA.

TPA 6019 Prof Sem Design 3 Credits
Grading Scheme: Letter Grade
Prof Sem Design

TPA 6026 Lighting Design II 3 Credits
Grading Scheme: Letter Grade
In-depth study of processes. Refinement of aesthetic concept, complex productions, state-of-the-art technologies, CAD applications, and lighting for built environment.
Prerequisite: TPA 5025.

TPA 6048 Costume Design II 3 Credits
Grading Scheme: Letter Grade
Advanced study. Specialized costume design problems for individual projects.
Prerequisite: TPA 5047.

TPA 6054 Detail Design for Costume Designers 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Intensive study and practical application of designing specific motifs and accessories for costumes.
Prerequisite: TPA 6048 or consent of instructor.

TPA 6069 Scene Design II 3 Credits
Grading Scheme: Letter Grade
Design work in a variety of genres. Complex multi-set productions.
Prerequisite: TPA 5067 or admission to MFA.

TPA 6235 Costume Construction 3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Detailed study of patterning and construction techniques used in men's and women's dress. Extensive hands-on work with contemporary and historical garments.
Prerequisite: consent of instructor.

TPA 6237 Pattern Making: Flat Patternmaking 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Using flat pattern techniques to create garments. Emphasizes period details.
Prerequisite: consent of instructor.

TPA 6243 Pattern Making: Draping 3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Advanced study of draping methods of costume creation. Extensive hands-on work using the sculptural qualities of fabric and clothing.
Prerequisite: consent of instructor.

TPA 6258 Computer Drafting 2D 3 Credits
Grading Scheme: Letter Grade
Study of computer aided drafting for the theatrical designer. Emphasizes techniques for the scenic and lighting designer.
Prerequisite: admission to MFA.

TPA 6357 Programming and Presentation for the Lighting Designer 3 Credits
Grading Scheme: Letter Grade
Intensive use of high-end software for programming and presenting lighting design concepts, for the advanced designer.
Prerequisite: TPA 5025, TPA 6026.

TPP 6115 Graduate Acting I: Modern Acting Theory and Practice 2-3 Credits
Grading Scheme: Letter Grade
Diagnosis of analytical and technical skills of acting through exploration of psychological realism through the use of psycho-physical exercises.

TPP 6116 Graduate Acting II: Shakespeare and High Style 2-3 Credits
Grading Scheme: Letter Grade
Analytical, research and technical skills needed to perform plays written in "high verse" with particular focus on the plays of Shakespeare. Students will be directed in the formalist approach to classical performance style. The approach is designed to enhance each student's awareness, development, and capability for heightened performance requirements.

TPP 6145 Graduate Acting III: Period Styles 2-3 Credits
Grading Scheme: Letter Grade
The stylistic techniques, analysis, and performance of plays from ancient Greek to the early twentieth-century. The course is designed to enhance the imaginative artistry of the student and to develop awareness and capabilities for heightened performance techniques.

TPP 6149 Acting IV: Contemporary Realism 2-3 Credits
Grading Scheme: Letter Grade
Investigating the fundamental principles of acting technique. Over a series of progressive exercises, students continue to discover an effective, dependable, repeatable set of working tools for the actor, derived from the teachings of contemporary acting theorists, to enhance their sense of purposefulness, immediacy and truthfulness in their performance work.

TPP 6237 MFA Company Acting Workshop 1-6 Credits, Max 24 Credits
Grading Scheme: Letter Grade
Student actors study, experiment, and produce in a laboratory emphasizing specialized skills and methods; and nonrealistic and period genres.

TPP 6266 Acting for the Camera 2-3 Credits
Grading Scheme: Letter Grade
Investigating acting technique relative to the specific constraints and demands of the film/television medium. In addition, the class helps to prepare the actor to procure work in the industry through discussions of and explorations focused on the business aspects of being a professional actor.
Prerequisite: Admission to the MFA Acting program Acting I, Acting II, Acting III, Acting IV
TPP 6285 Voice and Movement I 2-3 Credits
Grading Scheme: Letter Grade
Vocal skills, emphasizing versatility, production, power, and strength.

TPP 6286 MFA Voice and Speech II: Shakespeare and High Styles 2-3 Credits
Grading Scheme: Letter Grade
Vocal skills unique to the execution of nontraditional and period roles. Continued development of a virtuoso vocal instrument through exploration and experimentation with consonant, structural, and tonal energy. A coherent approach to voice, speech, text, and actor preparation. Emphasis on Verse Drama and Heightened Style.
Prerequisite: TPP 6116

TPP 6297 The Alexander Technique I 2 Credits
Grading Scheme: Letter Grade
Introducing fundamental principles of the Alexander Technique (AT); a mind-body approach to the use of self as applied to acting.
Prerequisite: Admission to the MFA Acting program.

TPP 6298 The Alexander Technique II 2 Credits
Grading Scheme: Letter Grade
Investigating the fundamental principles of the Alexander Technique (AT) introduced in Alexander Technique I. The course includes basic anatomy, developmental movement, breathing and relaxation techniques, and presentations.
Prerequisite: Admission to the MFA Acting program and TPP 6297.

TPP 6299 The Alexander Technique III 2 Credits
Grading Scheme: Letter Grade
Providing the opportunity to revisit the Alexander Technique principles in greater depth with an emphasis on applying those AT principles to acting challenges arising in the students’ thesis production. This course provides experimental integration of the AT principles with selected acting techniques, and voice and movement techniques with specific consideration to their thesis roles. This graduate level course is designed for 3rd year MFA candidate.
Prerequisite: Admission to the MFA Acting program, TPP 6297, TPP 6298

TPP 6385 Directing 3 Credits
Grading Scheme: Letter Grade
Explores the philosophy and psychology of directing and the director. Applied to scene study.

TPP 6515 Graduate Movement Training 2-3 Credits
Grading Scheme: Letter Grade
Helping the actor move freely and explore characterization through movement. This course introduces students to Period Styles and Social Deportment in order to develop awareness and capabilities for heightened performance tech.
Prerequisite: Admission to the MFA Acting program, TPP 6115 : Graduate Acting I: Modern Acting Theory and Practice

TPP 6536 Graduate Stage Combat 2-3 Credits
Grading Scheme: Letter Grade
Instruction in standard stage combat techniques of Unarmed and Rapier Dagger. Safety is emphasized in the creation of the illusion of armed and unarmed violence.
Prerequisite: Admission to the MFA Acting program

TPP 6717 MFA Voice and Speech III: Period Styles 2-3 Credits
Grading Scheme: Letter Grade
Emphasizing specialized voice and speech skills and methods of specific to the style of dramatic literature from ancient Greek to the early twentieth-century.
Prerequisite: Admission to the MFA Acting program

TPP 6718 MFA Voice and Speech IV: Advanced Vocal Training for the Actor 2-3 Credits
Grading Scheme: Letter Grade
Graduate Voice and Speech course emphasizing specialized skills and methods specific to modern and contemporary plays, film and television, and voice-over.
Prerequisite: Admission to the MFA Acting program

TPP 6946 Performance Practicum 3 Credits
Grading Scheme: Letter Grade
Training in specialized areas of performance.

Tourism, Recreation and Sport Management

Urban and Regional Planning

URP 6042 Urban Economy 3 Credits
Grading Scheme: Letter Grade
Principles of urban systems, including analytical techniques such as economic base analysis.

URP 6061 Planning Administration and Ethics 3 Credits
Grading Scheme: Letter Grade
Administration and management of public and private planning offices; ethics of planning profession.

URP 6100 Planning Theory and History 3 Credits
Grading Scheme: Letter Grade
History of planning and the associated development of theory. Synoptic versus disjointed incrementalism and the political setting for comprehensive planning are emphasized.

URP 6131 Land Use Planning Law 3 Credits
Grading Scheme: Letter Grade
Introduction to regulatory and nonregulatory techniques of plan implementation. Relationship of law and politics to the planning process. Police power as the basis for regulation. Mandatory planning and status of adopted comprehensive plans.

URP 6132 Growth Management Seminar 3 Credits
Grading Scheme: Letter Grade
Introducing students with an interest in land use planning to the evolution of growth management planning law in Florida.
Prerequisite: URP 6131.

URP 6203 Planning Research Design 1-3 Credits, Max 3 Credits
Grading Scheme: Letter Grade
Emphasizes research design, and literature research; student presentations at appropriate stages in thesis work.

URP 6231 Quantitative Data Analysis for Planners 3 Credits
Grading Scheme: Letter Grade
Planning problem formulation, quantitative research skills, and data gathering techniques. Statistical analysis and emphasis on computer applications.

URP 6270 Introduction to Planning Information Systems 3 Credits
Grading Scheme: Letter Grade
Introduction to concepts, theories, and practice of the use of Geographic Information Systems as applied to urban and regional planning issues.
URP 6271 Automation for Geospatial Modeling and Analysis 3 Credits  
**Grading Scheme:** Letter Grade  
Covers methods and techniques for automating geospatial modeling and analysis for urban planning by using visual models, computer programming, and custom-built applications and tools that utilize Geographic Information Systems (GIS) technology in the context of planning information systems.

URP 6272 Urban Spatial Analysis 3 Credits  
**Grading Scheme:** Letter Grade  
Theoretical and practical knowledge about spatial relationships as applied to urban form and the development and analysis of urban environments using geographic information systems and spatial analysis techniques such as spatial statistical modeling.  
**Prerequisite:** URP6270 or consent of the instructor.

URP 6274 GPS for Planners: Introduction to Global Positioning System 1 Credit  
**Grading Scheme:** Letter Grade  
Basics of digital field collection using GPS. GPS applications, components, concepts, mission planning, data collection in field, navigation, real-time and postprocessing correction using base station data, and exporting GPS to GIS.

URP 6275 Intermediate Planning Information Systems 3 Credits  
**Grading Scheme:** Letter Grade  
Advances technical skills and theoretical/conceptual skills to allow students to solve intermediate spatial problems using geographic information systems. Students will learn intermediate concepts and skills for data management, editing, analysis, and automation.  
**Prerequisite:** URP6270 or consent of the instructor.

URP 6276 Internet Geographic Information Systems 3 Credits  
**Grading Scheme:** Letter Grade  
Examines the theoretic and technological background in the emerging technologies in web-based geographic information systems (GIS).  
**Prerequisite:** URP 6270

URP 6277 Land Use Visioning and Analysis 3 Credits  
**Grading Scheme:** Letter Grade  
Fundamental data analysis techniques and GIS skills necessary for land use analysis and visioning.  
**Prerequisite:** URP 6270 or consent of instructor.

URP 6278 Web Mapping and Visualization 3 Credits  
**Grading Scheme:** Letter Grade  
Utilization of web mapping for communication and visualization of geographic data. Includes fundamentals of web GIS, web mapping formats, and spatial architecture, and technical skills for symbolizing data, publishing maps on the web, and creating web mashups.  
**Prerequisite:** Satisfactory completion (B or higher) of URP 6270, Introduction to Planning Information Systems

URP 6280 3D Geospatial Modeling and Visualization 3 Credits  
**Grading Scheme:** Letter Grade  
Covers methods and techniques for modeling and visualization of physical urban environments in three and four dimensions to help understand, simulate, evaluate, and communicate graphically concepts and ideas about planning and design of built environment. Software used in the course include GIS, 3D modeling, visualization, rendering, parametric modeling.

URP 6341 Urban Planning Project 1-12 Credits, Max 12 Credits  
**Grading Scheme:** Letter Grade  
Projects encompass city wide comprehensive planning examining the interaction of urban and social systems cast in scenarios of future growth and development.

URP 6409 Sustainable Community Development 3 Credits  
**Grading Scheme:** Letter Grade  
Explores the range of planning and development processes associated with creating sustainable communities ranging in scale from individual buildings, to collections of buildings and spaces within neighborhoods or larger collections of neighborhoods, as well as planning at the city and regional scale.

URP 6421 Environmental Land Use Planning and Management 3 Credits  
**Grading Scheme:** Letter Grade  
Introduction to the types of environmental impacts associated with land development and the connection between land use planning, the environmental regulation of land, and environmental assessment and analysis in the United States and internationally, with a special focus on Florida.

URP 6424 Sustainable Urbanism in the Americas 3 Credits  
**Grading Scheme:** Letter Grade  
An examination of sustainable patterns of growth in several urban environments in the Americas, within the context of specific cities and metropolitan regions. Urban management practices, particularly those related to urban lifestyles and consumption patterns are covered.  
**Prerequisite:** URP 6100 pr permission of the instructor.

URP 6428 Advanced Environmental Planning 3 Credits  
**Grading Scheme:** Letter Grade  
The course will examine cutting edge environmental planning theory and practice that aims to collectively manage linked social and ecological systems that are important, complex, and adaptive.  
**Prerequisite:** URP 6421 or URP 6429 or consent of instructor.

URP 6429 Natural Resources Planning and Management 3 Credits  
**Grading Scheme:** Letter Grade  
Natural resources planning, management principles, practices of natural resources, ecosystem, restoration planning, and management at local and regional levels

URP 6445 Planning for Climate Change 3 Credits  
**Grading Scheme:** Letter Grade  
Overviewing the relationship between human activities and climate change and what can planning do to mitigate and adapt to climate change, including the science and scenarios of climate change, impacts on the built and natural environment, the mitigation measures, and adaptive planning approaches to build resilient communities.

URP 6526 Health and the Built Environment 3 Credits  
**Grading Scheme:** Letter Grade  
Using connections between urban planning and public health using an environmental health framework on a global, regional, and local scale. Historical connections and emerging issues, such as obesity and physical activity, sustainability, and environmental justice, climate change, social equality, children's health, and the role of land use, environmental and other planning decisions.  
**Prerequisite:** None.

URP 6541 Economic Development Planning 3 Credits  
**Grading Scheme:** Letter Grade  
Major international and national economic development theory, issues and trends as they affect local economic development planning, methods, and practice.
URP 6542 Urban Land Economics 3 Credits
Grading Scheme: Letter Grade
Review of land economics within the context of urban and regional planning.

URP 6603 Development Review 3 Credits
Grading Scheme: Letter Grade
Seminar on practice of local government planning with emphasis on development review and land development regulation.

URP 6610 International Development Planning 3 Credits
Grading Scheme: Letter Grade
Critical examination of institutions that play a role in development issues in poorer nations within the context of international development strategies, exposing students to dominant strategies and emerging perspectives on international development.

URP 6711 Transportation and Land Use Coordination 3 Credits
Grading Scheme: Letter Grade
Explores the connection between land use and transportation by considering how four major sets of actors shape the urban environment: individuals, businesses, the professions and governments.
Prerequisite: URP 6716; URP 6131;
Corequisite: URP 6716

URP 6716 Transportation Policy and Planning 3 Credits
Grading Scheme: Letter Grade
Introduction to transportation policy planning in urban context.
Transportation policy instruments and policy-making processes, critical issues in transportation policy, history of policy in U.S. at federal, state, and local levels.

URP 6743 Affordable Housing Law 3 Credits
Grading Scheme: Letter Grade
Broad understanding of the affordable housing crisis and the federal, state, and local regulatory schemes employed to correct this deficiency, as well as the legal battles which have served as the basis for such regulations or the challenge thereof. Enhancement of legal drafting skills through the preparation of research memoranda and comprehensive planning language.

URP 6745 Housing, Public Policy, and Planning 3 Credits
Grading Scheme: Letter Grade
Supply, demand, and market relationships. History of government housing policy. Exploration of relationship between housing policy and urban and regional planning.

URP 6821 Transportation and Land-Use Modeling 3 Credits
Grading Scheme: Letter Grade
The planning process, modeling and applications for passenger transportation and land-use development of metropolitan areas with respect paid to its contribution to transportation project and policy analysis.

URP 6855 Urban Form in Cities throughout the Americas 3 Credits
Grading Scheme: Letter Grade
Urban form and development theories and how planning interfaces with developmental trends in North, Central, and South America.

URP 6871 Planning and Design I 3 Credits
Grading Scheme: Letter Grade
Lectures, readings, and exercises in planning research and design methods. Emphasis on design graphics and other means of communication.

URP 6872 Planning and Design II 3 Credits
Grading Scheme: Letter Grade
Focus on alternative roles and potential contributions from both private and public sector participants, case studies and exercises in formulation of urban design plans for private and public sectors.
Prerequisite: URP 6871

URP 6880 Defensible Space and CPTED in Urban Design 3 Credits
Grading Scheme: Letter Grade
Introduction to crime prevention through environmental design (CPTED) and defensible space in urban planning design.

URP 6887 Advanced Defensible Space in Urban Design 3 Credits
Grading Scheme: Letter Grade
Advanced analysis of Defensible Space, CPTED, and other place-based crime prevention planning theories and practices in distressed communities.
Prerequisite: URP 6880/4882

URP 6905 Exploration and Directed Study 1-4 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Exploration and Directed Study

URP 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

URP 6920 Colloquium 1 Credit
Grading Scheme: S/U
Introduction to the field; historical and philosophical concepts, processes, and issues related to the profession of planning. For entering MAURP students.

URP 6931 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

URP 6941 Urban Planning Internship 1-3 Credits, Max 3 Credits
Grading Scheme: S/U
Off-campus internship experience.

URP 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

URP 6979 Master's Research Project 1-6 Credits, Max 6 Credits
Grading Scheme: S/U
This option, in lieu of thesis, accommodates a physical design, geospatial analysis, or other community-based planning project that because of its maps, graphic content, or subject does not fit comfortably within a thesis format.

Wildlife Ecology and Conservation

WIS 5496 Research Design in Wildlife Ecology 3 Credits
Grading Scheme: Letter Grade
Scientific philosophy and logic of modern ecological approaches, and practical research design as applied to wildlife field ecology. Offered fall term.
Prerequisite: STA 2023 or equivalent; upper-division course in ecology.

WIS 5555C Conservation Biology 3 Credits
Grading Scheme: Letter Grade
Application of biological and resource management theory to the problem of the conservation of natural communities. Offered fall term.
Prerequisite: basic courses in ecology, genetics.
WIS 5562 Conservation Medicine 3 Credits
Grading Scheme: Letter Grade
Discusses conservation and wildlife forensic science with a transdisciplinary approach. Topics include forensic science, wildlife crime, illegal wildlife trade, and bushmeat trade; ecotoxicology, and the use of plants to harm humans, livestock, or wildlife.

WIS 6306 Applied Wildlife Forensic Genetics 3 Credits
Grading Scheme: Letter Grade
Provides the student with understanding of forensic genetics applied to wildlife conservation, DNA distribution in populations, mechanisms for evolutionary change, population genetics in solving forensic problems, genetic markers in forensics, and DNA utilization to investigate crimes against endangered and threatened species. Will prepare students for the Forensic Genetics Capstone course.
Prerequisite: VME 6573.

WIS 6421 Wildlife Toxicology: The Ecohealth Perspective 3 Credits
Grading Scheme: Letter Grade
Provides a global assessment of toxicological stressors, including pesticides, environmental contaminants, and other emerging chemical threats, and reviews the impact on wildlife, through an ecohealth perspective. Outlines the physiological and pathological impacts of toxins in wildlife as it relates to the investigative process for wildlife forensics.

WIS 6425 Carrion Ecology and Evolution 3 Credits
Grading Scheme: Letter Grade
Carrion Ecology and Evolution includes a range of organisms including molecular, bacterial, fungal, invertebrate, and vertebrate communities. Intra interspecific interactions related to population biology, community ecology, processes that manifest into habitats and ecosystems will be addressed. A multidisciplinary view of organisms will provide the basis for understanding decomposition.

WIS 6455 Wildlife Population Ecology 3 Credits
Grading Scheme: Letter Grade
Rigorous background in population analysis covering population growth and regulation, species interactions, life-history theory, and population viability analysis.

WIS 6466 Wildlife Population Modeling 3 Credits
Grading Scheme: Letter Grade
Theory and applications of life tables, age, and stage-structured matrix population models. Sensitivity analysis and analysis of life table response experiments. Unstructured population models.
Prerequisite: one course in calculus or linear algebra; one course in basic or popular ecology.

WIS 6468C Pattern and Process in Landscape Ecology 3 Credits
Grading Scheme: Letter Grade
Exploration of applied and quantitative methods to explore links between landscape patterns and processes.

WIS 6525 Environmental Interpretation 3 Credits
Grading Scheme: Letter Grade

WIS 6544 Administration in Natural Resources 3 Credits
Grading Scheme: Letter Grade
Natural resource agency administration primer in budgets, personnel management, program development, leadership, and strategic planning.

WIS 6556 Trade in Wild Resources 3 Credits
Grading Scheme: Letter Grade
Provides an overview of legal and illegal wildlife and plant trade, and global issues as related to CITES regulation and legislation and other international agreements. Covers species threatened by illegal activity and emphasizes efforts to combat elicit wildlife and plant activity, including successes and failures of current laws and legislation.

WIS 6557 International Wildlife Conservation Law, Policy and Ethics 3 Credits
Grading Scheme: Letter Grade
Upon successful completion of the course, students will understand the complexity of the international legal structure and be able to identify the organizations tasked with developing and enforcing international wildlife laws. In addition, students will gain skills necessary to identify the ethical and cultural concerns complicating solutions to conservation issues.

WIS 6558 Introduction to U.S. Wildlife Law, Policy & Ethics 3 Credits
Grading Scheme: Letter Grade
Upon successful completion of this course students will possess a thorough understanding of the U.S. legal system governing fish and wildlife conservation as it relates to wildlife management and will develop the skills necessary to analyze the complex stakeholder motivations affecting U.S. wildlife conservation policies from multiple perspectives.

WIS 6559 Contemporary Issues in Wildlife Protection and Conservation 3 Credits
Grading Scheme: Letter Grade
Provides students with an understanding of the fundamental concepts of animal protection, as well as social, ethical, and legal issues involving animal management. Students will have learned conservation methodologies and practices, wildlife management theories and techniques, applied ecology, and regulation of wildlife populations.

WIS 6561 Wildlife Crime Scene Processing 3 Credits
Grading Scheme: Letter Grade
Provides a detailed understanding of forensic science and medicine and how to properly document and process a crime scene where wildlife may be the victim, or possibly the perpetrator. Focus is on evidence recognition and handling as well as techniques for the improvisation of crime scene processing equipment under field conditions.

WIS 6563 Wildlife Forensic Pathology 3 Credits
Grading Scheme: Letter Grade
Examine the pathology and pathogenesis of infectious and non-infectious diseases, traumatic injury, and poisoning that are a feature of wildlife forensic cases. Recognition of aspects of gross and histopathological pathology and correlate changes with clinical pathology and other data.
Understand infectious agents and involvement in the production of pathological lesions.

WIS 6576 Human and Wildlife Conflict 3 Credits
Grading Scheme: Letter Grade
Introduces issues of human and wildlife conflict both in historical context and current conservation. Explore solutions, including innovative and traditional agricultural practices, hunting and tourism as potential means of offsetting the cost of wildlife damage, and policy development at the local, regional, and national or international levels.

WIS 6578 Human Dimensions of Biological Conservation 3 Credits
Grading Scheme: Letter Grade
Interdisciplinary overview of theory and practice of conservation education, communication, and integrated resource management using local and international models.
Women's Studies

WST 5933 Proseminar in Women's Studies 3 Credits
Grading Scheme: Letter Grade
Proseminar (seminar that prepares you for more advanced work)
introducing graduate students to Women's Studies scholarship. Overview
of feminist thought, interdisciplinary research, and feminist practice.
Students are introduced to scholars in the field, and learn how to design
and implement an independent research project appropriate to Women's
Studies.

WST 6004 Feminist Methods in Research and Scholarship 3 Credits
Grading Scheme: Letter Grade
Provides graduate training covering a range of qualitative and
quantitative research methods for giving voice to the diversity of
women's experiences and those of understudied and marginalized
populations, making visible the invisible and undercounted aspects
of people's lives and studying intersectionality. Includes overview of
feminist critiques of science and epistemologies.
Prerequisite: None. Open to all graduate students in all colleges.

WST 6348 Ecofeminism 3 Credits
Grading Scheme: Letter Grade
Holistic framework for understanding connections among environmental,
feminist, and social justice issues. Critical analysis of positions within
ecofeminist theory.

WST 6508 Advanced Feminist Theory 3 Credits
Grading Scheme: Letter Grade
Introduction to contemporary theoretical ideas in feminist thought. Often
taught with a common theme, in and across disciplines.
Prerequisite: Graduate-level course in feminist theory or equivalent.

WST 6905 Independent Study 1-3 Credits, Max 6 Credits
Grading Scheme: Letter Grade
Independent reading or research under guidance.
Prerequisite: consent of instructor and department chair; and 1 women's
studies course, or course that counts for women's studies.

WST 6935 Special Topics in Women's Studies 1-3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Selected topics in gender and women's studies, emphasizing new
knowledge production and contributions in feminist scholarship.
Examines a specific topic, a major figure, or a current problem in more
depth than is regularly possible in a more general course.

WST 6936 Feminist Challenges to Disciplinary Paradigms 3 Credits, Max
6 Credits
Grading Scheme: Letter Grade
Examines how feminist scholarship can transform traditional disciplines
and bodies of knowledge. Acquaints students with the major feminist
challenges to ways of thinking in one or more fields of study. Such ways
of thinking can include theory, methodology, disciplinary assumptions,
and/or applications.

WST 6946 Internship in Applied Women's Studies and Gender Research
1-3 Credits, Max 6 Credits
Grading Scheme: S/U
Practical experience in community. Internship with local agency, group, or
business in women's issues.
Prerequisite: permission of program director.

WST 6957 International Studies in Women's Studies and Gender
Research 1-6 Credits, Max 12 Credits
Grading Scheme: S/U
International Studies in Women's Studies and Gender Research
Prerequisite: admission to approved study abroad program and
permission of department.

WST 6971 Research for Master's Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master's Thesis

Writing Program

ENC 5319 Scholarly Writing for Publication 1-3 Credits
Grading Scheme: Letter Grade
Focuses on research reports, synthesizing academic literature, and
presenting research to diverse audiences. Grouped by discipline or
methodology, students transform research into publishable papers,
drafting and revising their work with instructor and peer feedback.

ENC 5931 Special Topics in Rhetoric and Writing 1-3 Credits, Max 6
Credits
Grading Scheme: Letter Grade
Designed to advance students' ability to write in specific genres and to
develop their understanding of special topics related to the field. Specific
sections tailored to the expertise of the faculty members teaching the
course.
Zoology

BOT 6726C Principles of Systematic Biology 4 Credits
Grading Scheme: Letter Grade
Theory of biological classification, taxonomy, nomenclature, and phylogenetics. Discussion of issues in systematic biology including species concepts and reticulate evolution. Laboratory experience in phylogenetic methods, including parsimony, maximum likelihood, Bayesian inference, divergence time estimation, and ancestral state reconstruction.

PCB 5307C Limnology 4 Credits
Grading Scheme: Letter Grade
Biological, chemical, and physical dynamics of inland waters.
Prerequisite: PCB 4044C, CHM 2046.

PCB 5415C Behavioral Ecology 4 Credits
Grading Scheme: Letter Grade
Theoretical and empirical bases for behavioral adaptations.
Prerequisite: ZOO 3513C, 4472C, PCB 4044C, 4674, or consent of instructor.

PCB 5615 Molecular Evolution and Systematics 4 Credits
Grading Scheme: Letter Grade
Patterns and processes of change at the molecular level in populations, species, and higher taxonomic groups, and their systematic implications.
Prerequisite: PCB 3063, graduate standing, or consent of instructor.

PCB 6049 Seminar in Ecology 1-3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Rotating seminar: various topics in ecology.

PCB 6377C Physiological Ecology of Vertebrates 4 Credits
Grading Scheme: Letter Grade
Physiological mechanisms that influence distribution and ecological relations, water conservation, and energy exchange in vertebrates.
Prerequisite: course in physiology.

PCB 6447C Community Ecology 4 Credits
Grading Scheme: Letter Grade
The evolutionary ecology of communities; conceptual and quantitative approaches to community structure; statistics independent projects.
Prerequisite: PCB 4044C or equivalent, and consent of instructor.

PCB 6695 Seminar in Evolutionary Biology 1 Credit, Max 5 Credits
Grading Scheme: Letter Grade
Current thinking. New topic each time offered. Recently published book or symposium proceedings on newly emerging research theme. Supplementary material drawn from evolutionary biology journals. Directed readings.
Prerequisite: PCB 4674.

ZOO 5115C Vertebrate Paleontology 3 Credits
Grading Scheme: Letter Grade
Evolutionary history of major vertebrate groups, emphasizing the principles of prehistoric investigations.
Prerequisite: ZOO 3713C.

ZOO 5486C Mammalogy 4 Credits
Grading Scheme: Letter Grade
Study of the ecology, natural history, behavior, and evolutionary history of mammals.
Prerequisite: ZOO 2203C.

ZOO 6005 Integrative Principles of Zoology 1 4 Credits
Grading Scheme: Letter Grade
Integrative approach to fundamental principles of ecology, evolution, and comparative biology.

ZOO 6308 Dynamic Optimization Modeling in Behavioral and Evolutionary Ecology 3 Credits
Grading Scheme: Letter Grade
Powerful and simple techniques for formalizing hypotheses. Appropriate to address questions of relative fitness of alternative choices or strategies. Instruction in computer programming and dynamic modeling.

ZOO 6406 Biology of Sea Turtles 3 Credits
Grading Scheme: Letter Grade
All aspects of biology of sea turtles and how their biology affects their conservation.

ZOO 6456C Ichthyology 4 Credits
Grading Scheme: Letter Grade
Ichthyology
Prerequisite: ZOO 2203C.

ZOO 6542 Nutritional Ecology 3 Credits
Grading Scheme: Letter Grade
Relations, water conservation, and energy exchange in vertebrates.

ZOO 6681 Advanced Topics in Zoology 1-3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Individual Studies

ZOO 6728 Special Topics in Zoology 1-4 Credits, Max 15 Credits
Grading Scheme: Letter Grade
Special Topics in Zoology

ZOO 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

ZOO 6920 Zoology Colloquium 1 Credit, Max 9 Credits
Grading Scheme: S/U
Readings and oral presentations on general topics in zoology. Discussions with eminent scientists in the discipline.

ZOO 6927 Special Topics in Zoology 1-4 Credits, Max 15 Credits
Grading Scheme: Letter Grade
Special Topics in Zoology

ZOO 6931 Seminar in Marine Turtle Biology 1-2 Credits, Max 5 Credits
Grading Scheme: Letter Grade
Advanced topics in biology and conservation of marine turtles.
Prerequisite: consent of instructor.

ZOO 6939 Seminar in Animal Behavior 1-3 Credits, Max 9 Credits
Grading Scheme: Letter Grade
Advanced topics in animal behavior.
Prerequisite: graduate standing or consent of instructor.

ZOO 6971 Research for Master’s Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master’s Thesis

ZOO 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been admitted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ZOO 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation
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Assistant Professor
Chambers, Alan H.
Assistant Professor
Horticultural Sciences
Chan, Edward K.
Professor
Chan-Olmsted, Sylvia M.
Professor
Journalism and Communications
Chandola, Nitin
Assistant Engineer
Mechanical and Aerospace Engineering
Chandran, Vijayendran
Research Assistant Professor
Chang, Jia
Assistant Professor
Chang, Lung-Ji
Professor
Chaparro, Jose Xavier
Associate Professor
Horticultural Sciences
Chapman, Frank A.
Associate Professor
Chapman, Frank A.
Associate Professor
Forest Resources and Conservation
Chapman, Lindsey Anne
Clinical Assistant Professor
Special Education, School Psychology and Early Childhood Studies
Chase, Carlene Ann
Associate Professor
Chase, Carlene Ann
Associate Professor
Horticultural Sciences
Chase, Christine D.
Professor
Chase, Christine D.
Professor
Horticultural Sciences
Chauhan, Ashvini
Assistant Professor
Soil and Water Sciences
Chebel, Ricardo C.
Associate Professor
Veterinary Medicine
Chen, Huan
Assistant Professor
Journalism and Communications
Chen, Jianjun
Professor
Chen, Jianjun
Professor
Horticultural Sciences
Chen, John Sze-Chi
Assistant Professor
Management
Chen, Shigang
Professor
Computer and Information Science and Engineering
Chen, Sixue
Professor
Chen, Sixue
Professor
Biology
Chen, Xinguang
Professor
Epidemiology
Chen, Youping
Associate Professor
Mechanical and Aerospace Engineering
Chen, Yunmei
Distinguished Professor
Mathematics
Cheng, Hai Ping
Professor
Physics
Cheng, Hsing
Professor
Information Systems and Operations Management
Cheng, Ting-Yuan
Assistant Professor
Epidemiology
Cheng, Zhiyong
Assistant Professor
Cheng, Zhiyong
Assistant Professor
Food Science and Human Nutrition
Cheong, JeeWon
Associate Professor
Health Education and Behavior
Professor
Clark, David G.
Professor
Horticultural Sciences
Clark, David J.
Associate Professor
Clark, David J.
Associate Professor
Clark, David J.
Associate Professor
Medicine
Clark, Mark W.
Associate Professor
Clark, Mark W.
Associate Professor
Soil and Water Sciences
Clark, Michael
Other
Theatre and Dance
Clark, Nancy M.
Associate Professor
Architecture
Clark-Curtiss, Josephine Elliott
Professor
Clarke, Mysha
Assistant Professor
Clarke, Mysha
Assistant Professor
Forest Resources and Conservation
Classen, Sherrilene
Professor
Classen, Sherrilene
Professor
Occupational Therapy
Clouser, Rodney L.
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Food and Resource Economics
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Associate Professor
Coady, Maria R.
Associate Professor
Teaching and Learning
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Curator
Anthropology
Coche, Roxane Jeanne Lilia
Assistant Professor
Journalism and Communications
Coers, Natalie
Other
Agricultural Education and Communication
Coffey, Amy Jo
Associate Professor
Coffey, Amy Jo
Associate Professor
Journalism and Communications
Cogle, Christopher Ramin
Professor
Cohen, Donald M.
Professor
Dentistry
Cohen, Donna L.
Associate Professor
Architecture
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Professor
Cohen, Matthew J.
Professor
Forest Resources and Conservation
Cohen, Ronald A.
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Cohn, Martin J.
Professor
Coker, Eric Stephen
Clinical Assistant Professor
Environmental and Global Health
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Research Assistant Professor
Coleman King, Chonika Ceptember
Assistant Professor
Teaching and Learning
Colina, Coray Mariu
Professor
Colina, Coray Mariu
Professor
Chemistry
Collier, Charles Wade
Professor
Law
Collings, Peter F.
Associate Professor
Anthropology
Collins, Angela S.
Assistant Professor
Forest Resources and Conservation
Collins, James Forrest
Professor
Collins, James Forrest
Professor
Food Science and Human Nutrition
Colon, Elayne P.
Associate Scholar
Special Education, School Psychology and Early Childhood Studies
Colquhoun, Thomas A.
Assistant Professor
Colquhoun, Thomas A.
Assistant Professor
Environmental Horticulture
Concannon, Patrick J.
Professor
Concannon, Patrick J.
Professor
Genetics and Genomics
Conesa Cegarra, Ana
Professor
Microbiology and Cell Science
Conklin, John
Associate Professor
Mechanical and Aerospace Engineering
Conley, Richard Steven
Associate Professor
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Connaughton, Daniel P.
Professor
Tourism, Recreation, and Sport Management
Conner, Bobbi Jo
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Conner, Larry Michael
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Conrad, Kirk Peter
Professor
Conrad, Kirk Peter
Professor
Physiology and Functional Genomics (IDP)
Conroy, Maureen Almaz
Professor
Consolazio, Gary R.
Professor
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Construction Management
Cook, Robert L.
Professor
Cook, Robert L.
Professor
Public Health and Health Professions
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Marketing
Cooke, Kirsten L.
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Coombes, Stephen A.
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Cooper, Brian Y.
Professor
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Environmental Engineering Sciences
Correia, Joel Edward
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Correll, Melanie J.
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Costin, Aaron M.
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Cottler, Linda B.
Professor
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Epidemiology
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Geological Sciences
Court, Christa
Assistant Scientist
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Food and Resource Economics
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Food Science and Human Nutrition
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Wildlife Ecology and Conservation
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Cuda, James Paul
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Dede, Duane E.
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Defrance, Susan D.
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Defrance, Susan D.
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DeGennaro, Vincent
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Dehoff, Rhonda Marsha
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Dehoff, Rhonda Marsha
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Deitch, Matthew
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Deitch, Matthew
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Delgado, Alejandro
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Digital Worlds
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Demopoulos, Amanda
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Dempere, Luisa Amelia
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Denagamage, Thomas N.
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Denard, Carl Andre
Assistant Professor
Chemical Engineering
Deng, Zhanao
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Denslow, Nancy D.
Professor
Denslow, Nancy D.
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Biochemistry and Molecular Biology
Derendorf, Hartmut C.
Distinguished Professor
Desaeger, Johan
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Deumens, Erik
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Chemistry
Devidas, Meenakshi
Research Professor
Devine, Darragh P.
Professor
Devine, Darragh P.
Professor
Psychology
Devkota, Pratap
Assistant Professor
Agronomy
Dewdney, Megan M.
Associate Professor
Plant Pathology
Dewitt, Bon A.
Associate Professor
Dewitt, Bon A.
Associate Professor
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<td>Dhillon, Braham</td>
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<td>Dixit, Purushottam D.</td>
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<td>Dobre, Virginia L.</td>
<td>Associate Professor</td>
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<td>Dicke, John M.</td>
<td>Assistant Professor</td>
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<td>Dickson, Donald W.</td>
<td>Professor</td>
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<td>Diehl, David Christopher</td>
<td>Family, Youth and Community Sciences</td>
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<td>DiGenaro, Peter</td>
<td>Assistant Professor</td>
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<td>Associate Professor</td>
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<td>Assistant Professor</td>
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<td>Assistant Professor</td>
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<td></td>
<td>Ding, Mingzhou</td>
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<td></td>
<td>Dinglasan, Rhoel David</td>
<td>Associate Professor</td>
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<tr>
<td></td>
<td>Dinglasan, Rhoel David</td>
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Logan, William
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<td>Lucky, Andrea</td>
<td>Associate Professor</td>
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<td>Agricultural Education and Communication</td>
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<td>Luo, Yi</td>
<td>Assistant Professor</td>
<td>Design, Construction, and Planning</td>
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<td>Soil and Water Sciences</td>
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<td>Assistant Professor</td>
<td>Human Development and Organizational Studies in Education</td>
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<td>Macdonald, Gregory E.</td>
<td>Professor</td>
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<td>Mack, Joseph M.</td>
<td>Professor</td>
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<td>Associate Professor</td>
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<td>Professor</td>
<td>Veterinary Medicine</td>
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<td>MacSuga-Gage, Ashley</td>
<td>Clinical Assistant Professor</td>
<td>Special Education, School Psychology and Early Childhood Studies</td>
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<td>Mai, Volker</td>
<td>Associate Professor</td>
<td>Epidemiology</td>
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Papp, Bernadett
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<th>Title</th>
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<td>Papp, Bernadett</td>
<td>Assistant Professor</td>
<td>Dentistry</td>
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<td>Industrial and Systems Engineering</td>
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<td>Pharmaceutical Outcomes and Policy</td>
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<td>Patrick, Erin E.</td>
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<td>Other</td>
<td>Urban and Regional Planning</td>
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<td>Patterson, Richard S.</td>
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<td>Entomology and Nematology</td>
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<tr>
<td>Payne, Jack M.</td>
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<tr>
<td>Pearlman, Lauren</td>
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<td>Pearson, Brian J.</td>
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Ren, Fan  
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Shen, Chiayi
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Sieving, Kathryn E.
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Sigmund, Wolfgang Michael
graduate
<table>
<thead>
<tr>
<th>Department</th>
<th>Name</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant Pathology</td>
<td>Small, Parker A.</td>
<td>Professor</td>
</tr>
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<td>Smartt, Chelsea T.</td>
<td>Associate Professor</td>
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<tr>
<td>Entomology and Nematology</td>
<td>Smidt, Samuel John</td>
<td>Assistant Professor</td>
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<td></td>
<td>Smith, Barbara K.</td>
<td>Research Assistant Professor</td>
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<td>Smith, Benjamin B.</td>
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<td>Smith, Colin T.</td>
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<td>Smith, Craig</td>
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<td>Smith, Daniel A.</td>
<td>Professor</td>
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<td>Smith, Hugh A.</td>
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<td>Smith, Lora L.</td>
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<td>Smith, Shon D.</td>
<td>Clinical Assistant Professor</td>
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<td>Smith, Sondra Lori</td>
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<td>Smith-Bonahue, Tina M.</td>
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<td>Smocovitis, Vassiliki B.</td>
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<td>Smocovitis, Vassiliki B.</td>
<td>Professor</td>
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Professor
Biology

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Stefanou, Spiro E.
Professor
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<th>Department</th>
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<td>Food and Resource Economics</td>
<td>Stein, Taylor Verne</td>
<td>Professor</td>
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<td>Steiner, Ruth Lorraine</td>
<td>Professor</td>
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<td>Urban and Regional Planning</td>
<td>Stelinski, Kirsten Suzanne</td>
<td>Associate Professor</td>
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<td>Stelinski, Lukasz Lech</td>
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<td>Art and Art History</td>
<td>Stenner, Jack E.</td>
<td>Associate Professor</td>
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<td>Tourism, Recreation, and Sport Management</td>
<td>Stepchenkova, Svetlana O.</td>
<td>Associate Professor</td>
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<td>Steves, Bruce R.</td>
<td>Professor</td>
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<td>Physiology and Functional Genomics (IDP)</td>
<td>Steverson, Delia Dennise</td>
<td>Assistant Professor</td>
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<td>English</td>
<td>Stewart, Gregory R.</td>
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<td>Stingl, Ulrich</td>
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<td>Stitt, Greg M.</td>
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<td>Electrical and Computer Engineering</td>
<td>Stofer, Kathryn Anne</td>
<td>Research Assistant Professor</td>
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<td>Stone, Amy E.</td>
<td>Clinical Assistant Professor</td>
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<td>Music</td>
<td>Stoner, Kristen Lia</td>
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<tr>
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<td>Stoppel, Whitney Leigh</td>
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<td>Strauss, Sarah L.</td>
<td>Assistant Professor</td>
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<td>Soil and Water Sciences</td>
<td>Streit, Wolfgang Jakob</td>
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<td>Journalism and Communications</td>
<td>Strekalova, Yulia A.</td>
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<td>Stuchal, Leah D.</td>
<td>Research Assistant Professor</td>
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<td>Stutte, Gary W.</td>
<td>Associate Professor</td>
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Horticultural Sciences
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